

**Contested Urban Waterscapes:
Water, Power and Urban Fragmentation in Medellín,
Colombia**

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ABSTRACT

This research explores how access to water has become a crucial terrain over which market-driven logics are both consolidated and contested. Drawing on case study research conducted in Medellín, Colombia, this study investigates the paradoxical situation of rapid emergence of the city's water company as a *multilatina* (regional multinational company) on the one hand, and the increasing number of households disconnected from the formal water supply networks particularly in low-income areas, on the other hand. By bringing together work on urban political ecology and neoliberalisation of nature, this dissertation illustrates not only how neoliberal principles constitute uneven urban waterscapes based on particular arrangements of nature, society and urban infrastructure, but also how the materiality of water challenges these new socio-natural configurations. Going beyond mainstream assumptions that narrowly interpret water disconnection as a result of inability to pay or as a technical-managerial problem, I argue that a complex interplay between water scarcity discourses, notions of citizenship and technological infrastructures deployed by the water company has become utterly instrumental to the production and reproduction of water inequalities. For disconnected households in particular, much is at stake as these socio-nature configurations determine not only how their lives will be affected but also how alternatives and solutions can be mobilized and implemented.

A conceptual triad of nature, society and urban infrastructure emerging through the simultaneous process of commodification and decommodification is introduced to address two key questions that will successively structure my analysis. First, to what extent have neoliberal reforms changed the management and ideological practices of Medellín's water utility company, and with what economic, social, spatial and environmental implications? Second, how do disconnected households perceive, experience and resist those transformations and how do they employ particular practices to secure access to water on an everyday basis?

A combination of historical and multi-scale analysis is deployed as a methodological tool to investigate the effects of commercialization on intensifying Medellín's water inequalities. An historical perspective illustrates how the form and shape of the urban waterscape reflects the profound changes in the managerial and ideological interests of the water company while a multi-scale analysis provides insights into how relations of power are enacted by looking into actor's diversified strategies to access and gain control over the flows of water. The research methods used to gather the information for this study involved the analysis of archives, official publications and

media material of the Water Company. This is combined with primary data derived from in-depth and semi-structured interviews, household surveys, local media reports and participant observation.

This research seeks to make a contribution to the current academic debates over neoliberalism in urban geography by investigating how public companies operating under market-oriented reforms deploy particular material, discursive and institutional practices to produce and reproduce water inequalities. Furthermore, it seeks to advance understandings of the materiality of water in order to find out how water's biophysical, spatial, symbolic and discursive aspects can come to influence everyday practices in low-income areas and contribute to current debates on alternatives to commercialization.

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ABBREVIATIONS AND ACRONYMS

ANAPO	Alianza Nacional Popular (National Popular Alliance)
BIRF	Banco Internacional de Reconstrucción y Fomento
BWB	Berliner Wasserbetriebe
CENS	Centrales Eléctricas de Norte de Santander (North Santander Power Stations)
CESCR	United Nations Committee on Economic, Social and Cultural Rights
CHEC	Central Hidroeléctrica de Caldas (Caldas Hydroelectric Power Plant)
CJL	Corporación Jurídica Libertad
CNDAV	Comité Nacional en defensa del Agua y de la Vida (National Committee for the Defense of Water and Life)
COP	Colombian peso
CRA	Comisión Reguladora de Agua Potable (Regulatory Commission for Water and Sanitation)
CREG	Comisión Reguladora de Energía y Gas (Regulatory Commission for Electricity and Gas)
DANE	Departamento Administrativo Nacional de Estadística (National Administrative Department for Statistics)
EADE	Empresa Antioqueña de Energía (Antioquia Energy Company)
EDEQ	Empresa de Energía del Quindío (Quindío Energy Company)
Eegsa	Empresa de Electricidad de Guatemala
EMVARIAS	Empresas Varias de Medellín S.A. E.S.P.
EPM	Empresas Públicas de Medellín (previously known as EE.PP.M.)
GDP	Gross Domestic Product
HET	Empresa Hidroecológica del Teribe S.A. (Teribe Hydroecological Enterprise)
HV	Habilitación de Viviendas (rehabilitation of homes)
IDB	Inter-American Development Bank
IDPs	Internally Displaced People
IIR	Institute for International Research
IMF	International Monetary Fund
IVR	Interactive Voice Response
IWRN	Inter-American Water Resources Network
JACs	Juntas de Acción Comunal (communal councils)
km	Kilometres
KW	Kilowatts

MAMM	Museo de Arte Moderno de Medellín (Museum of Modern Art of Medellín)
MDGs	Millennium Development Goals
MEGA	Meta Grande y Ambiciosa (Great and Ambitious Strategic Goal)
MTA	Mesas Técnicas de Agua (Communal Water Councils)
MW	Megawatts
NGOs	Non-governmental Organizations
OEA	Organización de Estados Americanos (Organization of American States)
OHCHR	Office of the United Nations High Commissioner for Human Rights
OSE	Obras Sanitarias del Estado (State Sewage and Water Works Company of Uruguay)
PSIRU	Public Services International Research Unit
SISBÉN	Sistema de Identificación de Potenciales Beneficiarios de Programas Sociales
SMP	Sociedad de Mejoras Públicas
SSPD	Superintendencia de Servicios Públicos Domiciliarios (Superintendence for Public Utilities)
TIC	Tecnología de la Información y las Comunicaciones (Information and Communication Technology, ICT)
TICSA	Tecnología Intercontinental S.A
TNI	Transnational Institute
UFW	Unaccounted for Water
UNDP	United Nations Development Program
UNEP	United Nations Environmental Program
UPE	Urban Political Ecology
US	American dollar
WB	World Bank
WHO	World Health Organization
WUF7	World Urban Forum, Seventh Session

CHAPTER 1

Contested Urban Waterscapes: Medellín, Colombia

1.1 Introduction

When this research began in 2010, Medellín's public multi-utility company, *Empresas Públicas de Medellín* (EPM) experienced an important moment of transformation. EPM, a company that supplies water and sewage, electricity, natural gas, telecommunication services and solid waste collection to an estimated population of 3,3 million people in the metropolitan area (Alcaldía de Medellín, 2011) launched itself into a path of rapid integration into the Latin America service market. It is now a leading energy distributor in Central America after taking over the electricity utilities in Panama, El Salvador and Guatemala (EPM, 2013). EPM has also acquired the operation contracts of three water treatment plants in Mexico, a wind park in Chile, and has undertaken a controversial fusion with the Swedish telecommunication company Millicom (El Colombiano, 18 July 2013). Outside of Colombia, the company behaves as a private multinational, operating in a highly competitive environment with a capital structure increasingly transnationalized. This geographical expansion became a significant turning point for consolidating EPM as one of the most "successful" *multilatinas*¹ (regional multinational companies) in the sphere of basic public services.

Such transformation has been a source of pride and admiration for many inhabitants of Medellín who have witnessed how a public company owned by the municipality can deliver good quality services while at the same time being profitable, low in debts and expanding successfully into other geographical areas. One of the aspects that has produced greatest excitement during this transnationalization phase is EPM's annual transfers to the municipality. The company has contributed significantly to Medellín's development over the years by transferring as much as 30 per cent of its annual revenues to the municipality for social investment programs². As a result, EPM has become a key actor not only in the provision of basic public services, but also in the urban transformation processes (Coupé et al., 2012). Today, besides the provision of basic public services, the company is actively involved in the maintenance of public

¹ According to Cassanova and Fraser (2009:1) *multilatinas* are "firms that leveraged domestic positions to expand their operations throughout Latin America". For Cuervo-Cazurra (2008) these firms have emerged as a result of structural reforms in their own countries, which press them to grown at the international level.

² Municipal Accord 69 of 1997 (Article 13).

fountains and parks, reforestation programs, the sponsoring of cultural events and urban development projects. This all to the extent that its visual presence has significantly expanded across the city.

Paradoxically, while EPM successfully expands commercial operations into other geographical areas and registers significant increment in its total revenues, which for 2013 amounted to COP\$ 12,5 billion (US\$ 4,1 million) (El Colombiano, 26 February 2014; EPM, 2013), around 13 per cent of the households in Medellín report being disconnected from the formal water supply network. Although EPM claims 99 per cent coverage of water supply (EPM, 2013), official statistics estimate that in 2011, 46,166 households are disconnected due to non-payment of bills (21,757 are suspended and 24,409 are cut off)³ (Personería de Medellín, 2011). Additionally, 29,696 households are largely excluded from the city's infrastructure network because their claims to land tenure remain illegitimate as a consequence of being located in the so-called "high-risks zones" (Alcaldía de Medellín, 2012a). While the commodification of water has become an integral part of the strategy of capital accumulation of EPM, many low-income households are left without access to this essential resource. This dissertation builds on the necessity to comprehend why water inequalities are increasing in Medellín despite the successful consolidation of EPM as a *multilatina*.

However, my analysis goes even further and questions: How do *desconectados* (disconnected households) secure access to water on a daily basis in an urban waterscape that is deeply neoliberalised? While doing fieldwork, I observed that disconnection triggered the development of a complex set of informal, and often illegal socio-technical arrangements, in which low-income households were forced to decommodify the flows of water by not only mobilizing pipes, tubes, taps and meters, but also neighbours, family, friends, *fontaneros* (local plumbers) and *los muchachos* (paramilitaries). These socio-technical arrangements were highly shaped by the different types of water *desconectados* used. Whether water was raw/potable, safe/unsafe, scarce/abundant, legal/illegal or technically differentiated as a physical loss/commercial loss⁴ came to play a critical role in the ways in which low-income households secure access to water on a daily basis and subvert the neoliberal visions of the water company.

³ According to the length of disconnection, EPM classifies its customers in two categories: *Suspended* (non-payment of bills between a period of two to seven months) and *cut off* (non-payment of more than seven monthly bills). According to the nature of disconnection, this research classifies *desconectados* in two categories: *Disconnected for non-payment* and *disconnected for illegitimate land tenure status*.

⁴ Technically, EPM differentiates the water that is produced but not billed to consumers in two categories (i) water lost through leakages in the distribution networks (physical losses) or (ii) meter inaccuracies and illegal connections (commercial losses). This water being lost is referred as unaccounted for water (UFW).

The simultaneous commodification and decommodification of water in Medellín has become materially expressed in the emergence of a complex informal landscape that stands in sharp contrast to the infrastructure networks built by the multi-utility company (see Figure 1). By following the flows of water through the informal landscape, I also found out that securing access to water is deeply political, because it embodies not just struggles over the material resource, but also over citizenship recognition. Acknowledging this aspect is particularly important as everyday practices deployed by *desconectados* to secure access to water are currently poorly understood or addressed by the municipality and EPM, a lacunae that has profound impacts on deepening water inequalities in the city.

Figure 1 The simultaneous commodification and decommodification of water in Medellín's urban waterscape



Source: Photograph by Marcela López, 2011.

The problem of disconnection has not gone unnoticed by some sectors of the population. I found social movements, particularly, the *Mesa Interbarrial de Desconectados* (Roundtable of Disconnection) demanding concrete solutions to the problem of disconnection and struggling to find alternative solutions to the current water supply systems based on principles of justice and equality. As a result of the mounting

pressure, EPM and the municipality have deployed different programs to address the overall disconnection situation. First, the municipality introduced in 2009 the program *Litros de Amor* ("litres of love"), a basic volumetric allocation of 2,5 m³/person/month free of charge. Although, it is recognized that the initiative represents a significant effort to progressively realize the right to water and to reduce inequalities in terms of access, it might obscure one of the darker sides of water provision in the city as the minimum amount of water offered by the program can quickly turn into a maximum for low-income households. Second, EPM initiated in 2011 a pilot project for prepaid water. Although this technology is presented as a socially and ecological "progressive" policy and as an "innovative" device to address inequalities in the city (El Colombiano, 9 March 2013; Semana Sostenible, 2014), its effects in the long-term are questionable as EPM avoids the political implications of disconnecting households that are too poor to pay their bills by giving them the "freedom" to self-disconnect from the network when they run out of money. This research attempts to examine the implications and contradictions of both programs for reducing water inequalities in Medellín.

Dominant narratives emanating from the municipality and the multi-utility company tend to simplistically interpret disconnection for non-payment as a problem rooted in widespread poverty (EPM, 2011; Nuñez et al., 2011) while inability to extend infrastructure networks to unserved areas is justified by their illegal land tenure status or technical difficulties arising from the topographic conditions of the city's periphery. These mainstream discourses have largely neglected both the complex realities of water inequalities and the context in which they are generated. This research seeks to disrupt these narratives by analysing to what extent the recent transformation of EPM into a *multilatina* contributes to reinforcing and deepening the already protracted conditions of social inequality by taking the case of water disconnection as the main empirical reference.

Existing academic research has primarily shown how private companies have systematically failed to provide affordable and accessible water services to the urban poor while making significant profits (Bakker, 2010a; Castro, 2008b; McDonald and Ruiters, 2005; Swyngedouw, 2004, 2007). Such failures have contributed to a growing scepticism towards the role of the private sector in water supply provision. As a result, many private companies have been forced to return the management of water services to public hands, a process commonly known as remunicipalisation (Hall et al., 2013; Pigeon et al., 2012). In Berlin, for example, privatization was reversed as the water company *Berliner Wasserbetriebe* (BWB) was sold by the private enterprise RWE to the city in May 2012 (Beveridge and Neumann, 2013). Another case is the infamous "Water War" in the Bolivian city of Cochabamba in 2000 where the American company Bechtel

was pressed to cancel a contract and return water supply services to the state-owned company SENAPA (Crespo et al., 2003; Perreault, 2006; Spronk et al., 2012).

Although privatization failures in the water supply sector are well documented, there has been relatively little attention given to the impacts of public companies running under market-oriented principles (for an exception, see McDonald, 2014). This form of entrepreneurial organization known as commercialization (Bakker, 2010a) is the most dominant form of public enterprise today (McDonald, 2014). It is less controversial than privatization and has not yet been sufficiently analysed in academic debates. Particularly little is known about the impacts of commercialization on changing modes of water supply and consumption. This research attempts to address this gap in the literature.

Thus, the recent and successful transformation of EPM into a *multilatina* provides an important moment to raise questions about the public character of the company and the role that the Municipality of Medellín plays as an “extra-economic” actor (Bridge, 2013). State-owned companies operating under private principles tend to blur the boundaries between the private and the public (McDonald, 2014; Spronk et al., 2014), thereby, generating confusion about what means “public” and who holds responsibility for the provision of public services. Therefore, conventional debates that centre on the binaries between public versus private are found inappropriate to capture the effects of these hybrid modes of water supply provision and the complex realities that (re)produce water inequalities in urban contexts. Additionally, little has been said about how disconnected households construct their own meanings of “public” as an alternative to neoliberal service reforms. This perspective is particularly important for understanding how low-income households make and imagine the provision of public services in an urban waterscape that is deeply neoliberalized.

With this in mind, I pursue two research questions that permit tracing the simultaneous process of commodification and decommodification of Medellín’s urban waterscape. The first question concerns the commodification process by exploring the impacts of state-owned companies operating under market-oriented logics on water supply provision. To what extent have the neoliberal reforms changed the management and ideological practices of Medellín’s water utility company, and with what economic, social, spatial and environmental implications? The second question focuses on the process of decommodification by uncovering how *desconectados* transform and challenge neoliberal ideals imposed by the water company and describing its institutional, discursive and material effects. How do disconnected households perceive, experience and resist EPM’s transformations and how do they employ particular practices to secure access to water on an everyday basis

This research argues, first, that the commercialization of the water company and its successful insertion into transnational networks of capital accumulation has constituted uneven urban waterscapes that are sustained by particular arrangements of nature, society and urban infrastructure. These arrangements are consolidated by a complex interplay between water scarcity discourses, ideals of citizenship and technological infrastructures that facilitates and sustains inequalities in access to water. Second, water comes to disrupt and alter these new nature, society and urban infrastructure configurations by refusing to become fully commodified. Therefore, I demonstrate that the materiality of non-human nature plays an important role in the ways that *desconectados* develop particular practices to secure access to water on a daily basis and subvert the neoliberal visions of the water company. However, these practices are substantially shaped not only by the biophysical and spatial characteristics of water itself, but also by how water is legally and technically differentiated by the company.

In sum, the simultaneous processes of commodification and decommodification have transformed water into a highly contested resource. Commercialization as a new form of neoliberal governance has dramatically changed legal frameworks and institutional reforms in ways that processes of accumulation are facilitated while the needs of low-income households are not being adequately addressed. The reconfiguration of these institutional arrangements (norms, rules and regulations) towards commercial principles entails not only the transformation of social and material configurations, but also the ways how water is interpreted and discursively presented (Bakker, 2003a; Swyngedouw, 2004). Inherent to these processes are power imbalances that (re)produce inequalities and injustices in the city (Kaïka and Swyngedouw, 2011). Following this line of inquiry, this dissertation provides an opportunity to expand in great detail how neoliberal interests, uneven power relations as well as struggles derived from diverse -and often antagonistic- meanings of nature operate on the ground through Medellín's contested urban waterscape.

1.2 Conceptualizing inequalities in a neoliberal urban waterscape

To capture the power relations and contradictions of Medellín's water supply provision, this research brings together work on urban political ecology (Gandy, 2002; Heynen et al., 2006; Kaïka, 2005; Swyngedouw, 2004) and neoliberalisation of nature (Bakker, 2005; Castree, 2008a, 2008b; Heynen et al., 2007). By engaging insights from both literatures, I deploy an analytical framework that is particularly useful in illuminating the contestations over control and access to water in urban waterscapes. Viewing these

contestations through the simultaneous processes of commodification and decommodification provides great insights into how neoliberal processes transform the relations between nature, society and urban infrastructure in uneven ways, and how low-income households contest these transformations.

Debates in urban political ecology (UPE) provide an important part of departure in exploring water inequalities in cities as they permit understanding how the metabolism and circulation of water in any city in the world is largely embedded in wider processes of political and economic interests. Centring on the importance of nature to urbanization, UPE scholars conceptualize urbanization as the process of bringing nature into the city by transforming it into a commodity and subsequently inserting it into structures of capital accumulation (Gandy, 2006; Kaïka, 2005; Swyngedouw, 2004). Consequently, the city becomes the outcome of a socio-natural process called urbanization, rather than a socio-technical one. This perspective challenges the prevailing city-nature dichotomy that allows cities to be seen as the antithesis of nature, and therefore, they have been traditionally perceived as anti-urban or unnatural.

Relying heavily on the work of Heynen, Kaïka and Swyngedouw (2006), this research examines nature in the city as a metabolic process. Building on Marx's conception of metabolism as a metaphor to analyse nature-society relations, these scholars deploy urban metabolism to trace the processes through which flows of resources are drawn into the city, transformed into commodities through human labour, and finally eliminated. An example of urban metabolism is the production of potable water and its subsequent standardization into cubic meters in order to facilitate its commodification. Thus, metabolism is perceived as a highly politicized and contested process in which social relations are continuously shaping urban flows. This process is infused with uneven relations of power as different actors mobilize urban metabolism to enhance certain environments while deteriorating others.

One way to approach the city and its contested metabolism is through the concept of waterscape, a constructed landscape that continuously changes and transforms by sustaining a complex assemble of institutional frameworks, discursive practices, technical choices and struggles over meanings that usually surpass a fixed scale (Budds and Hinojosa, 2012; Loftus, 2007; Perreault et al., 2012; Swyngedouw, 2004). The waterscape becomes a useful analytical tool to reconcile the nature-society opposition, as it approaches the metabolism of water not only as a physical, but also a social process. While flowing through the waterscape, water is not narrowly defined as a resource, a passive and politically neutral object without a sense of materiality. Rather, water becomes productively framed as "socio-nature" (Swyngedouw, 2004), which both shapes and becomes shaped by, uneven power relations inherent in the process of

urbanization. This conceptualization offers an alternative vantage point from which to evaluate how the flows of water through Medellín's urban waterscape become part of a strategy of capital accumulation, while at the same time sustain and deepen inequalities in access.

The metabolic process of bringing nature (water) into the city would be impossible to conceive without the development of urban infrastructure networks. Whilst these physical artifacts might appear as simple and invisible technical measures to effectively organize the continuous flow of water through the city, within the field of UPE, infrastructures are understood as instruments that embody power relations that go in line with a capitalist mode of production (Gandy, 2004). As urban infrastructure networks support the simultaneous circulation of flows of water and flows of capital, they become a productive field for understanding the way in which this double circulation constructs and reconstructs uneven urban waterscapes. This perspective echoes the argument pose by Stephen Graham and Simon Marvin (2001) in the *Splintering Urbanism* thesis, which states that the increasing fragmentation of urban infrastructure networks is primarily rooted on recent waves of neoliberal reforms.

Although Graham and Marvin's work is strongly rooted in the Western world by assuming the prevalence of a "modern networked city" of universal and equitable water supply services, their insights into splintering infrastructure find a solid ground in the case of water distribution in Medellín, as the city is equipped with efficient infrastructural networks that provide relative high coverage rates (except in the areas outside the urban perimeter where formal infrastructure is notably absent). The splintering urbanism argument becomes highly instructive for this study as it explores how the water supply networks turn more efficient for the purpose of capital accumulation and expansion while at the same time undergone a socio-technical rupture by pressing those households to leave the formal infrastructure network for reasons of non-payment. The company usually removes the conventional meters or pipes to force customers off the water network, or installs technological devices such as flow limiters, prepaid meters to reduce access.

Acknowledging the significant implications of neoliberalisation in the contemporary process of urban transformation, geographical scholarship on the neoliberalisation of nature (Bakker, 2010a; Castree, 2008a, 2008b; Heynen et al., 2007; Mansfield, 2008; McCarthy and Prudham, 2003) is well positioned to complement and deepen UPE work on water inequalities for several reasons: first, it approaches to neoliberalism as a variegated project (Bakker, 2010b). Second, it highlights the role of the state in facilitating resource mobilization and capital accumulation (Bridge, 2013). Third, it can better elucidate how nature's materiality poses a set of challenges,

opportunities and obstacles to certain neoliberal projects (Bakker, 2004; Castree 2007; 2010). However, despite the fact that cities have become a strategic geographical site for the articulation of a variety of neoliberal initiatives (Brenner and Theodore, 2002), urban nature has remained largely marginal in the literature of neoliberalisation of nature. The work of UPE on water inequalities provides a strong foundation for the neoliberalisation of nature to branch in urban contexts.

The commercialization of EPM is an example of the neoliberalisation of nature, a field of study undertaken by critical geographers to analyse how neoliberal policies are connected in practice to the biophysical world (Castree, 2010; Heynen et al., 2007, Mansfield, 2008). Differing from privatization, which involves organizational change (transfer of management from public to private control); commercialization involves institutional change (in the sense of norms, rules and regulations) towards market principles and efficiency measures (Bakker, 2010a). Making this analytical distinction is necessary to avoid conceptualizing neoliberalism as a hegemonic, oversimplified and undifferentiated project. Within the literature on nature's neoliberalisation, commercialization is understood as a form of neoliberal governance that engenders not only political and economic outcomes, but also environmental (Castree, 2010; Bakker, 2010a; Heynen et al., 2007) and socio-spatial ones (Peck et al., 2009). Acknowledging the multidimensional character of commercialization is particularly important for understanding that policy prescriptions are both materially and discursively driven. Therefore, the reconfiguration of institutional arrangements towards market principles requires the transformation of notions of citizenship (e.g. from citizen to customer), discursive representations of nature (e.g. from public good to scarce commodity) as well as material practices (e.g. from modern networked city to the splintering of infrastructures).

Whilst these institutional strategies become arenas in which particular neoliberal ideals become promoted and implemented, they also reflect incoherent contradictions inherent to processes of capital accumulation. These contradictions are best captured by the concept of governance failure (Bakker, 2010a) as it permits evaluating how institutional strategies fail to provide low-income households with affordable and adequate urban water supply services, even though they are entitled to this fundamental right. The problem of water disconnection in Medellín is a clear example of governance failure. This conceptual framework is particularly important for this study as it facilitates going beyond economic approaches that tend to interpret disconnection for non-payment as a phenomenon associated to poverty, and places a strong emphasis on non-economic aspects. It addresses profound questions that undermine low-income households' capability to have access to water: Why are low-income households unable to pay their

bills? Which difficulties do they face to be re-connected legally? Why do they connect illegally despite of the strict sanction imposed by the water company? This perspective brings human agency into the forefront by recognizing low-income households as important actors in the (re)production of urban waterscapes.

While scholars within the UPE tradition have placed a strong empirical and analytical attention on how neoliberalism shapes the metabolism and circulation of water through networked systems (e.g. Gandy, 2006, 2008; Kaïka, 2005; Swyngedouw, 2004), they have largely failed to explore everyday practices of negotiating access to water among low-income households, and the complex material and social configurations that emerge through these practices. In other words, despite the growing contributions in the field of urban water in UPE literature, the ways how low-income households construct, mobilize and consolidate different practices to secure access to water on a daily basis remain insufficient examined (with the exception of Loftus, 2007; Truelove, 2011).

Understanding the ways in which water flows through the urban waterscape requires a close examination of power operating within particular modes of capital accumulation as well as within the daily practices of low-income households. I suggest that nature's materiality (Bakker and Bridge, 2006; Castree, 2005; Sultana, 2009, 2013) is well positioned to fill this gap as it allows for greater understanding of the ways that everyday governance is enacted among low-income households. By focussing on water as an actor, I show that it is not enough to look at how power relations shape urban flows (water), but also at the ways in which urban flows also shape power relations.

In sum, literatures on UPE and the neoliberalisation of nature can provide valuable insights for analysing the links between water disconnection and the transformation of EPM into a *multilatina* by focusing on Medellín's contested urban waterscape. I suggest that a productive way to approach this contestation is through the simultaneous processes of commodification and decommodification. These two different parallel metabolisms are infused by intense political contestations that reflect broader tensions and contradictions inherent to new forms of neoliberal governance. The theoretical framework adopted in this research is extended more in depth in Chapter 2 and a framework to analyse contested urban waterscapes is provided in section 2.3.3.

1.3 Research methodology: Tracing flows of water and flows of capital

This section presents the arguments to select the city of Medellín as a valuable case study to conduct research on the intricate linkages between water inequalities and commercialization processes. Furthermore, it highlights the methodology and research methods that have helped to shape the conceptual claims, the fieldwork, reflections and the structure of the thesis.

1.3.1 Medellín: A city between innovation and inequalities

I was confronted several times with questions such as why did you select Medellín as a research site? What is so special in this city that you want to write your PhD thesis? The answer is quite simple: because it allowed me to be engaged not only as an academic, but also as an activist and citizen. First, my decision to select Medellín as the empirical research site was largely driven by the interest to comprehend the contradictions of a city that is economically prosperous yet, at the same time; it is ranked as the city in Colombia with the highest level of inequality (El Colombiano, 2 March 2014). I decided to use water as an analytical entry point to explore this paradoxical situation. Looking at inequalities through water was promising given the successful emergence and consolidation of the city's water company as a *multilatina* and the high number of households disconnected from the water supply system.

As an academic, I was in a privilege position to take the risk necessary to challenge dominant narratives that simplistically explain water disconnection and contribute with my own theoretical interpretations to a better understanding of the problem. Second, this research was inspired by my previous work for a Colombian-based NGO, where I took part in campaigns for the human right to water and the participatory budgeting program. Being involved as an activist allowed me to undertake research that is more politically engaged and materially useful especially for those who have been historically marginalized and excluded. Third, as a citizen I have a responsibility to contribute with my work and ideas to social change.

Another reason I was interested in conducting research in Medellín came out from the significant international attention that the city has received in the last couple of years in relation to a particular strategy of urban transformation known as *Urbanismo Social* (social urbanism) (Alcaldía de Medellín, 2012b; Brand and Dávila, 2012). As a result, Medellín was awarded in 2013 the Innovative City price under a list of 200 cities leaving behind final candidates such as New York and Tel Aviv. It was selected for its integrated transportation system composed of metro lines, aerial cable cars, buses and

bikes, a network of school and libraries in low-income areas as well as new parks and museums. The same year Medellín obtained the title of one of the world's most resilient cities by the Rockefeller Foundation for its strategies to cope with violence and drug trafficking. Additionally, it hosted in April 2014 the VII World Urban Forum (WUF7).

At the heart of this urban transformation is EPM, a public multi-utility company owned by the Municipality of Medellín. My decision to focus this research on this company was driven by several reasons. First, it is a company that holds the monopoly not only of water and sewage, but also electricity, natural gas, telecommunication services and solid water collection, a fact that gives EPM an important role in the urbanization processes. Second, one of the most salient features of the company is the partnership it has created with the municipality. According to an article published by *Forbes Magazine* (27 January, 2014), this partnership "has yielded opportunities in marginalized neighbourhoods, fostered inclusive communities, and attracted international recognition and investment". The municipality has largely used EPM's annual transfers to finance urban transformation projects (Alcaldía de Medellín, 2012b; Coupé et al., 2012). Third, at the moment of writing this research, EPM experienced a particular and important period of transformation. I was interested in understanding how a company that has been praised both nationally and internationally for its efficiency operates in such a highly unequal context, and exploring to what extent its transformation into a *multilatina* has contributed to reinforce water inequalities in Medellín.

1.3.2 Methodological approach and methods

The operationalization of UPE and neoliberalisation of nature in field research requires a methodology that permits exploring how Medellín's urban waterscape is contested by different actors with unequal power relations, diversified interests and located in multiple geographical arenas (e.g. the household, the community, the corporate/transnational sector, the state, etc.), and how such contestations determine particular environmental outcomes. According to Paulson et al. (2003), one of the most challenging questions in the political ecology field is how to begin the analysis of a particular phenomenon across diverse temporal and spatial scales. Following Vayda and Walters (1999), this research initiates with a focus on the environmental events or changes we want to investigate, in this case water disconnection, and then moves backwards in time (historical analysis) and outwards in space (multi-scale analysis) in order to construct a chain of causes or "chain of explanations" (Blaikie and Brookfield, 1987) leading to this particular event. Moving across scales of time and space permits challenging self-evident explanations

that portrait water disconnection as a problem merely situated at the household scale or the present time. The interception between the methodological and theoretical framework developed in this research for the analysis of contested urban waterscapes is illustrated in Figure 2.

Historical analysis: Moving backwards

This research draws from insights of UPE literature to undertake a historical analysis that traces the organization of Medellín's urbanization process. This analysis is written from the perspective of EPM since its inception in 1955 to the present, and reconstructs how the company's necessity to control and domesticate the flows of water through the city has constituted urban waterscapes characterized by particular historical representations of nature, notions of citizenship and urban infrastructure networks. Additionally, results obtained from this analysis serve to find enough evidences to support Graham and Marvin's thesis of *Splintering Urbanism*, an approach that has been subject of broad criticism because of the absence of any historical foundation that clearly explains why basic network infrastructures (e.g. water, electricity, telecommunication) were universally available in particular contexts and not in others (see Bakker, 2010a; Coutard, 2008; Kooy and Bakker, 2008). Acknowledging that infrastructure networks represent a fertile area to analyse urban flows, a historical background elucidates how new forms of neoliberal governance and the fragmentation of urban water networks become closely intertwined in the urbanization process.

The historical analysis is organized around two distinct time periods and strongly relies on archival material. Each period traces the main processes that shaped Medellín's urbanization according to the changing roles of EPM:

- (i) **Municipalization (1955-1990):** Access to water during this period strongly relied on moral values rather than economic interests. Having access to water at home, for instance, was considered an emblem of citizenship, a precondition to enjoy a dignified and modern life. Additionally, water was perceived as a public good to be provided by the state through its public company at affordable prices (Chapter 3).

- (ii) Commercialization (1991-present): During this period water has been transformed from a public good into a “scarce” commodity available to those who can pay for it. Citizens became characterized as customers. Additionally, prepaid systems became increasingly presented as an “innovative” solution to readdress inequalities as it adjusts to the capacity to pay of the customer while facilitating the reduction of debts to the water company (Chapter 4).

Multi-scale analysis: Moving outwards

To trace the effects of neoliberalisation processes on particular natures, it is required to adopt a multi-scalar approach that enables understanding how water disconnection articulates with the transformation of EPM into a *multilatina*. From the discipline of Geography, it is hard to imagine that explanations to the problem of disconnection in low-income areas, can be narrowly confined to a single geographical scale (e.g. the household scale) when it has been widely acknowledged that neoliberal processes have profound effects on access, control and management of natural resources (Heynen et al., 2007; McDonald and Ruiters, 2005; Perreault, 2006; Swyngedouw, 2004). Consequently, disconnection needs to be connected to wide variety of political and economic processes operating at a variety of articulated geographical scales such as state and municipal interventions in the water sector as well as strategies of expansion of Medellín’s multi-utility company.

This approach presents significant methodological challenges, as it requires dismantling the traditional categorization of scales as fixed containers of space (as, for example, the local, the regional, the national and the global) (Budds and Hinojosa, 2012; Swyngedouw, 2010; Zimmerer and Bassett, 2003). Spatial scales are neither a pre-given nor static hierarchical category. Instead, Swyngedouw (2010:9) argues, they are “perpetually disputed, redefined, reconstituted and restructured in terms of their extent, context, relative importance and interrelations”. In other words, scales are socially produced and politically mobilized (Budds and Hinojosa, 2012). For instance, the case of EPM shows that it is difficult to fit the company into a single and neatly spatial scale (e.g. municipal scale), as its transformation into a *multilatina* has entailed the emergence of multiple scalar reconfigurations.

In order to disentangle the scale as a static unit, this research approaches scalar dynamics through the concept of waterscape (see section 2.2.1). The analysis of contestations from the scale of the waterscape is particularly useful to capture a series of socio-natural processes through which water is commodified and decommodified by

different actors (human and non-human) and the power relations between them. From a waterscape perspective, it is the linkages or connections that matter for the analysis of power dynamics (both material and discursive) and contestations, rather than the scales per se (Norman et al., 2012).

Thus, the multi-scale analysis deployed in this study draws on a dialectical approach that centres on how actors (human) interact across scales to contest the urban waterscape, and how water (non-human) itself intervenes these interactions. It centres on three main human actors (*desconectados*, EPM and the state/municipality), their diversified strategies and interests to commodify and decommodify the urban waterscape, and the alliances being formed across scales. Additionally, this research frames nature as an actor in order to reveal how different types of water (raw/potable, safe/unsafe, legal/illegal scarce/abundant, physical loss/commercial loss) play a crucial role in building particular arrangements with *desconectados* to subvert the neoliberal visions of the water company.

This analysis begins with the process of decommodification by looking at the close interaction between disconnected households and water. Then, it continues with the process of commodification, which centres on the water company, and then the national state and the municipality in the following way:

DECOMMODIFICATION OF THE URBAN WATERSCAPE

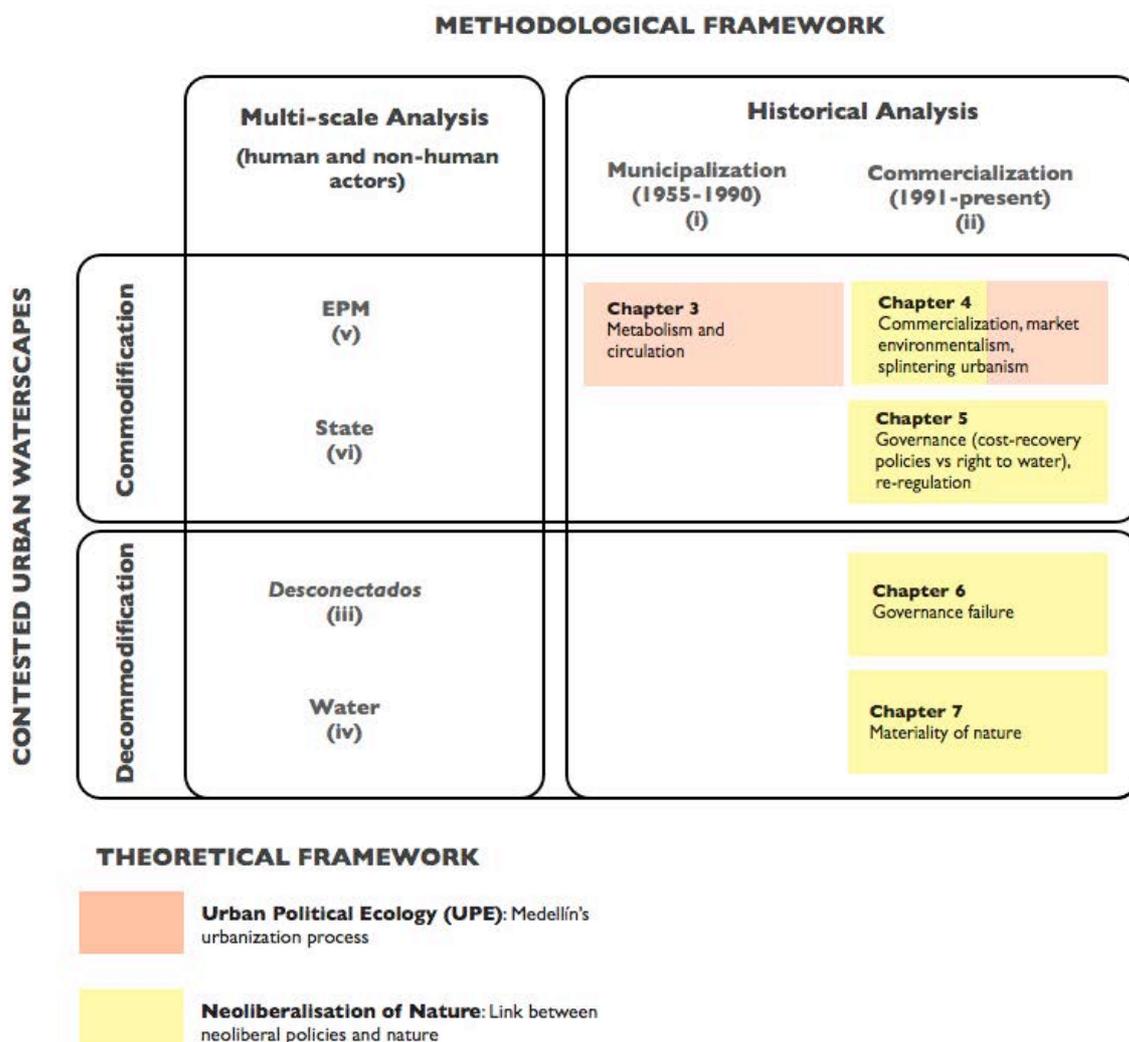
- (iii) Disconnected households: The chain of explanations starts with the smallest decision-making unit – the household. I conducted household surveys, direct observations and attendance in community meetings to trace how disconnected households perceive and experience disconnection policies, which difficulties they face to be re-connected legally, and how they organize themselves to express their concerns (Chapter 6).
- (iv) Water: I conducted household surveys, direct observations and in-depth interviews with community leaders and *fontaneros* to follow water into the material and social spaces of the household. Water's materiality is particularly important to analyze how *desconectados* enact norms of everyday governance to secure access on a daily basis and how EPM intervenes these practices depending on the types of water being used. This perspective is particularly important for understanding the ways in which water resists being fully commodified (Chapter 7).

COMMODIFICATION OF THE URBAN WATERSCAPE

- (v) Empresas Públicas de Medellín (EPM): This part of the multi-scalar analysis centres on the transformation of EPM into a *multilatina*. Through corporate interviews, analysis of media material, review of local newspapers for a period between 2010 and 2014, and attendance in public events, I trace corporate strategies, educational programs and legal mechanisms that justify water disconnection. Information collected at this level is also used to complement the second period of the historical analysis (Chapter 4).

- (vi) The state and the Municipality of Medellín: This section focuses on national legislation regarding access to water and evaluates the constitutional tensions and contradictions arising from whether water should be treated as a commodity or a right. Additionally, it analyses the role of the Municipality of Medellín, as a sole-owner of EPM and as the main receptor of the annual transferences of the water company. I draw on in-depth interviews and analysis of legislative and regulatory material (Chapter 5).

Figure 2 Intersection between the methodological and theoretical framework for the analysis of contested urban waterscapes



1.3.3 Fieldwork phases

Fieldwork research was carried out between 2011 and 2014 in three phases. The first fieldwork phase centred on disconnected households, the second phase focused on EPM and the third phase was dedicated to the reconstruction of Medellín's urbanization process from a historical perspective. The research draws on both qualitative and quantitative data that emerged from a variety of sources including 64 household surveys, 41 in-depth and semi-structured interviews with a wide range of actors, attendance in public forums and debates, direct observations, examination of archival records, analysis of media material, campaigns and legislative reports. Table 1 describes in more detail the structure of this research and the methods deployed in each fieldwork phase.

Table 1 Research structure

Research Questions	Hypothesis	Fieldwork Phases	Aims	Methods	Results
<p>Decommodification</p> <p>1. How do disconnected households perceive, experience and resist EPM's transformations and how do they employ particular practices to secure access to water on an everyday basis?</p>	<p>The materiality of water plays an important role in the ways that <i>desconectados</i> develop particular practices to secure access to water and subvert the neoliberal visions of the water company. However, these practices are shaped in significant ways not only by the biophysical and spatial characteristics of water itself, but also by how water is legally and technically differentiated by the company.</p>	<p>PHASE I</p> <p>Case study (Disconnected households)</p>	<ul style="list-style-type: none"> - Understand how <i>desconectados</i> perceive and experience disconnection policies and which difficulties they face to be re-connected legally. - Examine how <i>desconectados</i> experience new strategies offered by the municipality and the water company to redress inequalities in access (e.g. prepaid systems, a free water allowance program). - Understand how <i>desconectados</i> organize themselves to express their concerns and which impact they have. 	<ul style="list-style-type: none"> - Household surveys. - In-depth and semi-structured interviews. - Participation in mass parades and attendance at regular meetings of the roundtable of disconnection (<i>Mesa Interbarrial de Desconectados</i>). 	<p>Chapter 6 <i>Los Desconectados: Struggling to Pay Water Bills</i></p>
		<p>September – November, 2011 Medellín</p>	<ul style="list-style-type: none"> - Identify informal practices deployed by <i>desconectados</i> to satisfy daily needs and understand why illegal practices in many cases become the only feasible solution despite the strict sanctions imposed by the company. 	<ul style="list-style-type: none"> - Household surveys. - In-depth and semi-structured interviews. - Direct observation: water practices (e.g. reusing), informal technologies. 	<p>Chapter 7 Heterogeneous Waters: Shaping Forms of Everyday Governance</p>
<p>Commodification</p> <p>2. To what extent have neoliberal reforms changed the management and ideological practices of Medellín's water utility company, and with what economic, social, spatial and environmental implications?</p>	<p>The competitive logic of the water company has constituted a complex interplay between water scarcity discourses, ideals of citizenship and technological infrastructures through which water inequalities are facilitated and sustained.</p>	<p>PHASE II</p> <p>Case study (Empresas Públicas de Medellín – EPM)</p> <p>February-March, 2013 Medellín</p>	<ul style="list-style-type: none"> - Understand the regulatory framework that controls water supplies services at the national level and examine how EPM positions itself within this framework. - Identify priorities and interests, mission and visions. - Identify strategies/programs to reduce disconnections and illegal practices. - Identify the use of specific discourses and ideologies (corporate language). 	<ul style="list-style-type: none"> - Analysis of legislative and regulatory material. - In-depth interviews with key representatives of EPM and the municipality. - Analysis of the EPM campaigns and corporate material, review of local newspapers and media. - In-depth interviews with the Municipal's Human Rights Office, EPM syndicate and local NGOs. - Attendance in public forums and debates. 	<p>Chapter 5 The State: Deepening Contradictions in Service Provision</p>
		<p>PHASE III</p> <p>Archival Research</p> <p>February-April, 2014 Medellín</p>	<ul style="list-style-type: none"> - Develop a historical chronology of EPM since 1955 to contrast two specific moments in the structural organization of the company (municipalization and commercialization). 	<ul style="list-style-type: none"> - Examination of archival records: EPM Library and <i>Sala de Patrimonio Documental</i> (EAFIT). - Academic consultations EAFIT University and Medellín National University. - Analysis of secondary texts: company website, educational material, local media reports. 	<p>Chapter 3 EPM, Municipalization (1955-1990)</p> <p>Chapter 4 EPM, Commercialization (1991-present)</p>

PHASE I: DISCONNECTED HOUSEHOLDS

The first field research phase covered twelve weeks from September to November 2011. I initiated my research at the household scale due to the limited information available about water disconnection, particularly disconnection for non-payment. This problem has been scarcely addressed and presented to the public, and the existing information is merely confined to basic statistics that said very little about who are the *desconectados* and why they are not able to pay their bills. During this period, I worked in close cooperation with three local institutions: *Corporación Ecológica y Cultural Penca de Sábila*, *Corporación Jurídica Libertad* (CJL) and *Personería de Medellín* (Municipal's Human Rights Office). All three institutions have been actively involved in water supply services in low-income areas.

At the scale of the household, information was drawn from primary survey data based on a survey of 64 households located in sixteen *barrios* (neighbourhoods) that register high levels of disconnection for non-payment and poverty rates. Although the sample size is not large, it is an exploratory study in areas highly relevant for the phenomena of water disconnection, and therefore is able to develop preliminary explanations with respect to service provision that permit further research on disconnection patterns. Results from the survey were complemented with other published survey data (e.g. *Medellín en Cifras, 2011*) and attendance in public events. The study areas were selected in consultation with municipal government officials, NGOs representatives and community leaders based on statistics of water disconnection provided by the water company. The initial "draft" for the survey was frequently redefined according to the outcomes of the consultations. Results from this survey are presented in Chapter 6 and 7 and the entire structure of the household survey is presented in Appendix 1.

The household survey focussed on measuring the institutional, material and discursive dimension of water disconnection based on the concepts of governance failure and materiality of nature as shown in Table 2. The concept of governance failure brings the human agency at the forefront and permits identifying how institutional arrangements fail to provide *desconectados* with affordable and adequate water supply services, even though they are entitled to this fundamental right. The concept of nature's materiality places non-human agency at the centre of the analysis in order to understand how *desconectados* deploy different strategies to secure access according to the types of water they use.

Table 2 Key variables to address the problem of disconnection for non-payment in a household survey

Concepts	Components	Variables
Governance failure (Human agency)	Failure of institutional arrangements to provide <i>desconectados</i> with access to water: <i>Why are disconnected households unable to pay their bills? Which difficulties do they face to be re-connected legally?</i> (Chapter 6)	
	Economic aspects	<p><i>Socio-spatial characterization:</i></p> <ul style="list-style-type: none"> Household geographical location Social stratification/ SISBÉN⁵ level <p><i>Socio-economic characterization:</i></p> <ul style="list-style-type: none"> Number of family members in the household Levels of education and working conditions Monthly income Debts with the water company
	Non-economic aspects	<ul style="list-style-type: none"> Length of disconnection Main causes of disconnection Social/economic barriers to be formally re-connected Channels of communication and information with the water company and the state Mechanisms of participation
Materiality of nature (Non-human agency)	Strategies deployed by <i>desconectados</i> to cope with institutional failures: <i>How do non-human agency (water) influence the ways in which <i>desconectados</i> enact norms of everyday governance?</i> (Chapter 7)	
	Informal/illegal practices	<ul style="list-style-type: none"> Length of disconnection Types of water (raw/potable, safe/unsafe, abundant/scarce, commodity/right, physical loss/commercial loss, legal/illegal) Technical arrangements (pipes, tubes, taps) Social arrangements (neighbour, friends and family solidarities, water mafias, plumbers) Water company/state interventions Perception towards the notion of "public"

⁵ The SISBÉN is a system established in 1994 by the Colombian government to select beneficiaries for welfare programs such as education, health care, conditional cash transfers, youth training, subsidies for older people depending on the economic conditions of individual households. By 2002, 27 million people (60 per cent of national population) were registered in SISBÉN databases, of whom about 13 million received benefits (Castañeda, 2005).

Household surveys were conducted door-to-door with the assistance of community leaders and three students from local universities (Medellín National University and Antioquia University) who were active participants in the Roundtable of disconnection (*Mesa Interbarrial de Desconectados*). A map of the fieldwork areas where household surveys were conducted is found in Appendix 2. The pattern of research was structured in the following way: contact a community leader; identification of households disconnected for non-payment with the help of the community leader; and then follow this up with the household surveys. Before starting a household survey, I introduced myself, my position as a doctoral researcher and the nature of my work. It was a necessary introductory step in order to avoid being misunderstood as being an employee of the water company, who in the majority of the cases generates a negative image among *desconectados* and could serve as a potential actor to report illegal connections. Also, it was important to clarify at the beginning that names and surnames of the family members and the address of the household were not included in the survey and that the entire data will be kept confidential and not reported to the water company. In this way, interviewees could be much more open and communicative in expressing their opinions, feelings and worries without any fear. In some cases, after the completion of the survey, conversations continued in the form of unstructured interviews to allow more participation to other family members.

The assistance of a community leader during the whole survey process was important for several reasons: first, local knowledge was necessary to select those households disconnected from water supply services provided by the public company. Due to the sensitiveness involved in investigating the causes of water disconnection, a member of the community was crucial to create trust. Many *desconectados* feel ashamed of exposing their social and economic situation or they simply feel very suspicious of outsiders, especially in cases where water was obtained through illegal means. However, even with the support of a community leader, a significant number of families refused to be interviewed. They felt that the reasons for being disconnected were too private to share with an unknown person or they simply denied the fact that they were disconnected.

Secondly, a local guide in the area of research was necessary for security reasons. Some of the areas that report high levels of water disconnection are controlled by criminal bands (*Las Bacrim*), which have a strong link with mafia groups and other illegal activities. These groups have set up check points to restrict free mobility in the *barrios* and to control weapons and drug circulation. They have created *fronteras invisibles* (invisible borders), which are in constant transformation in order to secure territorial control and to guarantee economic interests. A community leader was crucial

to identify these borders and to provide information in advance before departing to the fieldwork in terms of accessibility to specific areas. However, in one of the field visits to the *barrio* La Cruz, survey activities have to be suspended due to the mistrust of a member of a criminal group who ordered one of the survey assistants to immediately leave the area.

This period of research also involved active participation in the *Mesa Interbarrial de Desconectados*, hosted by the local NGO *Corporación Jurídica Libertad* (CJL). This part was essential for establishing relationships of trust with specific community leaders as well as to have a broad understanding of the context of water disconnection. Before starting the household survey process, it was important to have an active participation in the activities organized by the roundtable of disconnection, be engaged in discussions, clarify my role as an independent researcher and show political commitment to the process. I agreed with the coordinators of the roundtable that results of my research should be beneficial for the group. I realized that they had less willingness to cooperate if the research was simply framed as *purely* academic exercise.

Meetings were used to discuss a diversity of topics such as legal mechanisms to avoid disconnection (e.g. tutelary actions, right of petition and popular actions), government solutions to the problem of disconnection (e.g. introduction of the *Litros de Amor* program, prepaid water meters) and trainings on how to read and understand water bills. The roundtable publishes a monthly brochure called *Boletín Vida Digna*, which contains information on proposals to improve the living conditions of disconnected families, their rights, what to do in case of disconnection, advantages and disadvantages of the prepaid systems, etc. The participation in the roundtable activities and the published awareness raising material provided a vital source to identify information that could be incorporated in the questionnaires and to select specific sites for conducting the surveys.

Information was complemented by attending and observing different activities including local forums and seminars as well as the *Seventh Inter-American Dialog on Water Resource Management (D7)* taking place in Medellín on November 13-19, 2011, where different national and international actors involved in the water sector were present.

PHASE II: EMPRESAS PÚBLICAS DE MEDELLÍN (EPM)

The second phase of research covered seven weeks from February to March 2013. During this phase, it was crucial to establish contacts with staff members of EPM and to be well informed about the company before conducting interviews. I strongly relied upon corporate interviews (Hughes, 1999; Schoenberger, 1991) conducted with staff members of EPM. Instead of testing a prior formulated hypothesis, in-depth interviews offered a fertile ground for the generation of hypothesis about water disconnection. The material resulting from the interviews provided valuable insights for understanding: (i) the complex process of transformation of EPM into a *multilatina*, (ii) the specific legal and institutional framework under which the company operates, and (iii) the arguments being deployed to justify disconnection. Extra documentation was requested (e.g. company presentations, official reports, promotional material) to increase verifiability of the information collected in the interviews. Interviews were complemented with information obtained through media material produced by EPM (e.g. multimedia, videos), annual reports, financial statements, the company official website, a visit to EPM's customer services office, and studies on the legal and institutional framework. A guided tour to the EPM's Water Museum with a group of school kids and examination of different educational material provided insights into how the company represents water both discursively and materially and attempts to re-educate a young generation into a new ethic of water use.

I joined several times EPM staff and contractors for fieldwork in low-income areas. I gained enormously from these activities as I got better insights into how low-income population perceive the company directly in the field, how they communicate with the employees and what kind of strategies they deploy to make their claims heard. By doing fieldwork with the company, I realized that I was excluding a group of households from my research that has been historically marginalized and did not even appear in the statistics of the water company and the municipality because this group is located outside the urban perimeter. By law, the company is not allowed to provide water services in these areas because they are located in so-called "high-risks zones". However, these unserved households have recently become a target for the water company in order to reduce the unaccounted for water (UFW). I identified a great potential to explore power relations through EPM's strategies to educate unserved households in water consumption as well as the socio-technical arrangements deployed by unserved households to secure access to water on a daily basis. Hence, I decided to include this group in my research in order to expand the contextualization of water disconnection.

PHASE III: HISTORICAL ANALYSIS

The third phase of research covered nine weeks from February to April 2014. The gathering of empirical evidence for this phase relied extensively upon archival material in Medellín, recording the history of the city, the origins of *Empresas Públicas de Medellín* (EPM) and the development of the city's water infrastructure network. Before beginning my research in the historical archives, I contacted several professors from the Department of History at EAFIT University and Medellín National University to get recommendations on the existing secondary literature. This information was very useful to identify key historical moments and to grasp useful methods to conduct archive research. Based on the outcomes of the consultations and the theoretical foundations, I elaborated a chronology that considers two periods of transition between modes of regulation. Each period was drawn from a diversity of research methods as illustrated below:

- *Period I Municipalization (1955-1990)*
Archival research (EPM library and *Sala de Patrimonio Histórico* at EAFIT University). Historical material was complemented with in-depth interviews and review on secondary sources.
- *Period II Commercialization (1991-present)*
Archive research of EPM library complemented with corporate interviews, articles in local newspapers, company reports, media analysis, EPM official website and attendance in public forums and debates.

To collect information on the municipalisation period (1955-1990), I strongly relied upon archival resources. Evidence was collected to document the specific nexus between infrastructure networks and the formation of citizenship rights in connection with the municipalization of water services through the formation of EPM in 1955. Research was primarily conducted in the *Sala de Patrimonio Documental* at EAFIT University and EPM library. The archivists, with an excellent knowledge of how the documents are organized and their content, kindly assisted me in identifying relevant material for my research. Magazines (e.g. *Revista Progreso* published by the *Sociedad de Mejoras Públicas, SMP*), minutes of meetings, photographs and public awareness campaigns were used as primary sources.

Archival resources were complemented with in-depth interviews addressed to EPM staff, water users, local NGOs representatives and members of the academia. Company records were obtained from the EPM library. Here, I particularly relied on information obtained from magazines published by the company since 1969 (e.g. *Revista Empresas Públicas de Medellín*), company annual reports and institutional brochures. Archive material was organized chronological and then subsequently classified by topics. This approach gave me a clear path to follow the transformation of EPM, the main programs that were established during this period and the key organizations and people behind such programs. Results were complemented by valuable pieces of historical work written by E. Libardo Ospina (*Una Vida, Una Lucha, Una Victoria. Monografía Histórica de las Empresas y Servicios Públicos de Medellín*, 1966), Alberto Mayor Mora (*Ética, Trabajo y Productividad en Antioquia*, 1989) and Fernando Botero Herrera (*Medellín 1890-1950. Historia Urbana y Juego de Intereses*, 1996).

Archival evidence on the commercialization period (1991-present) strongly relied on documents obtained in the EPM library. I used magazines (e.g. *Revista EPM* and *Letras Jurídicas*), annual reports, financial statements, promotional and educational material as well as institutional videos. This information was complemented with data gathered via Internet research including the company's official website and articles in local newspapers (e.g. *El Colombiano*, *El Mundo*). On-line sources provided meaningful insights into the latest projects undertaken by EPM, particularly, for documenting the recent transformation of the company as a *multilatina*. Information was also complemented with in-depth interviews conducted with EPM staff during phase II.

In order to understand the current relationship between the company and the Municipality of Medellín, I conducted in depth-interviews with staff from the Department of Planning, the Secretariat of Public Services and *Personería de Medellín*. Information collected through interviews was complemented with my attendance and observations in several public forums. Particular attention was paid to the intense political and public debates that took place in the Municipal Council as a result of the controversial fusion UNE-Millicom and the acquisition of ENVARIAS, the company in charge of solid water collection in Medellín. A detailed description of different activities undertaken during the three fieldwork phases is in Appendix 3 and a list of interviews conducted between 2011 and 2014 is provided in Appendix 4. Interviews and activities were transcribed shortly after they were conducted. Reflecting on the outcomes during the transcription process was essential to trigger new topics to be investigated and to identify potential candidates to be interviewed.

1.4 Structure of the thesis

The overall structure of the thesis illustrates how Medellín's urban waterscape is contested through the simultaneous processes of commodification and decommodification. It does so by moving from corporate strategies that enable capital accumulation to the practices in low-income areas that are used to decommodify and secure access to water on a daily basis. Specifically, Chapter 3, 4 and 5 trace the commodification of the urban waterscape from the perspective of Medellín's water utility company and the state/municipality, while Chapter 6 and 7 unpack decommodification processes in low-income areas.

Chapter 1 provides an introduction to the problem statement, main arguments, objectives and research questions. It offers evidences for understanding why water inequalities are increasing despite the successful transformation of the city's multi-utility company as a *multilatina*. Chapter 2 explores how neoliberal processes shape the relationship between water, society and urban infrastructure. For this purpose, it deploys a theoretical framework that integrates urban political ecology and neoliberalisation of nature to trace the complex relations of power and the politics influencing control and access to water in neoliberal urban waterscapes.

Chapter 3 and 4 offer a historical context of the transformation of EPM and its role in shaping Medellín's urbanization process. Through a historical analysis that considers two distinct periods in EPM's history: municipalisation (Chapter 3), and commercialization (Chapter 4), both chapters present a necessary background for understanding why inequalities in access to water arise, and for revealing the main driving forces behind it. In particular, Chapter 3 examines the changing patterns of the water utility company since its inception in 1955 in which the municipal hydraulic paradigm was adopted as a model to secure the universalization of basic public services in the city and to control and domesticate nature's water. It traces how the municipalisation period relied not only on techno-managerial aspects to ensure the metabolism and circulation of water, but also on distinctive notions and ideals of publicness, citizenship and modernity.

Chapter 4, on the contrary, shows how the commercialization of the water company has produced splintered, uneven and exclusionary urban waterscapes. It particularly examines how the introduction of market mechanisms in water supply provision and the transnationalization of operations paved the way for the implementation of new forms of fragmentation and differentiation in access to water, while producing positive environmental and aesthetics effects. The growing number of disconnected households for non-payment of bills and for maintaining an illegitimate

land tenure status became the primary symptom of water inequalities. This chapter also examines the intricate relationship between the company and the Municipality of Medellín as its sole-owner.

Essential for a neoliberalisation of nature analysis is to trace the tensions and contradictions inherent of commercialization strategies. Chapter 5 undertakes this task by exploring how different neoliberal governance reforms support the production and reproduction of social inequalities. First, it examines the role of the state in regulatory actions through the implementation of cost-recovery strategies such as tariff rates, policies of disconnection, prepaid systems, discursive representation of water as a “scarce” commodity and how these contradict with the right to water. Second, it shows how EPM has found remarkably difficult to fully control and domesticate the flows of water by looking at how such flows are lost through faulty meters, leaky pipes and illegal connections. Then, it explores how the water company implements different strategies, which simultaneously secure cost-recovery and the right to water in order to cope with existing legislative gaps.

I have previously argued that the flows of water through Medellín waterscape are organized not only through EPM’s strategies of accumulation, but also through *desconectados* choices as they try to secure access to water on a daily basis. Acknowledging *desconectados* as active actors in the (re)production of the urban waterscape, Chapter 6 and 7 document the decommodification process. Chapter 6 explores through the concept of governance failure how institutional arrangements fail to provide *desconectados* with access to water. It particularly shows the economic and non-economic aspects surrounding water access among Medellín’s poorest population in order to challenge dominant narratives that interpret disconnection for non-payment as a poverty trap problem. Then, it examines how *desconectados* organize themselves to demand concrete solutions. Chapter 7 unravels the ways in which water shapes norms of everyday governance in low-income areas. It traces the complex landscape that emerges as consequence of disconnection by focussing on the informal practices deployed by *desconectados* to secure access to water based on particular material, discursive and institutional strategies.

Finally, Chapter 8 draws conclusions from the case study of Medellín as well as the applicability of the theoretical concepts selected for the analysis of water inequalities. Furthermore, it explores alternative possibilities for constructing more equal and just water systems.

CHAPTER 2

Water, Power and Urban Fragmentation

2.1 Introduction

This chapter introduces the theoretical foundations deployed in subsequent chapters to analyse the connections between the commercialization of public water companies on the one hand, and the increment of inequalities in access to water on the other hand. The analysis is grounded on academic work developed within the fields of urban political ecology (UPE) and neoliberalisation of nature in order to trace contestations over the control and access to water in urban waterscapes. Viewing these contestations through the simultaneous process of commodification and decommodification draws attention to the ways in which neoliberal processes shape the relationship between nature, society and urban infrastructure in uneven ways. I contend that a focused analysis on these two different parallel metabolisms (commodification and decommodification) can be particularly useful for analysing water inequalities in cities as both processes are infused by intense political contestations that reflect broader tensions and contradictions inherent of new forms of neoliberal governance.

I begin this chapter by reviewing certain aspects and core arguments prominent in the UPE literature, which facilitate the analysis of commodification processes from the perspective of the urbanization of nature. It highlights the importance of the waterscape as a scale of analysis and infrastructure networks as artifacts that physically sustain the metabolism and circulation of commodified water. Drawing on the *Splintering Urbanism* thesis (Graham and Marvin, 2001), this research reveals how infrastructures, an integral component of the “modernist ideal” of universal and equitable water services, have become increasingly fragmented through recent processes of neoliberalisation. This is followed by a discussion in the field of nature's neoliberalisation, which provides suitable tools to connect how neoliberal principles and policies influence the biophysical environment. Here, I emphasize for a more careful consideration to three aspects: Strategies of neoliberalisation of nature, the role of the state and the materiality of nature.

Then I present an analytical framework to examine contested urban waterscapes that take into account three components: processes (commodification, decommodification), actors (human and non-human) and strategies (discursive, material

and institutional). I suggest that bringing these components together can be particularly useful for conceptualizing water inequalities embedded in processes of capital accumulation. In the conclusion, I highlight how UPE and neoliberalisation of nature literatures are well positioned to shed light on ways that water, power and infrastructure networks intimately connect to (re)produce contested urban waterscapes.

2.2 The Urbanization of water

While UPE is a comparatively recent theoretical development, political ecology has been around since the mid-1970s. It has emerged as an area of critical research inspired by political economy and human/cultural ecology. Political ecology has been applied across different disciplines such as biology, anthropology and political sciences; however, in the area of geography it has become a key framework for understanding the complex relations between nature and society by focusing on the different forms of access to and control over resources (Robbins, 2004; Watts, 2000).

This line of reasoning is particularly positioned as an interdisciplinary area of research, which connects politics and economy to problems of environmental access and ecological change (Robbins, 2004). By taking an analytical focus on factors that shape power relations among different social groups and influence aspects of their environment, this stimulating scholarship challenges dominant interpretations of the causes of environmental degradation (e.g. Malthusian explanations of environmental crises and resource scarcity, Hardin's highly influential metaphor of the 'tragedy of the commons') and contests prevalent and mainstream policy prescriptions that obstruct real democratic change.

Political ecologists such as Raymond Bryant and Sinead Bailey (1997) agree that the environmental problems facing the Third World are not simply a reflection of policy and environmental failures, but rather are a manifestation of broader political and economic forces, which are associated with the worldwide spread of global capitalism. Based on their assumptions, the idea of a "politicised environment" becomes a centre of analysis, since environmental problems cannot be understood in isolation from the political and economic context within which they are created. Accordingly, one of the main works of political ecologists, whatever approach they adopt for their research, is to explain the topography of a politicised environment (Bryant and Bailey, 1997). Framed in this way, the political becomes the driving force behind environmental problems within the political ecology literature.

Much of the work within political ecology has predominantly been on the global South as well as on rural and agricultural contexts. Research has been concerned with topics of soil erosion and land degradation (Blaikie and Brookfield, 1987), biodiversity (Escobar, 1998), conflicts around natural protected areas (Neumann, 2003), forest conservation (Page, 2003), extractive activities (Bridge, 2007; Burry, 2005) and peasant conflicts over natural resources (Basset, 1988; Vasquez and Liverman, 2004). From late 1990s, this analytical approach has been expanded to the city (Gandy, 2002; Heynen et al, 2006; Kaïka, 2005; Swyngedouw, 2004; Swyngedouw and Heynen, 2003), a subject that will be presented and discussed in the following section.

2.2.1 Nature, society and infrastructure in the city

The field of UPE provides suitable tools for introducing political ecology into the city (Angelo and Wachsmuth, 2014) by interrogating the complex and interrelated socio-ecological transformations taking place in urban environments. For Lawhon et al. (2014:500) UPE is defined as a field of research “concerned with the process of urbanization of nature, or the social, cultural, and political relations through which material and biophysical entities become transformed in the making of often unequal cities”. From this perspective, scholars in this academic tradition argue that the uneven production of urban environments needs to be understood within the context of broader economic, political and socio-cultural relations that have conducted to urban environmental change (Swyngedouw and Heynen, 2003).

The program of UPE attempts to tease out who gains from and who pays for, who benefits from and who suffers from particular process of socio-environmental change and addresses questions of power relations and the networked and scalar geometries of these relations – through which uneven and unjust urban transformations are taking place (Heynen et al., 2006; Swyngedouw and Heynen, 2003). Not surprisingly, therefore, issues of inequalities, justice and poverty are often the focus of research within the field of UPE (Lawhon et al., 2014). Particularly, studies on water inequalities in urban contexts have received considerable attention within this body of thought (see, for example, Gandy, 2002; Graham et al., 2013; Kaïka, 2005; Loftus, 2006b; Swyngedouw, 2004).

Debates in UPE provide an important point of departure in retheorizing society-nature relations in urban contexts, as it is recognized that city and nature do not exist independently from each other (Gandy, 2002; Kaïka, 2005; Swyngedouw and Heynen, 2003; Swyngedouw, 2004). Scholars working in this field of inquiry call for a critical engagement with the theorization of urban processes as socio-natural processes (Gandy,

2002; Heynen et al., 2006; Kaïka, 2005; Swyngedouw, 2004) in order to avoid conceiving the city as a purely social site separated from the non-human world. This conceptualization challenges frameworks that portrait cities as “unnatural” places and urbanization processes as the source of the problem (Braun, 2005), a perspective largely supported in the literature on “the sustainable city” (Swyngedouw and Kaïka, 2000).

While sustainability frameworks tend to centre on pure technical matters of proper planning and design leading to a highly aesthetic and deeply ideological understanding of urban nature (Braun, 2005), they have become largely silent on questions of social inequality and injustice as well as patterns of inclusion and exclusion. This interpretation is largely attributed to mainstream theoretical frameworks that have traditionally analysed nature and society as two separate and isolated fields, obstructing the real understanding of environmental problems. This nature-society dichotomy perhaps owns its origins in the century-old philosophy of environmental determinism that romantically conceptualizes nature as fragile, pristine and untouched by man activity, constantly under threat and in danger to disappear. In other words, such studies perceive nature as the antithesis of society and thus, by definition, incapable of being “produced” by humans within their economic systems (Castree, 2000).

In the area of ecology for example, the built environment and the urban structures that go into it have been excluded from any theoretical and practical considerations, producing a radical separation in the understanding of urban processes from environmental-ecological analysis (Harvey, 1996). For industrial ecology, in particular, nature is contextualized as static and external category, a source of raw materials for cities and the destination for waste disposal (Castán Broto et al., 2012; Wachsmuth, 2012). Here cities are often represented as a self-contained system opposite to nature, which operate as a model of inputs and outputs of water, electricity, material and wastes. For example, the concept of urban “ecological footprint” constitutes one of the methods that measure flow rates through the city (Wackernagel and Rees, 1996) in isolation from wider historical and social processes (Gandy, 2004). This spatial metaphor centres on understanding the environmental impact of cities by positing cities as antithetical to “natural material cycles” (Gandy, 2002; Wachsmuth, 2012), or as sites where nature stops (Kaïka and Swyngedouw, 2011). Powerful arguments like this are quite problematic because they conceive the city as the source of many environmental problems while nature is presented as an entity separated and excluded from human relations.

Kaïka (2005: 24) suggests that the city should be conceptualized “as a process of continuous—but contested—socio-ecological change, which can be understood through the analysis of the circulation of socially and physically metabolized “nature””. To follow

the flows of metabolized water through the city as a process that is both physical and social, this research mobilises the concept of waterscape (Budds and Hinojosa, 2012; Loftus, 2007; Perreault et al., 2012; Swyngedouw, 2004), a constructed landscape that continuously changes and transforms by sustaining a complex assemble of institutional frameworks, discursive practices, technical choices, social practices and struggles over meanings that usually surpass a fixed scale. Swyngedouw (2004:3) particularly defines the waterscape as "a manufactured landscape, one that is wrought, historically and geographically, from a mesmerizing mixture of local, regional national, and international socio-economic and political-ecology processes and struggles". A waterscape approach has been increasingly used among academics working on the field of political ecology of water to dissolve the nature-society dichotomy in order to illustrate how water, power and capital fuse together to produce highly uneven urban environments.

Although there is a broad consensus that the watershed is the appropriate geographical scale to approach issues of water governance and management (Molle, 2009), this approach has been subject to critics because it fails to take into account political and economic processes that extend beyond the physical boundaries of the watershed (Budds and Hinojosa, 2012; Perreault et al., 2012). On the contrary, the waterscape can be deployed as extensively as possible to cover different phenomena that are spatially and temporally distant from the watershed in question (Perreault et al., 2012). Neighbourhoods (Perreault et al., 2012; Zug, 2014), urban settings (Ahlers et al., 2014; Bakker, 2010a; Loftus, 2007, Swyngedouw, 2004), rural places (Perreault et al., 2012; Sultana, 2013), river basins (Budds, 2009) and countries (Swyngedouw, 2003) illustrate the variety of sites where the waterscape approach has been mobilized within political-ecological analyses.

Through the lens of the waterscape is it possible to avoid the limitations of thinking about water in purely biophysical terms and as a static object that is subject to human manipulation. While flowing through the waterscape, water is not considered anymore as a passive and politically neutral object lacking of agency (Perreault et al., 2012). Rather, water becomes productively framed as "socio-nature" (Swyngedouw, 2004), which both shapes and becomes shaped by, uneven power relations inherent in the process of urbanization. Building on this, urbanization is understood as a process of bringing nature (water) into the city by transforming it into a commodity, and inserting it into the sphere of money. This process is composed by capturing raw water (e.g. surface water, groundwater) from distant reservoirs, treating it to make it suitable for human consumption, transporting it to individual households in the form of cubic meters through complex infrastructure networks and integrating it into transnational capital flows. This conceptualization, therefore, offers an alternative vantage point from which

to evaluate how the flow of water is not only a physical process, but also a social process as water becomes integrated into a strategy of capital accumulation while sustaining inequalities in access in the urban realm.

Scholars in the area of UPE acknowledge that the city is not where nature stops. Instead, nature has been transformed and utilized in the process of making and remaking cities. As UPE has begun to challenge the view that cities are the antithesis to nature, cities have been productively conceptualized “as metabolic vehicles constituted in and through metabolic circulatory socio-ecological flows” (Braun, 2005: 15). In this regard, concepts such as metabolism and circulation become central theoretical lenses for understanding how social power relations redirect material flows as discussed below.

2.2.1.1 Urban metabolism and circulation: understanding nature-society interactions

Drawing on the work of Nik Heynen, Maria Kaïka and Erik Swyngedouw (2006), the organization of Medellín’s urbanization processes will be contextualized within the metaphors of metabolism and circulation as they serve as useful entry-points for a critical reformulation of the social-environmental basis of the city’s existence and its change over time. According to the authors (2006: 13), metabolism and circulation are “mobilized as a guiding vehicles that permit casting urbanization as a dynamic socio-ecological transformation process that fuses together the social and natural in the production of distinct and specific urban environments”. These scientific metaphors have been taken from the medical sciences and being broadly applied to urban planning studies as they provide a new reading of the urban conditions in terms of flow, process, change, transformation, and inter-connectedness. Both concepts have emerged in the mid-nineteenth century and since then they have been connected to projects, visions and practices of modernization, and with the associated “modern” transformation of the city (Swyngedouw, 2006).

The understanding of metabolism in UPE is rooted in a Marxist theory. Metabolism has been used to analyse the dynamic relationships between humans and nature that produces socio-natural entanglements (Heynen et al., 2006). In a capitalist political-economic system, metabolism refers to the process through which nature is drawn into the city to subsequently being transformed into commodities through the exploitation of human labour, and finally being disposed. From this perspective, metabolism is seen not as an anatomical analogy, but as the interweaving of social and biophysical process that produce new forms of urban nature (Gandy, 2004). Cook and Swyngedouw (2012: 17) argue that, “metabolism is not confined to the boundaries of the city but involve a complex process of linking places, and the human and non-humans within these places,

in uneven and contingent ways". While these metabolisms might improve the conditions of some groups in specific places, it can also affect negatively other groups somewhere else by excluding them from access to essential resources and services. Although the metaphor of metabolism has made an important effort to capture processes of socio-ecological change, Swyngedouw (2006) suggests that it requires to be bounded with another equally central metaphor, called circulation.

In a capitalist economy, the notion of metabolism is intrinsically connected with the circulation of capital. Swyngedouw and Heynen (2003:905) capture this phenomenon by pointing out that

The circulation of capital as value in motion, then, is the combined metabolic transformations of socio-natures in and through the circulation of money as capital under social relations that combine the mobilization of capital and labour power.

Thus, metabolism serves to illuminate the circulatory processes that underpin the transformation of nature into essential commodities (Gandy, 2004). By taking the distribution of urban water as an example, is it possible to observe how water and capital become intertwined through a metabolic process, so circulation becomes a key concept in the production, reproduction and survival of capitalist relations of production (Loftus, 2012). Thus, the circulation of water through the city is strongly entangled with the circulation of capital and power operating at different geographical scales. Matthew Gandy (2004) captures this phenomenon in his own work on the water supply system in New York City, as he employs the metaphor of circulation to express the double circulation of money and water within the water supply network. He (2004: 8) contends, "it is capital that represents the most powerful circulatory dynamic in the production of modern cities".

Urban infrastructures are essential objects to sustain and secure the continuous circulations and metabolisms of modern urban life (Graham, 2006; Graham and Marvin, 2001; Kaïka, 2005). They are the mediators through which the constant transformation of Nature into City takes place (Swyngedouw and Kaïka, 2000). Thus, massive and capital-intensive infrastructure networks are necessary preconditions to secure the circulation of metabolized water. A set of technological devices such as tanks, pipes and networks help to transport water from distant places located outside the cities to individual households, thereby, the process of mobilizing and homogenizing water serves to sustain the urban metabolism through which particular capitalist social relations are organized. This argument will frame the spatialization of inequalities in the urban waterscape, as discussed in detail below.

2.2.1.2 Spatializing inequalities through infrastructure networks

UPE pays particular attention at how urban infrastructure networks are produced and transformed at the intersection between flows of capital and flows of nature (Gandy, 2002, 2008; Swyngedouw, 2004). The transformation of water into urban nature would be impossible to conceive without the development of infrastructure networks. Whilst these physical artifacts might appear as simple and invisible technical measures to effectively organize the continuous flow of water through the city, they can also be understood as instruments that embody power relations that accompany and enable capitalist modes of production. McFarlane and Rutherford (2008) make a strong call to open the “black box” of urban infrastructure in order to explore how the politicization of this physical fabric both discursively and materially produces specific socio-spatial configurations as well as distinctive notions and ideals of citizenship.

As urban infrastructure networks support the simultaneous circulation of flows of water and flows of capital, they become a productive field for understanding the way in which this double circulation constructs and reconstructs contested urban waterscapes. The increasing commodification of water services entails the reconfiguration not only of nature-society relations, but also of networked systems towards a more efficient circulation of capital. Despite of the growing academic literature centred on the nature-society separation, little is known on the spatial implication of this separation (Braun and Castree, 1998; Kaïka, 2005). This research addresses this gap by examining the splintering of the water infrastructure networks as the most vivid material expression of the nature-society dualism. Drawing on the *Splintering Urbanism* thesis developed by Stephen Graham and Simon Marvin (2001), it is argued that the reshaping of urban infrastructure networks is primarily embedded in recent waves of neoliberal reforms.

Graham and Marvin's argument is strongly rooted in the Western world by assuming the prevalence of a “modern networked city” that has been fragmented through neoliberal processes. However, this work can be peculiarly unsuited for many cities in the global South as splintered infrastructure networks can be traced back to colonial times and not to recent neoliberal reforms. In these contexts, the process of universal access was never achieved. This is the case of cities developed under European colonialism such as Mumbai (McFarlane, 2008; Gandy, 2008), Lagos (Gandy, 2006) and Jakarta (Kooy and Bakker, 2008) where water and sanitation infrastructure networks were built in favour of colonial elites while the majority of the native population was excluded. The colonial legacy of differentiated and highly selective processes of accessing water and infrastructure networks was deeply rooted in policies of discrimination that made a clear distinction between clean, modern and civilized

Europeans and elite population while the rest was subsumed under to category of native, dirty, uncivilized and primitive (Desai et al., 2014; Gandy, 2008). This suggest that there is a need for a deeply historical contextualization when applying the argument of *Splintering Urbanism* in order to prove that water inequalities are inextricably bound up with recent political and economic processes that caused the collapse of the “modernist ideal” of universal water services.

From this perspective, infrastructure networks are productively viewed as an integral component of the urbanization of nature. As Kaïka and Swyngedouw (2000: 124) rightly note, “water supply networks, for example, are the means of transforming H₂O (a natural element) into potable, clean, translucent water (a socially produced commodity embodying powerful cultural and social meanings)”. Through them companies, elite groups and organizations are able to extend their influence in time and space in order to reach their goals (Graham, 2000; McFarlane and Rutherford, 2008). Therefore, infrastructure networks are involved in sustaining uneven social power relations inscribed in socio-ecological metabolisms that permit the circulation of capital.

The functioning of contemporary urban infrastructure networks reflects and embodies dominant interests and positions aiming at turning water into money and inserting it within transnational circuits of capital accumulation. This suggests that the increasing fragmentation of the water infrastructure networks should be understood as a historical and multi-faceted phenomenon that articulates political and economic factors operating not only in local arenas, but also in transnational ones. This research provides a historical background that considers two key moments in water supply provision - the municipal hydraulic paradigm and the neoliberal modernization – and elucidates how urbanization processes have been closely intertwined with infrastructure networks, discursive representations of nature and citizenship rights.

The municipal hydraulic paradigm and the universalization of access

The municipal hydraulic paradigm of water management was the approach selected in most of the countries to manage water supply systems in the beginning of twenty century (Bakker, 2005; 2010a; Gandy, 2004). This mode of water provision emerged in response to the concerns over deteriorating environmental conditions and increasing epidemic diseases such as cholera and typhoid, which threatened the social and political cohesion of the entire city by affecting not only the poor but also the middle and upper classes (Gandy, 2004). Prior to this municipalization period, private companies supplied water to a minority of households, especially those located in wealthier parts of the city in order to generate profits for the investors.

In most colonial cities, for example, water infrastructure networks were unequally distributed. Areas inhabited by colonial and local elites were sufficiently supplied with water while the rest of the city relied on public taps, rivers or contaminated wells and ponds for water provision with disastrous consequences for public health (see, for example, Gandy, 2008; Kooy and Bakker, 2008; Swyngedouw, 2004). As water was considered to vital to be left to the intentions of private interests and in response to the failure of private operators to supply the rapidly growing urban population with a proper piped water supply system, the national state assumed a leading role as owner, manager and regulator of infrastructure projects. The “market failure” argument was evoked to justify the municipal hydraulic paradigm.

During this period, the state embarked in the construction of standardized and integrated systems of networked water supply over whole urban areas according to the demands of the “modern infrastructural ideal”, which many cases emulated European models of water provision. This network was conceived and developed along the principle of universalization of access and commitment to social equality, which required a significant government intervention. The management of water supply systems in the hands of the state relied not only on economic, but also on ethical arguments. As Bakker (2003b) notes, running water inside individual households was considered to be a powerful material emblem of citizenship.

Under the state hydraulic mode of regulation, the state played an important role in protecting ordinary consumers against the abuse in prices established by natural monopolies and securing protection of public health. Social rights were given priority over market interests. Hygiene reforms were put into place through standardized water services to promote a sanitized and deodorized urban environment (Graham and Marvin, 2001). Changing attitudes towards public health served as a pretext for the modernization of the city’s water supply systems, which reflected wider political and economic interests for capital investment (Gandy, 2004). Infrastructure networks began to be seen through organic metaphors as the “circulation systems” of the nation, in which the power, legitimacy and territorial definition of the modern nation state become materialized (Graham and Marvin, 2001). Thus, investments in the water sector become a mechanism of legitimization of the state, while simultaneously playing a supportive role in capital accumulation as a vital input to process of rapid urbanization, industrialization, and agricultural modernization (Bakker, 2002).

The municipal hydraulic model was also characterized by the introduction of large-scale and capital-intensive engineering projects (e.g. dams, infrastructure networks, aqueducts and canals) aiming at transforming, homogenizing and standardizing water in the benefit of a new urban society. These massive and fixed

infrastructure systems served to cover the large demands of the industrial sector, while simultaneously satisfying the needs of the growing urban population who accessed services by means of subsidies. This infrastructural development became part of a Fordist-Keynesian state largely dependent on external capital flows, mainly in the form of bilateral and multilateral loans vulnerable to currency fluctuations. This aspect is pointed out by Erik Swyngedouw in his work of water access and exclusion in Guayaquil, Ecuador, where he comments that the success of such lending schemes was reliant on a sustained export based economy which was generated on the basis of cocoa, banana and oil exports (Swyngedouw, 2004).

By the late twentieth century, due to process of deindustrialization and economic crisis, investment priorities changed and the efficiency of the municipal hydraulic paradigm became underestimated. Water infrastructure networks experienced a decline in the levels of investment leading to widespread dilapidation and abandonment (Gandy, 2004). The provision of entitlements of water supply was categorized as an unsustainable practice because water was considered available in unlimited quantities, and its provision for free or a minimum price could trigger perverse economic effects such as low cost-recovery rates (Winpenny, 1994). Such conditions underpin the emerging discourse of water scarcity, which could facilitate the implementation of commercialization strategies and the introduction of a new ethic of efficiency (Bakker, 2002). The construction of large dams became a subject of high criticism because of the environmental and human impacts generated including forced displacement of local population, flooding of cultural heritage sites and destruction of fragile aquatic ecosystems. However, in Latin America, dam construction continues to be a contested issue until today. Since the mid-1970s, the municipal hydraulic period was coupled with a deep fiscal and ideological governmental crisis with undermined long-term investment in infrastructure (Gandy, 1997, 2004; Bakker, 2010a). This condition served to pave the way for the introduction of neoliberal reforms as it is described below.

Neoliberal modernization and the selective categorization of citizenship

The municipal hydraulic era was displaced by a period of neoliberal modernization, which promised to solve the urban infrastructure crisis by applying market-oriented strategies. The underlying assumption is that the market can provide water supply services in a more efficient way compare to the state (Bakker, 2003a). Such a shift also entailed a new conceptualization of the term efficiency, which became closely connected to conservation (ibid.). In this sense, markets are not presented anymore as the cause of environmental concerns; instead they are the solution to achieve environmental protection and guarantee a better distribution of scarce resources.

From this perspective, neoliberalism should be considered not only a political and economic project, but also an environmental one. The environmental dimension of neoliberalism is best captured by the term "market environmentalism" a form of resource regulation, which promises simultaneously economic growth and environmental benefits (Bakker, 2005). The market environmentalism model has been adopted by a wide range of countries and organizations to accept that environmental protection is best achieved by means of assigning property rights, incorporating environmental externalities, applying price mechanisms to nature services, and trading these services within a capitalist market (Anderson and Leal, 2001; Liverman, 2004). As Liverman (2004: 735) rightly notes, "markets in environmental services are becoming the dominant approach to managing and protecting the environment in the twenty-first century". In Latin America, for example, these ideas have been incorporated to resources such as land, water, forest and biodiversity in order to trade them in free markets as scarce resources and at high prices while environmental sustainable allocation is promoted (Roberts and Thanos, 2003).

In the water supply sector, debates on the conversion of water from a public good into a commodity have been around since 1980s with the predominance of the Washington Consensus reforms and later on with international declarations such as the Dublin Principles in 1992 and Hague Declaration in 2000. Since then, the introduction of market logics in the delivery of water services has been recognized as the most efficient way to improve coverage in urban areas and promote conservation strategies. The "state failure" argument was evoked to justify the market environmentalism model. Activities formerly undertaken by the state have become redistributed among panoply of different actors ranging from transnational corporations to grassroots organizations (Gandy, 2004) while the World Bank has positioned itself as an international key player in water governance by furthering neoliberalisation agendas (Bakker, 2010a; McDonald and Ruiters, 2005).

Neoliberal policies have been introduced through cost-recovery strategies, which means that processes should reflect the full cost of water infrastructure and maintenance in order to achieve sustainable services while consumers should pay for what they use. It is assumed that consumers paying for consumption at cost-reflective prices will use water more efficiently and will refrain from unsustainable behaviour compare to those consumers who are served by unmetered systems. Infrastructure reforms focus on economic equity (the willingness-to-pay principle) rather than social equity (ability-to-pay principle), thus, essential humanitarian objectives such as health and well-being become undermined while the full enjoyment of citizenship rights becomes closely connected to the capacity to pay.

Under market environmentalism, high water prices would encourage efficiency and conservation practices compare to treating water as a public or free good. This argument is supported by a constructive discourse of water availability: water is ideologically re-presented as a scarce resource in order to inculcate the “real” value of water to consumers as well as to introduce the foundation for market mechanisms in water provision (Kaïka, 2003; Swyngedouw, 2004). Thus, treating water as a fundamentally scarce resource offers the ideal justification for its commodification. Swyngedouw (2009: 57) rightly notes, “The hegemonic neoliberal arguments claim that the market offers the optimal mechanism for the allocation of presumably scarce water resources”. This argument is explored in detail by Maria Kaïka in her book *City of Flows*, where she contends that the drought experienced in Athens between 1989 and 1991 was used by the water supply company as a political tool to enable reframing water as an economic good, and therefore, legitimizing the increment in the price of water by up to 300 per cent (Kaïka, 2005).

From a technical perspective, whilst infrastructure networks were standardized and homogeneously organized during the municipal hydraulic model to supply users with basic water demands, under market environmentalism, market logics become imprinted not only on discursive practices, but also on infrastructure networks through the introduction of technologies that control water circulation (e.g. flow limiters, prepaid systems). As a result, the introduction of market mechanisms have induced a socio-spatial restructuring in order to establish new regimes of capital accumulation, which consequently have produced the splintering of water infrastructure networks and the selective categorization of citizenship.

In sum, the increasing commodification of water services entails the reconfiguration not only of social relations to nature, but also of networked systems towards a more efficient circulation of capital. Urbanization processes, therefore, need to approach to nature not just as a biophysical element, which is used to construct the city, but also as a commodity that is integral to dynamics of capital accumulation (Gandy, 2002). This recognition opens up the possibility for understanding how the flows of water through infrastructure networks are subject not only to its biophysical dimension, but also to highly unequal social power relations, which are inherent of new emerging forms of neoliberal governance.

2.3 Governing urban natures

In the last decade, debates over water supply have been dominated by the putative merits of the public and private sectors, which tend to encourage a focus on ownership, either public or private. Supporters of the private sector claim that the intervention of market forces and private ownership is crucial to improve efficiency in water supply services. Advocates of this argument assert that the private sector performs better than the public sector which is overwhelmed with problems of corruption, bribery, high water losses, overstaffing, unresponsive behaviour and low levels of cost-recovery and they claim that treating water as an economic good guarantee better sustainable water practices (World Bank, 1997, 2004; Shirley and Walsh, 2001; Kessides, 2004; Johnstone and Wood, 2001). In contrast, promoters of the public sector reject any involvement of private interests in water provision by arguing that companies under public control perform as well as their private counterparts, when properly supported and resourced, and they claim that it is unethical to profit from water as it is a non-substitutable resource essential to human life (Bayliss, 2002; Goldman, 2005).

However, neither private nor public enterprises have been able to ensure access to water the growing urban population. Private enterprises, for instance, have been pressed to transfer the management of water supply services to municipal authorities as a consequence of corruption, excess of profits, high water tariffs and low water quality. This transition from private to public provision, a process known as remunicipalization, has taken place in cities not only in the global South, but also in the global North (Beveridge and Naumann, 2013, Lobina et al., 2014; Pigeon et al., 2012; Perreault, 2006; Spronk et al., 2012).

Another important phenomenon that has begun to attract the attention of scholars is commercialization, a form of entrepreneurial behaviour adopted by public companies to mimic private sector strategies (Bakker, 2010a). State-owned companies operating under private principles pose particular challenges, as it is difficult to delineate clear borders between the public and the private (McDonalds, 2014; Spronk et al., 2014). Additionally, they raise complex and conflicting questions about the meaning of "public" and the nature of the state (McDonalds, 2014). This is largely attributed to competitive strategies undertaken outside their domestic market (e.g. transnationalization) while implementing prepaid systems, disconnecting for non-payment, and educating customers under neoliberal logics as the case of EPM will show in the following empirical chapters.

Hence, authors such as Bakker (2010a) and Swyngedouw (2006) suggest that associating public ownership with non-profit and private ownership with market is thus

relative, and highly contextual, as legal and regulatory frameworks for water supply provision change significantly according to different geographical locations. Some academic debates have recently recognized the necessity to move away from these polarized positions by acknowledging the conceptual and political limitations of discussing performance and efficiency from the perspective of ownership (public-versus-private) (Bakker, 2010a; Braadbaart, 2002; Budds and McGranahan, 2003; McDonald and Ruiters, 2005). As Swyngedouw (2006:47) rightly argues, “the key question is the power geometry through which water ownership, control, distribution, and access is organized”, rather than the public or private character of the company. Answering to this call, this study seeks to move beyond this public-private binary (or the state versus market activity) as focus on ownership fails to short to explain the failure to provide water in Medellín’s low-income areas. Instead, it shifts the attention towards the political, economic and ideological contexts in which particular modes of governance emerge (Bakker, 2010a; Castro, 2006).

2.3.1 Governance and citizenship

The exclusion of large sectors of the urban population from adequate access to water either by public or private companies is closely linked to formal institutional strategies that tend to give priority to neoliberal forms of water management over substantive democratic governance and citizenship (Castro, 2008a). Before concepts such as governance and citizenship are introduced, it is important to clarify the definitions adopted in this study. Although governance assumes a uniform, uncritical and widespread understanding, the term has been characterized by variety of different meanings and implications, according to disciplinary and ideological contexts (for an overview, see Bridge and Perreault, 2009).

In the language of policy makers, the term governance is defined as the range of political, organizational and administrative processes, through which different stakeholders (including non-traditional actors such as NGOs and social movements) articulate their interests, exercise their legal rights, take decisions and mediate differences (Bakker, 2010a; Rogers and Hall, 2003; UNDP, 2007). As a concrete example, the Commission on Global Governance defines governance as “the sum of the many ways individuals and institutions, public and private, manage their common affairs. It is a continuing process through which conflicting or diverse interests might be accommodated and cooperative action may be taken” (Dalby, 2002, cited in Bridge and Perreault, 2009: 484). Consequently, cooperation becomes critical for achieving effective governance that can help moving towards a more sustainable future (UNEP, 2009).

However, the conceptualization of governance described in this literature encounters some constraints as the term is presented as a neutral, instrumental and technical strategy for policy implementation, which lacks of any political content and is largely silent on questions of social power. In an apparent paradox, governance, which is essentially a political process, becomes depoliticised in the policy literature (Castro, 2007). Governance, in these idealized terms, positions the state, the market and civil society as equal partners whose participation in decision making take place in symmetrical and transparent forms, when in practice, the term evokes an asymmetrical and non-transparent partnership in which actors tend to have different proportions of political power and knowledge. Additionally, the term "civil society" is deployed in idealized terms as the realm of reciprocity, voluntary action and solidarity (Castro, 2007).

Real practice shows that in the global South, civil society refers to a small minority of the population who are fully rights-bearing citizens in the sense imagined by Western political theorists (Chatterjee, 2004). Civil society is often restricted to minor political and economic elites while the majority of society are excluded or marginalized to participate meaningfully in the social and political life or to take part in decision-making process. In this sense, the notion of symmetrical participation is meaningless. Denying the enjoyment of full access to the status of citizenship obstructs people's capacity to exercise democratic control over public or private actors in charge of delivering essential public services (e.g. affordable and safe water and health services). In the water sector, for instance, neoliberal practices make a selective distinction of citizens by identifying who is entitled to access to water and who is excluded according to the ability to pay. By doing so, particular subjects are created with behaviours that better respond to the necessities of the market. This phenomenon is captured by the anthropologist James Ferguson (2009:172) who points out that under neoliberalism "the *responsibilized* citizen come to operate as a miniature firm, responding to incentives, rationally assessing risks, and prudently choosing from among different courses of action".

As discussed above, the mainstream definition of governance has little to contribute to the resulting imbalance in power configurations and inequalities in the allocation of resource rights, aspects that particularly characterize governance. As Bridge and Perreault (2009: 475) rightly argue, "the vagueness and malleability of the term serve to obscure a broad range of interests and ideological positions". Another problem that encounters this classical notion of governance is that it fails to consider the reasons why a plethora of non-state actors (e.g. bilateral aid agencies, transnational corporations, non-governmental organizations - NGOs), emerge while at the same time it hides and disguises the reasons for the "retreat" of the state and its implications. It

fails to interrogate core political questions such as who participates in decision-making? What is the role of civil society in this process? Which mechanisms of participation are available? And, whose interests are being protected and excluded?

In order to expand the idealistic and classical formulation of the concept of governance introduced above, this study deploys governance to describe institutional strategies and decision-making processes and practices by which formal and informal decisions are made regarding distribution, access, control and management of natural resources in a neoliberal economy (Bridge and Perreault, 2009). Through this conceptual lens, is it possible to transcend the conventional and traditional formal institutional strategies (e.g. regulations, laws, rules) to include informal tactics and strategies (e.g. bargaining, solidarity and negotiation) through which natural resources are governed. Thus, the importance of institutions in this study relies on the fact that they have a significant influence in deciding which actors gain access to water resources and which ones are excluded, and in creating geographies of enclosure and exclusion that enable the mutual co-existence of abundance and scarcity.

Whilst institutional strategies become arenas in which particular neoliberal ideals become promoted and implemented, they also reflect incoherent contradictions inherent of processes of capital accumulation. To unpack these contradictions, I use the conceptual framework of governance failure (Bakker, 2010a). This lens becomes analytically useful for addressing how institutional strategies framing water supply provision are actually experienced by low-income households in sometimes unexpected, and often contradictory ways. In other words, the concept allows for a detail empirical examination of how institutional strategies fail to provide low-income households with affordable and adequate urban water supply services, even though they are entitled to this fundamental right.

Governance failure applied to the case of disconnection for non-payment in Medellín facilitates tracing the main factors that undermine low-income households' capability to secure access to water, despite high coverage rates. This perspective, therefore, permits going beyond economic approaches that tend to simplistically interpret disconnection for non-payment as a phenomenon associated to poverty, and it places a strong emphasis on non-economic aspects. This interrogation permits bringing human agency into the forefront by recognizing low-income households as active agents in establishing norms of everyday governance. Governance failure, therefore, offers the possibility to explore how the profound changes in Medellín's urban waterscape are attributed not just to the EPM's transformation into a *multilatina*, but also to the daily practices of *desconectados* to secure access to water.

But, what exacerbates governance failure? By drawing on neoliberalisation of nature literature, this study critically analyses recent governance shifts in water supply provision and their deeply contradictory outcomes as a result of the imposition of neoliberal oriented principles. This research suggest that this literature is particularly useful for the studies in water inequalities as it generates useful insights into understanding the connections between neoliberal principles and policies, on one hand and the natural environment on the other hand (Castree, 2010; Heynen et al., 2007; McCarthy and Prudham, 2003) as further discussed below.

2.3.2 Neoliberalisation of the natural environment

Critical geographical research on nature's neoliberalisation provides diverse empirical studies to analyse the impacts of neoliberal reforms on particular geographical locations and specific biophysical resources and environments including water (Bakker, 2005; Smith, 2004; Budds, 2004; Loftus and McDonald, 2001; Perreault, 2005, 2006); wildlife (Robbins and Luginbuhl, 2007); gold (Bridge, 2007; Burry, 2004, 2005); fisheries (Mansfield, 2007; St. Martin, 2008); wetlands (Robertson, 2007); land (Correia, 2007; Wolford, 2007); forest (McCarthy, 2005, 2006), etc. This body of literature has been undertaken in the majority of the cases by critical geographers to question the reconfiguration of society and nature relations in a neoliberal economy (Castree, 2008a 2008b; Heynen et al., 2007). Although the effects of neoliberal policies have tended to be analysed in economic sectors such as unemployment, welfare systems, industrial policy and trade (Castree, 2008a), nature's neoliberalisation literature opens up a fruitful ground to examine how neoliberal policies are connected in practice to the biophysical world, a topic that has remained largely unexplored in critical scholarship.

Although neoliberalism apparently enjoys a uniform understanding, finding a concrete definition is not a straightforward task. There is a significant variation in the way the term is used in contemporary scholarship, thereby, been subject to highly controversial debates. As Peck et al. (2009: 96) point out, "neoliberalism has become a rascal concept". In perhaps the strictest sense, the term stands for a complex congregation of ideological commitments, discursive representations, and institutional practices that further the implementation of market-oriented policies (McCarthy and Prudham, 2003) and supports particular paradigmatic changes in the relations between state, market and society and the non-human world (Castree, 2010). The institutionalization of neoliberalism takes place through a wide range of strategies such as privatization and commercialization of services formerly provided by the state; extension of private property rights, labour market flexibility, shift to full cost-recovery

for services that were formerly subsidized, and restructuring of the state apparatus in a way that tend to strength private authority (Heynen et al., 2007; McDonald, 2007).

Neoliberalism has profoundly influenced international development thinking by establishing the basic rules for global lending agencies operating in the crisis-torn economies such as Africa, Asia and Latin America, and the former Soviet Union (Peck and Tickell, 2002). International organizations such as the International Monetary Fund (IMF) or the World Bank strongly suggest through their structural adjustment plans that borrowing countries should adopt neoliberal policies. In Latin America, the "laboratory for neoliberal experiments par excellence" (Sader 2009: 171), neoliberal reforms have been aimed at the decentralization of administrative authority and the transfer of state-companies to transnational enterprises (Perreault and Martin, 2005).

Several scholars have pointed out the necessity to look at neoliberalism as continually evolving, hybrid, differentiated and complex set of policies, discourses and ideas rather than a universal, monolithic and coherent policy (see Castree, 2007; Peck and Tickell, 2002; Peck, 2001; Perreault, 2006) whose effects are not geographically uniform. As McDonald (2007: 71) points out, "neoliberalism is never exactly the same in two places". Neoliberalism in Europa or USA, for instance, has unfolded in different ways compared to Africa where Ferguson (2009) claims it has taken the particular form of recolonialization. Perreault (2006: 153) also supports this point by suggesting that, "neoliberalism is best thought of not as an end product, but as a variegated and highly contested process riven with internal contradictions". To avoid the pitfall of treating neoliberalism as a "uniform thing", several scholars suggest making an analytical distinction between the terms neoliberalism and neoliberalisation (e.g. Brenner and Theodore, 2002; Castree, 2010; Heynen et al., 2007). While neoliberalism refers to singular and coherent ideologies and institutions associated with the political-economic project to further commodification and market imperatives, neoliberalisation represents the practices, processes and networks through which these ideals and policies are promoted and implemented (Castree, 2010; Harris, 2009).

Additionally, it is suggested that neoliberalisation should be analysed not only as a political and economic process, but also an environmental (Bakker, 2010a; Castree, 2008a; 2010a) and socio-spatial one (Peck et al., 2009). This multidimensional character can be observed through the transformation of society-nature relations in a way that the latter becomes a commodity to be tradable in the market. This process has profound implications for access, control and use of natural resources and with effects that are environmental and spatial differentiated. However, neoliberalism should not be taught as a fixed condition having unitary effects. Outcomes may be positive or negative depending on particular geographical and historical contexts (Bakker, 2010b). This

research discusses in great detail three key aspects within the neoliberalisation of nature literature in order to understand the trajectories and effects of specific neoliberalisation processes when articulated to different types of natures:

- *Strategies of nature's neoliberalisation*: Rather than being homogenous and undifferentiated, neoliberalism is a heterogeneous project (privatization, commercialization and commodification).
- *The role of the state*: Rather than simply entailing deregulation, neoliberalism requires an active involvement of the state in regulatory actions.
- *Nature's materiality*: Rather than being a static or raw material lacking of agency, nature should be framed as an actor as it poses challenges and obstacles or provides opportunities to different types of neoliberalism.

2.3.2.1 Strategies of nature's neoliberalisation

Market principles and practices have been increasingly articulated to a greater variety of biophysical resources in different geographical contexts. Scholars within the field of neoliberalisation of nature have particular manners to conceptualize neoliberalism and to measure the effects of nature's neoliberalisation, which brings them to a wide diversity of conclusions (Castree, 2008a; Heynen et al., 2007). In line with this, Castree (2008a, 2008b) notes that the new case-study literature on neoliberalisation of nature is characterized by serious deficiencies. He calls for a more analytical precision with respect to the analysis of a variety and interlinked set of reforms, which are often over-simplified or grouped, in a single, hegemonic and undifferentiated process called "neoliberalism" (Bakker, 2010). Responding to Castree's call, Bakker (2010a) develops a very helpful analytical typology for a more accurate understanding of neoliberalisation in situ that considers multiple modes of property rights and service provision and applies it to the water supply sector. She distinguishes three different types (or modalities) of neoliberal practices: privatization, commercialization and commodification.

Privatization involves a change in ownership, or a transfer of management from public to private control (Bakker, 2010a; Mansfield, 2008) and it is often involved in limiting rights to access (Guthman, 2008). Cases in Latin America where water supply systems are managed by private operators include: La Paz by the French company Suez, Santiago de Chile and Cartagena by Aguas de Barcelona from Spain and Guayaquil by

the American company Bechtel. Commercialization involves changes in resource management practices, which introduce commercial principles (such as cost-recovery, competition and efficiency), commercial methods (such as cost-benefit assessment, performance contracts), and commercial objectives (such as profit-maximization) (Bakker, 2005). Privatization involves organizational change, differing from commercialization, which involves institutional change (in the sense of laws, rules and regulations) (Bakker, 2010a). Although, these two types of neoliberal practices may overlap in practice, Bakker stresses the importance to make distinction between them (ibid.).

In practice, privatization or private sector participation often involves commercialization. However, in some cases commercialization can also occur without privatization as water services run in a business-orientated logic while the ownership remains under public hands without the involvement of private sector (McDonald and Ruiters, 2005). Under this modality, it is difficult to make distinction between the state and the market, or the private and the public as state practices are reformed by introducing private sector practices.

From a neoliberal point of view, the transformation of a natural resource into a commodity does not occur neither within privatization, nor commercialization (Bakker, 2010a). Commodification is necessary to convert a resource into an economic good, through the application of mechanisms that enable the resource to be brought, sold or traded at a price determined by the market (Bakker, 2010a; McDonald and Ruiters, 2005). Although commodification and commercialization are related processes, Bakker (2005: 544) suggests that an analytical distinction between them is necessary as the "latter entails changes in resource institutions, a necessary but insufficient condition for the former, which involves the conversion of a resource into an economic good".

In the water sector, commodification functions as a process in which water supply services become monetised and the market becomes a key social institution influencing accessibility and encouraging individual consumption. Aspects such as competition and efficiency determine allocation. However, commodification should not be only confined to economic terms. McDonald and Ruiters (2005:23) suggest that "commodification is a systemic and comprehensive transformation of our material lives; price is merely its external appearance". These interpretation questions oversimplify definitions of commodification as a process that simply attach a price to a good or service that used to be provided without any cost (ibid.). A political economic perspective goes beyond price mechanisms by understanding commodification as a multidimensional process. Bakker (2005) suggests that the multidimensional character of commodification entails the following transformations: *Institutional* (changes in norms, rules and regulations);

discursive (transformation in the meanings and values assigned to nature in order to be extracted from biophysical contexts, valued, and displaced); and *material* (physical interventions that permit the standardization of nature to be amenable to exchange).

In sum, the type of reforms developed above (privatization, commercialization and commodification) become analytically useful in characterizing processes of neoliberalisation of nature as it enables to avoid the oversimplified and hegemonic status of neoliberalism, conduct comparative analysis of different types of neoliberalisation, identify the pathway of specific neoliberal reforms as well as systematically evaluate strengths, weaknesses and results (Bakker, 2010b). The ways in which these disaggregated categories unfold depend to a large extent on the role of the state and the different types of natures. The state as an “extra-economic” actor (Bridge, 2013) and nature’s materiality (see Bakker and Bridge, 2006; Bridge, 2009; Castree, 2003; Sultana, 2009) are aspects that will be analysed more in detail below.

2.3.2.2 The state as an “extra-economic” actor

The current transition from government to governance in a neoliberal economy might appear as the state has lost all its power when, indeed, it has grown significantly and society is more rule-bound than ever (Guthman, 2008; Peck and Tickell, 2002). Contrary to this often-repeated refrain, neoliberalisation entails the state as a crucial actor in creating, maintaining and intensifying the process of commodification. Polanyi (1944 cited in Castree, 2008a: 144) addressed this issue long time ago by claiming that, “the free market is a myth: markets need regulating if they are to survive”.

In a neoliberal economy, the state has been active in the establishment new legal and institutional frameworks that facilitate dynamics of capital accumulation. Entrepreneur and consumer friendly tax policies, firm-friendly labour market policies, and measures to enable “free” movements of capital represent few forms of state intervention (Castree, 2010). Additionally, the state has become more efficient to manage the interests of capital and the (inevitable) tensions and multiple contradictions of the market economy, as well as to step aside to let the market deliver the services that used to be core responsibilities of the state (McDonald, 2007). Although the mobilization of state power has changed in form, scale, type of practice or effectiveness, it remains crucially central for the proper functioning of neoliberal ideologies (Peluso, 2007).

In the water supply sector, the widespread assumptions of the “retreat of the state” under neoliberalism come into question. The introduction of market principles in the delivery of essential services such as water has been a process initiated and guided

not by the market, but by the state in response to specific strategic dilemmas, which can no longer be managed within the current political-economic conjuncture (Bakker, 2003a). The neoliberalisation of the water sector should thus be understood as a process of reregulation rather than deregulation (Bakker, 2003a, 2007; Smith, 2004; Swyngedouw et al., 2002) characterized by an emergent form of governance of natural resource allocation, which requires simultaneously organizational change (in the form of government) as well as institutional change (in forms of governance) (Bakker, 2002). This assumption brings attention to the ways in which the state repositions itself, primarily through the function not of operator but as a regulator or “market manager” of contemporary socio-natural relations with the intention to protect and make markets work more effectively. By doing so, neoliberalism puts private interests to operate within the state itself. Not surprising, therefore, the core functions of the state run “like a business” or “enterprise models” (Ferguson, 2009) while the state itself consolidates as a critical “extra-economic” actor (Bridge, 2013).

2.3.2.3 Nature’s materiality: Opportunity or limitation?

The modalities of neoliberal practices previously discussed (privatization, commercialization and commodification) vary significantly depending on the biophysical and spatial qualities of the natural resources under consideration. For example, whether a resource is abiotic/biotic, flow/static, point source/diffuse resource, opens up new possibilities for the neoliberalisation of nature literature to examine how different types of neoliberal reforms apply to specific natural resources. From this perspective, neoliberalism is at some level dependent upon the non-human world (nature) for its success as the biophysical and spatial characteristics of a natural resource posse a set of challenges, opportunities and potential limits to different types of neoliberalism (Castree, 2010).

Political economic analyses have the tendency to conceptualize unproblematically resources as objects, things, commodities or raw materials ignoring their different biophysical qualities and the socio-cultural values attached by specific social groups (Bakker and Bridge, 2006; Bakker, 2010b). These narrow approaches have contributed to the overriding conceptualization of nature in pure physical terms and as a category external to the society, thus, supporting the nature-society dualism. Additionally, they fail short to explain why and how particular natures resist being incorporated into particular political economic and spatial forms (Braun, 2008).

Several scholars have pointed out that more attention needs to be paid to the biophysical and spatial characteristics of different natural resources and their articulation with local governance frameworks, labour practices, modes of regulation, habits of consumption and affective relationships in order to have a more rigorous understanding at how processes of resource commodification unfold (Bakker, 2005; Bakker and Bridge, 2006; Bridge, 2009; Castree, 2003). Such assumption has led to geographers such as Karen Bakker (2010b: 716) to question, "why do some types of neoliberalization processes occur with respect to some types of socio-natures, and not others?" as she observes a significant variation in the articulation of neoliberalism with different types of natures. Similarly, Castree (2003: 288) notes, "commodification works rather differently depending on the specific nature in question" as some natures resist being fully commodified while others are more readily subsumed. Acknowledging this aspect offers a helpful starting point to find explanations on why neoliberalisation has been widespread in some cases (gold) (Bridge, 2007) while in other cases it was been more restricted (water) (Bakker, 2005), and why private property rights are easier to assign to natural resources that are immobile (e.g. timber, diamonds, agricultural products) compare to movable resources such as water (Bakker, 2005), wildlife (Robbins and Luginbuhl, 2007) or oceanic fisheries (Mansfield, 2007).

Nature's materiality provides a productive framework for understanding these differences by exploring how particular natures come to inflect and influence the ways that neoliberalism plays out. Materiality provides fruitful insights for interrogating nature-social relations (or in other words, rejecting the nature-society dualism) as it transforms natural resources from "dead" objects produced by human labour and culture to "living" objects produced by social relations (Bakker and Bridge, 2006). This distinct conceptualization of materiality becomes analytically useful in commodity studies to break down the economic narrow approach in which resources are often confined, and it acknowledges commodities (and spaces that supply them) as significant sites where processes that shape social relations can be understood (ibid.).

To take one example, the properties and meanings attached to a resource such as gold or forest should not be regarded as intrinsic. Instead, these properties and meanings acquire (or lose) exchange value as the resource interacts with social processes (Bakker and Bridge, 2006). In this regard, what might be viewed as a resource can change according to the historical and geographical context, meanings are multivalent and fluid as a consequence of technological change and culture that confer utility and value into resources (Bridge, 2009). What makes a thing such as timber, copper or coal to be count as a resource (or not) tells us more about what a society is rather than the substance itself (ibid.). Noel Castree (2003: 277) also shares this

sentiment when he claims that the question is not “what is a commodity? But rather what type of characteristics do things take-on when they become commodities?”

The biophysical and social character of water

Several studies undertaken in recent years have proved how markets have found remarkably difficult to profit from the commodification of water. Private companies, for example, have begun to withdraw from the water sector and forced to bring management back to public control. This process known as remunicipalisation⁶ is taking place not only in cities in the global South including La Paz (Rouse, 2009), Cochabamba (Crespo et al., 2003; Perreault, 2006; Spronk et al., 2012) and Buenos Aires (Loftus and McDonald, 2001), to name a few, but also in the global North. In Berlin, for example, the water company *Berliner Wasserbetriebe* (BWB) underwent a process of remunicipalisation triggered by a popular referendum in 2011 (Beveridge and Naumann, 2013; Lobina et al., 2014).

Greater attention to water’s materiality is important for understanding of why, this essential resource, cannot be entirely incorporated into capital accumulation relations. Water is a flow resource that moves through multiple channels (rivers, lakes, canals, infrastructural networks, sea basins) and takes multiple forms. It is bulky, non-substitutable, heavy, expensive to transport, socially and economically contested, subject to market and state failures, highly susceptible to monopolistic control (“natural” monopoly in economic terms) and requires long-term and capital-intensive investment programs (Swyngedouw, 2009). Additionally, it is subject to competing demands as it needs to be mobilized from different places to serve simultaneously water-consuming activities for industrial, agricultural, domestic, power generation, mining and recreational purposes. While it flows, water poses challenges to the establishment of property rights, as boundaries are difficult to define (Bakker, 2003a).

From a neoclassical economic perspective, water is also a resource that is not easy to commodify as it is subject to two major market failures: first, it is highly susceptible to monopolistic control due to high costs involved in building infrastructure networks (in economic terms it means that supply by one firm entail lower costs than supply by more firms). The second failure is related to externalities, which cannot be incorporated into the water price mechanisms because they are difficult to measure (Bakker, 2005). This is the case of environmental externalities such as pollution and

⁶ The Public Services International Research Unit (PSIRU), the Transnational Institute (TNI) and the Multinational Observatory published in 2014 a list of 180 cases of remunicipalisation in 35 countries. “*Here to stay: Water remunicipalisation as a global trend*”. Available at: <http://www.tni.org/briefing/here-stay-water-remunicipalisation-global-trend>.

deterioration, and social externalities such as declining infant mortality rates, and reduced health costs, which are unquantifiable in economic terms. Water due to its biophysical and spatial peculiarities has resisted commodification attempts, and therefore, has proved to be an “uncooperative commodity” (see Bakker, 2004).

Besides water’s biophysical and spatial characteristics, its social character also comes to play a critical role in the ways that neoliberalisation fails or succeed. While circulating through complex infrastructure networks, water obtains multiple -and often contradictory- meanings, a debate often framed in terms of commodity vs. right. Water acquires values as it is captured, chemically and biologically treated, filtered and transported in the form of cubic meters from distant reservoirs to the household tap. Hence, water should be framed as a commodity. On the contrary, as water is a non-substitutable resource essential for life, several scholars and activists have called for recognizing the importance of water as a right (e.g. Barlow, 2008; Shiva, 2002). Discourses over the right to water are often infused with powerful cultural, spiritual and symbolic meanings that valorise social equity over economic efficiency (Lahiri-Dutt, 2006; Swyngedouw, 2004).

Peasant communities and indigenous populations in the Andean countries, for example, are more prone to resist any attempt of commodification because water rights constitute an integral part of their cultures and identities (Boelens et al., 2010). In India, anti-privatization struggles that took place in 2002 integrated in the campaigns’ language aspects such as human right discourses, conceptions of water commons and cultural meanings of water to successfully close a Coca-Cola bottling plant (Bywater, 2012). Different meanings assigned to water make the commodification of this resource not only more complicated compare to other network utility services such as electricity, gas and telecommunication, but also more prone to widespread social protests and resistance.

This research deploys nature’s materiality to understand how water resists being commodified, particularly in low-income areas. It analyses how *desconectados* built specific alliances with different types of water in order to secure access on a daily basis. This perspective is particularly important to enrich debates within UPE literature, which have largely focussed on how power operates within particular modes of capital accumulation, while diffuse forms of power enacted by *desconectados* has remained insufficient addressed. Thus, attention to water’s materiality allows for a greater understanding of how decommodification is mobilized in low-income areas to subvert the commercialization model adopted by the water company. From this perspective, this research conceives decommodification as a political and social process to mitigate the scope and influence of the market in everyday life (Vail, 2010).

2.4 A framework to analyse contested urban waterscapes

Drawing on theoretical insights provided by UPE and neoliberalisation of nature literatures, this research develops an analytical framework for better understanding contestation over control and access to water in urban waterscapes. It suggests that attention needs to be paid to the particular connections between three salient components: *processes* (commodification and decommodification), *actors* (human and non-human) and *strategies* (discursive, material and institutional). Together, these components are useful for conceptualizing, explaining and exposing water inequalities as a problem articulated to political and economic interests operating at multiple scales. Although this conceptual framework is not exclusive or exhaustive, it serves the purpose of analysing contestations over control and access to water in urban contexts as shown in Figure 3.

1. Processes: *What* is being contested in the urban waterscapes?

Contestations in the urban waterscapes need to be approached from two distinct and simultaneous processes/metabolisms. The first of these is the transformation of water as an abundant and public good into a scarce and economic good or *commodification*. The second is the resistance of water to be commodified or *decommodification*.

Commodification is a systemic process of transforming a resource into an economic good. Water companies (whether public or private) deploy standardized and capital-intensive urban infrastructure networks (e.g. dams, tanks, pipes, meters) to capture and homogenize water (H₂O) into potable and clean water. This metabolized water is delivered to customers at a cost-reflective price. Customers in return have the responsibility to pay to the company. In case of failing to pay on time, the water service is disconnected until debts are paid back.

Decommodification is the process of disrupting the social relations that contribute to water's commodification process (McDonald and Ruiters, 2005) established by water companies. In this process, water becomes insulated from the spheres of capital and it is distributed according to household's needs. It is important to stress that a decommodification process is not equivalent to the provision of water free of costs. Instead, it is a weapon employed by low-income households to secure access in an urban waterscape that is deeply neoliberalised.

While commodification particularly evaluates how power circulates within particular forms of capital accumulation, decommodification analyses diffuse forms of power circulating within the daily practices in low-income households in their attempt not only to secure access to water, but also articulate political claims such as the right to citizenship. Examining both commodification and decommodification in the same empirical study enables a conceptualization of water inequalities that goes beyond socio-economical and techno-managerial approaches and offers the potential for a more nuanced understandings of alternatives to commercialization (McDonald and Ruiters, 2012).

2. Actors: *Who* is taking part in these contestations and *why*?

Contemporary studies over water access tend to focus on either commodification or decommodification. However, very little research has addressed commodification and decommodification as two closely intertwined processes. By drawing attention to different kinds of actors (human and non-human) and the interactions among them at different scales, this conceptual framework provides productive ways for tracing how uneven power relations are embedded in water struggles and contestations. Analysis might include human actors (water companies either public or private, the state as a regulator and low-income households) as well as non-human actors (water).

3. Strategies: *How* are the urban waterscapes being contested?

Actors deploy different strategies to justify and legitimize their interests and actions. The power of specific actors to mobilize and negotiate these strategies ultimately decide who will be entitled to have access to water, and who will be excluded.

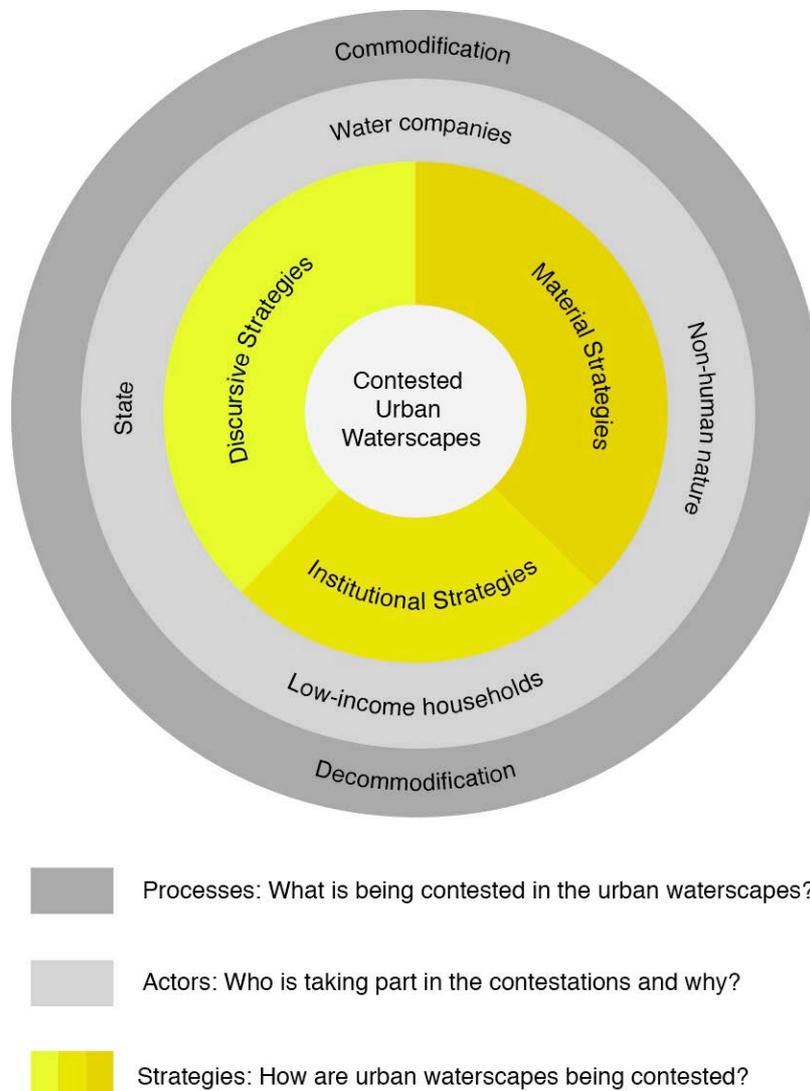
These strategies are divided into three categories:

Discursive strategies: Discourses are necessary to defend and legitimize particular policies and practices. For example, water can be discursively presented as a scarce resource, public good, commodity or right, and the "citizen" in a market logic can be associated to good/disciplined user that pays water bills on time, and therefore, is granted with the right to have sufficient and reliable access, while the "non-citizen" is the bad/undisciplined user that needs to be excluded from the water service for non-payment of bills or because illegal land tenure status.

Material strategies: Infrastructure networks are essential objects to organize the flows of water into the city as they physically sustain the simultaneously process of commodification (standardized pipes, storage tanks, conventional meters, flow limiters, prepaid technologies) and decommodification (tubes, valves, pumps, taps).

Institutional strategies: Institutional frameworks are necessary to determine how water is (to be) used, distributed and governed and to legitimize some forms of authority over others. This research involves traditional formal institutions (e.g. regulations, laws and rules) and informal institutions (e.g. bargaining, solidarity, negotiation).

Figure 3 A conceptual framework to analyse contested urban waterscapes



2.5 Conclusions: Constructing uneven urban waterscapes

By understanding inequalities in access to water as closely tied to processes of capital accumulation, I have aimed to demonstrate the ways in which water, power, and infrastructure networks conjoin to produce contested urban waterscapes. These contestations have been productively approached from an analytical framework that contains three main components: *processes* (commodification and decommodification), *actors* (human and non-human) and *strategies* (discursive, material and institutional). Bringing all components together in the same empirical study can provide useful insights for understanding the multidimensionality of water inequalities, thereby, challenging mainstream explanations that present water disconnection as a problem largely or solely attributed to legal, socio-economic or technical aspects.

I have posited that there is a benefit in bringing together literatures of UPE and neoliberalisation of nature to reveal how neoliberal reforms have contributed to reinforce water inequalities by excluding large sectors of the population from adequate and affordable water services, while intensifying processes of capital accumulation. Debates in UPE constitute an important point of departure in exploring water inequalities in cities. UPE approach the urbanization process as a socio-natural process by looking at how the relationships between water, power and capital produce highly uneven urban environments. UPE analyses are central in the understanding of how the metabolism and circulation of water in any city in the world is largely embedded in wider processes of political and economic interests. In the case of Medellín, as the following chapters will document, this is linked to the commercialization of the water company and its need to transnationalize operation in other geographical areas.

Acknowledging the significant implications of neoliberalisation in contemporary process of urban transformation, neoliberalisation of nature is well positioned to complement work on water inequalities with a UPE perspective. This scholarship permits analysing in great detail how particular forms of neoliberal governance connect with the biophysical world and which role the state plays in enabling these new socio-natural configurations. Additionally, it brings the materiality of nature into the forefront in order to understand how the biophysical and social character of water comes to play a critical role in challenging and obstructing particular modes of neoliberalism, and in shaping daily practices to gain access to water in low-income areas. Nature's materiality provides insightful approaches for understanding why water due to its biophysical and social character resists being fully commodified.

CHAPTER 3

EPM a Vital Source of Welfare and Progress: Municipalization (1955-1990)

Water services are without any doubt an obligatory service for the whole community. In the complexity of nowadays world, it is possible to find communities without electricity, telecommunication and transportation services, but without water it is hard to imagine the survival of any population (Penagos Estrada, 1988:3) (Translated by author)⁷.

Empresas Públicas de Medellín is the engine that drives the cycle of industrial progress of Antioquia's capital. It is the one that guarantees the supply of essential services for urban extension while providing valuable comfort and satisfaction to its residents (Robledo Correa, 1961: 103) (Translated by author)⁸.

3.1 Introduction

This chapter undertakes a historical analysis of the urbanization of water in Medellín during the municipalization period. Drawing on archive research, the analysis examines in great detail how *Empresas Públicas de Medellín* (EE.PP.M) organized the flows of water through the urban waterscape under a municipal hydraulic paradigm model. It centres on different strategies deployed by the company to conquer and urbanize nature, a necessary precondition to sustain the metabolism of the modern city and the capital expansion of the company. By doing so, this chapter illustrates how the consolidation of the company becomes increasingly dependent on ecological expansion.

As EE.PP.M assumed a key role in the city's modernization processes through the domination of nature, Medellín's urbanization process became strongly connected to the construction of large-scale and capital-intensive infrastructure projects. This chapter explores how the consolidation of a "modern infrastructure ideal" (Graham and Marvin, 2001), a project envisioned by the local elites, reflected company's moral obligation to provide in-house connection to urban residents, particularly those living in extremely unsanitary conditions, while creating distinct notions and ideal of publicness, citizenship, and modernity.

⁷ El servicio de acueducto es sin lugar a dudas el servicio obligatorio para toda la comunidad. En la complejidad del mundo de hoy, es posible que existan comunidades con escasos servicios de energía, comunicaciones, transporte y otros, pero sin agua no se concibe la subsistencia de ninguna población.

⁸ Empresas Públicas de Medellín son el motor que impulsa el ciclo del progreso industrial en la capital Antioqueña, que garantiza el abastecimiento de los servicios esenciales para el ensanche urbanístico de la misma y que aporta una valiosa cuota de confort y de satisfacción para sus moradores.

To trace the flows of water through Medellín's waterscape, the body of this chapter has been organized according to the main social, political, economic and ecological dynamics that give water particular functions: (a) Water, a diffuse frontier between that public and the private, (b) water, a source for securing urban modernization, (c) water, a resource to be controlled by engineers, (d) water, a source for maintaining urban social order, and (e) water, a resource for furthering ecological expansion. By taking these different functions together, I aim to challenge the city-nature dichotomy, as water while flowing through the urban waterscape is subject not only to biophysical, but also social process. In other words, I aim to show in this chapter how nature and the city are integrated processes in the production of particular urban waterscapes.

3.2 Water, a diffuse frontier between the public and the private

The municipal hydraulic paradigm of water management was the approach introduced in most of the countries to manage water supply systems in the beginning of twentieth century (Bakker, 2005, 2010a; Gandy, 2004). This mode of water provision emerged in response to concerns over increasing health problems, deteriorating environmental conditions and to support a sanitized city (Swyngedouw, 2004). Prior to the municipalization period, water and sanitation services in Medellín were highly stratified. Water supply systems were in the hands of unregulated private companies, which secure water provision mainly the wealthy parts of the city and the industrial sector while the excluded population relied on public fountains supplied by polluted sources (Toro B., 1996).

The prevalence of private over public interests became predominant not only in the water and sanitation sector, but also in all aspects of urban development as shown by the Colombian historian Fernando Botero Herrera in the period between 1890 and 1950 (Botero Herrera, 1996). The author demonstrates in great detail how the *Plano Regulador* of Medellín (City Planning Scheme) was constantly modified or overloaded with exceptions in order to fulfil the interests of the urban elites. As a result, Medellín turned into a city without any proper planning, with minimal state regulation and little respect for public spaces, green areas and architectural heritage while the industrial sector spread across the city (ibid.).

A growing and powerful textile sector, which became the most important economic core in the Department of Antioquia between 1902 and 1920, boosted an exclusive control over water resources (EE.PP.M, 2000). Textile companies such as Coltejer, Rosellón and Fabricato spread across the metropolitan area in close proximity to

the waterfalls, thereby, enjoying special concessions for using water for hydropower generation through the movement of Pelton turbines (López Díez, 2003). Consequently, the costs associated with electricity and water consumption were significantly reduced for these industries. Also, the control over water flows became a strategic tool for speculative and lucrative urban development projects controlled by private construction companies (Botero Herrera, 1996).

The inability and unwillingness of private operators to meet the needs of the rapid growing urban population and the outbreak of diseases such as typhoid, dysentery, diarrhoea and enteritis (Álvarez Echeverri, 1996) pressed the municipal authority to adopt a radical position and support the municipalisation of basic public services (López Díez, 2003). As a result, the *Empresas Públicas Municipales* (Municipal Public Company) was created in 1920 under control of the *Concejo de Medellín* (city council). The Municipal Public Company took control of water, sanitation, electricity, and telephone services as well as the management of public markets, the cattle fair and the slaughterhouse. Despite being in public hands, the company became strongly dependent on private interests. The elites represented by the *Sociedad de Mejoras Públicas* (SMP) significantly influenced the management of public assets of the company during this municipalization period.

The *Sociedad de Mejoras Públicas* (SMP) was created in 1899 by the political and economic elites as a private institution devoted to the management and control of urban planning of Medellín. The institution undertook important infrastructure projects to improve the aesthetic and sanitary conditions of the city in accordance to European regulations (López Díez, 2003). The Nutibara Hotel, the Botanical Garden, the Airport Enrique Olaya Herrera, the Museum of Antioquia, the Pilot Public Library, the canalisation and rectification of Medellín's river and Santa Elena stream, and the pavement of main streets exemplified some of the main urban projects promoted by the SMP (Botero Herrera, 1993; Restrepo Uribe, 1981). Ironically, despite that many of these projects were financed with public resources, the private sector was the main beneficiary. For some members of the SMP, this diffuse frontier between the public and the private was not an issue of main concern as they claimed that: "*aquello que beneficiaba a un particular tambien beneficiaba a la ciudad*" (what benefits a private individual also benefits the city) (Botero Herrera 1993: 79). Botero Herrera in his book *Medellín 1890-1950. Historia Urbana y Juego de Intereses* argues that SMP's influential role in the development of the city was legitimated through fostering an *espíritu cívico* (civic awareness) or concern for public assets among Medellín's inhabitants. According to the author, this civic awareness built a strong sense of regional identity compare to other cities in Colombia.

The SMP played a leading role in the modernization of the water supply system, which was officially under control of the Municipal Public Company. This modernization consisted on the replacement of rudimentary water networks built out of clay for iron pipes, and the construction of the first chlorination plant, which reported a reduction of 7 per cent in the mortality rate caused by consumption of contaminated water (EE.PP.M, 2000). As the Santa Elena stream, the main source of water supply of Medellín was not longer capable of meeting the growing urban and industrial demands; the company began capturing further water resources located in the Department of Antioquia. Consequently, the Municipal Public Company extended in 1940s the water supply system to the Riogrande basin, located 54 km north of Medellín, with the construction of Riogrande I hydroelectric power plant. The project was culminated in 1952 (EE.PP.M, 1980b) and it was built with loans provided by the BIRF (*Banco Internacional de Reconstrucción y Fomento*) (López Díez, 2003). Riogrande I acquired a great symbolic value because it exemplified the impressive technological achievement of the *paisa*⁹ culture. Additionally, the completion of the project became a starting point for EE.PP.M to be increasingly reliant on international loans.

Despite improvements in the water sector, the control of all basic public services in the hands of the City Council became a source of concern among the local elites. During 35 years, the elites pressed for the establishment of a public company immune of any political influence and guided by the same technical and administrative criteria of private companies (SMP, 1961). The rejection of any political interference in public assets was expressed by Ricardo Olano, one of the most prominent leaders of the SMP, who commented: "the City Council should be composed by engineers, doctors, business men, lawyers, architects, industrialists. I am not sure which role a politician can play in the City Council"¹⁰ (Botero Herrera, 1996). Therefore, the SMP suggested that the only way to secure national and foreign loans for the modernization of the city was to create an autonomous entity in charge of providing electricity, water, sanitation and telecommunication.

However, the BIRF expressed disagreement for any attempt to integrate all four basic public services into one company, and therefore, it proposed the separation of the electricity sector from the rest of the services (EE.PP.M, 2000; López Díez, 2003). Local elites represented by the SMP and the *Asociación Nacional de Empresarios de Colombia* (ANDI, National Business Association of Colombia) (López Díez, 2003) insisted on creating a multi-utility company to reduce administrative costs and to join synergies

⁹ *Paisa* is an adjective used to describe the inhabitants of the Department of Antioquia.

¹⁰ El Concejo debe ser compuesto de ingenieros, médicos, hombres de negocios, abogados, arquitectos, industriales. No se ve qué papel puede hacer un político en un Concejo municipal.

between projects for water and energy production (López Díez, 2003; SMP, 1961). As a result of intensive discussions, the BIRF approved the proposal, and the *Empresas Públicas de Medellín* (EE.PP.M) was created in 1955 as an autonomous entity, decentralized, with its own assets and fully owned by the municipality (Municipal Accord 58 of 1955). With EE.PP.M, Medellín became the first city in Colombia in creating a solid structure of integrated basic public services responsible for the administration of water supply, sanitation, electricity and telecommunications (Botero Herrera, 1996).

The Article 23 of the Municipal Accord 58 of 1955 set the main principles guiding the new autonomous entity:

Empresas Públicas de Medellín will be an non-political organization, guided by a rigorous administrative efficiency, for which appropriate technical systems of business organization will be deployed in order to facilitate the achievement of its primary objective, which is to provide citizens with a regular, permanent and affordable public services, while promoting the progress of Medellín, by encouraging the development of new industries and the growth of already existing ones (EE.PP.M, 2000) (Translated by author)¹¹.

The administration of the company was in the hands of a managing director who was elected as the legal representative and a board of directors constituted by the Mayor of Medellín, two politicians elected by the City Council, and four recognized city entrepreneurs (Article 32 of the Decree 375 of 1955). This organizational structure received strong support from the urban population and successfully attracted financial funding from international institutions through loans. A rigorous management and control of debt made of EE.PP.M a valuable reference for international institutions. This aspect was highlighted in a seminar that took place in Washington in 1963 where the IDB affirmed that EE.PP.M could be considered a pilot company not only for its organization, but also for its financial reliability (Restrepo Uribe, 1981). According to Alejandro Uribe Escobar, company's managing director (1964-1967), EE.PP.M's success was attributed to a careful coordination and planning that properly combines financial and technical aspects (Ospina, 1966). Uribe Escobar goes on to argue that:

¹¹ Las Empresas Públicas de Medellín será una entidad apolítica, dirigida con un riguroso criterio de eficacia administrativa, para lo cual emplearán adecuados sistemas técnicos de organizaciones de empresas, con el fin de obtener su objetivo primordial, que es el de garantizar a la ciudadanía el funcionamiento regular, permanente y económico de los servicios públicos necesarios, y el de fomentar a la vez el progreso de Medellín, con el estímulo para la organización de nuevas industrias y el crecimiento de las ya establecidas.

The programs presented several years ago to the international agencies for funding were done in time and under the financial schemes ... This feature of careful planning from the point of view of design, construction, work programs and financial aspects is uncommon and worth mentioning. The fact that EE.PP.M was able to outstandingly perform despite substantial political changes and several currency devaluations is an eloquent testimony of the carefulness and dedication with which the company has been managed ... (Ospina, 1966: 213) (Translated by author)¹².

A growing international recognition marked a significant dependence of EE.PP.M on bilateral loans. Consequently, Medellín's urbanization process became closely bounded up with the circulation of capital provided by international lenders. For example, the Inter-American Development Bank (IDB) largely financed the expansion of water and sewage system, while the World Bank provided loans for extending electricity demands.

3.3 Water, a resource for securing urban modernization

During the municipalization period, investments in water and electricity projects were central to the shaping of the modern city. Taking advantage of the large hydroelectric potential of the Department of Antioquia¹³, EE.PP.M began searching for natural resources located outside the boundaries of the city to sustain Medellín's metabolism. It did so by embarking in the construction of hydroelectric power plants to secure not only the continuous flow of water into the city, but also the production of energy. As a result, the function Medellín and the consolidation of EE.PP.M became strongly dependant on the constant urbanization of nature. The company intensified the drawing of water into the city with the construction of Guadalupe III (1962) and Troneras (1964) to complement the electricity capacity of the already built hydroelectric power plants of Guadalupe I (1932) and Guadalupe II (1949) (Toro B., 1996). As a result, energy generation capacity increased from 137 thousand kilowatts (KW) to 413 thousand KW and the number of subscribers grew from 99,910 to 168,500 between 1960 and 1970 (EE.PP.M, 1980a). The urbanization of nature went further with the construction of Guatapé hydroelectric power plant in 1971, the biggest and most ambition engineer project at the time with a generating capacity of 280,000 KW (EE.PP.M, 1980b) diverting

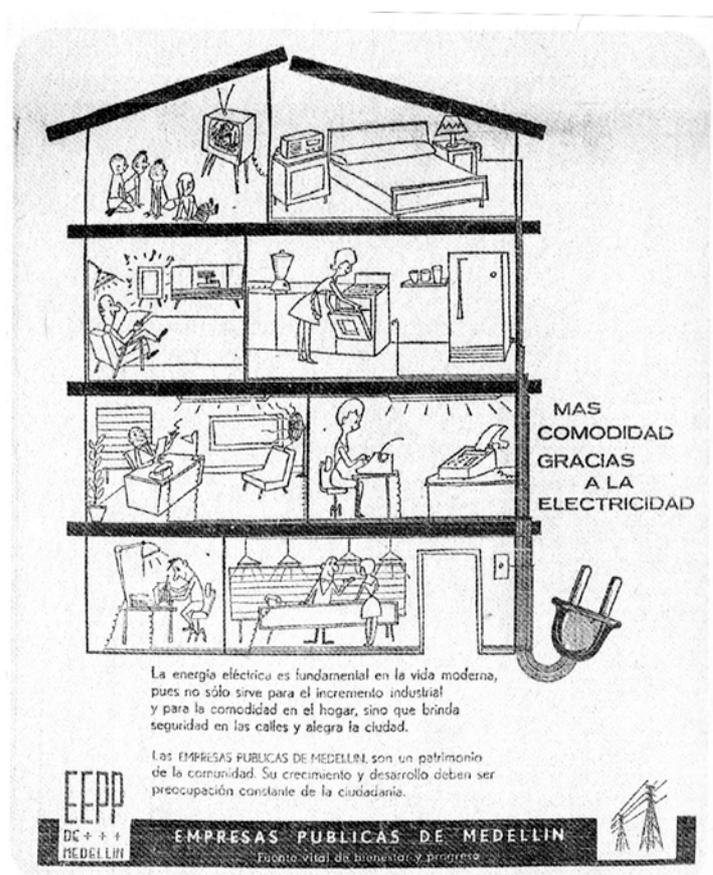
¹² Los programas presentados hace varios años a los organismos internacionales para obtener su financiación se han realizado cumplidamente en el tiempo y en los pronósticos financieros ... Esta característica de una planeación cuidadosa desde el punto de vista del diseño, la construcción, los programas de trabajo y los aspectos financieros no es frecuente y merece destacarse. El que haya sido posible a pesar de cambios políticos sustanciales y de varias devaluaciones monetarias es un testimonio elocuente de la previsión y del celo con que se han manejado las Empresas Públicas de Medellín.

¹³ The Department of Antioquia concentrates 25 per cent of the hydroelectric potential in Colombia and 50 per cent of the cheapest hydroelectric potential to be developed (Palacios B. and Medina O., 1982).

water from the Nare River and regulated by the Peñol-Guatapé reservoir.

The increment in energy production facilitated a drop in prices (Toro B., 1996). According to the World Bank, the city of Medellín registered one of the lowest electricity tariffs in the world (Restrepo Uribe, 1981). As a result of the abundant production of electricity and low tariffs, the company launched public awareness campaigns to encourage households to connect to the electricity supply network (see Figure 4). Consequently, households reduced dependence on fuels such as wood, oil and coal for cooking and lighting (EE.PP.M, 2000; López Díez, 2003) and reported a growing use of modern electrical appliances such as radios, irons, heating and stoves (Toro B., 1996). Thus, individual electricity connections contributed to the construction of modern homes and electricity consumption became an integral component of a modern life.

Figure 4 Public awareness campaign launched in the 1970s to support the use of electricity at home

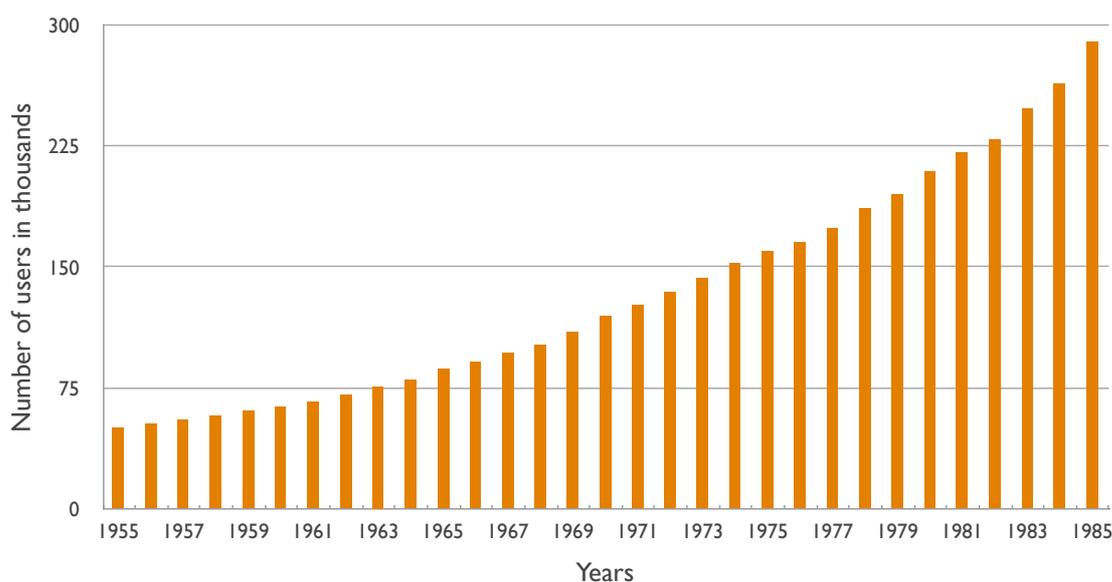


Note and source: The campaign reads: Greater comfort thanks to the electricity. Electricity is fundamental for the modern life, it not only improves industrial performance and secures comfort at home, but also it provides security in the streets and brightens the city.

Source: Hernández Patiño, 2012: 108.

Investments in water infrastructure networks also grew rapidly since 1960s. Loans provided by the IDB facilitated in 1973 the transfer of water from the distant Pantanillo and Piedras rivers (EE.PP.M, 1980a; 2000) with the construction of La Fé, a reservoir with a storage capacity of 15 million m³ (Restrepo Uribe, 1981). By 1980, 75 per cent of the population of Medellín and its Metropolitan Area consumed water from this source (EE.PP.M, 1980b). However, transforming raw water from the reservoir into potable water required a set of infrastructure networks. EE.PP.M secured the growing and continuous flow of metabolized water into individual households by constructing of a complex urban infrastructure system composed by 1,340 Km of distributional networks, 41 storage tanks located around the periphery of the city (EE.PP.M, 1979) and four purification plants (Villa Hermosa, El Pedregal, San Cristóbal and La Ayurá), which received superficial water transferred from diverse and distant streams such as Santa Elena, La Mosca, La Honda, Piedras Blancas, La García, La Iguaná, La Puerta, Tenche y Rionegro (EE.PP.M, 1979). As a result, the number of individual users of water services grew from 50,500 in 1955 to 289,700 by 1985 (see Figure 5) while water supply increased from 60 million to 590 million m³ (EE.PP.M, 1980a; 1980b). During the municipalization period, water infrastructure acquired a significant discursive and material importance by being presented as hallmarks of welfare and progress as shown in Figure 6.

Figure 5 Increment in the number of individual water users between 1955-1985



Source: Data derived from EE.PP.M, 1979; 1980b; 1985b.

Figure 6 Advertising celebrating the opening of the water purification plant "La Ayurá"

brindamos por el progreso ...

¡SALUD!

PLANTA DE TRATAMIENTO DE AGUA

"LA AYURÁ" (PRIMERA ETAPA)

Costo aproximado de las obras civiles, equipos y montajes, 16 millones de pesos.

Filtros: seis (6) unidades para una capacidad de 20.000 metros cúbicos de agua filtrada por día, cada uno; lavado con agua y aire a presión.

Tanque de agua filtrada: Capacidad 5.500 metros cúbicos aproximadamente.

La planta de tratamiento "La Ayurá" hace parte del sistema de acueducto que utiliza las aguas del Rionegro, y comprende las siguientes obras: Presa sobre la quebrada Las Palmas - Torre de captación y túnel de conducción (8 kilómetros) - Tubería de presión - Pozo de aquietamiento - Planta "La Ayurá" y tubería de conducción a la ciudad.

" 120.000 metros cúbicos diarios "

panorámica de la planta



galería de sifones *dosificadores de cloro*

sala de bombas de aire

galería de operación

costo \$ 15.000.000

porque usted colabora,
la ciudad progresa
con "agua pura"

Empresas Públicas de Medellín



WIESNER

Note and Source: The poster reads: We celebrate progress. ! Cheers! Water purification plant "La Ayurá", first phase. 120,000 m³ per day. Cost COP\$ 15,000,000. Source: SMP, 1968.

Nevertheless, despite significant efforts to improve water supply systems, insalubrious conditions remained prevalent in the city due to the lack of an integrated sewage system. Although the US-based engineering firm, Greeley and Hansen, conducted in 1956 a detailed feasibility study to build a sewage system (EE.PP.M, 1969), the project was never completed due to technical and financial constraints. Consequently, Medellín River became the most important disposable site of wastewater in the city. According to a study conducted between 1972 and 1973 by the National University Medellín, the main causes of heavy contamination in the river and its various tributaries were attributed to the waste disposal of 1,5 million inhabitants and 20 per cent of the Colombian industry (EE.PP.M, 1981). The report also concluded that the aesthetic and ecological consequences of such heavy pollution were detrimental, as the river became a source of fetid odours and unpleasant appearance (ibid.).

3.4 Water, a resource to be dominated by engineers

One of the main particularities of EE.PP.M is that a significant number of members of the board of directors and general managers were educated as engineers in the *Escuela Nacional de Minas* (National School of Mines), an institution created in 1888. According to the sociologist Alberto Mayor Mora in his book *Ética, Trabajo y Productividad en Antioquia* (1989), this famous engineer school took a leading role in educating a new emerging social class according to the ideals and values of an elite determined to orientate the economic development of the Department of Antioquia. For the most prominent families in Antioquia, the progress of the region should rely on technology, sciences and the domination of nature, and therefore, technical professions such as engineering were in a privileged position to fulfil these goals (Mayor Mora, 1989). Therefore, the flourishing economy based on agriculture, mining and manufacture activities demanded engineers with practical skills that better respond to the technical and organization challenges of the export-oriented economic growth and the *Escuela de Minas* emerged as a response to this demand (Murray, 1994).

The *Escuela* together with the *Colegio Militar* (Military School) (1847-1854) and the *Facultad de Matemáticas e Ingeniería* (Faculty of Mathematics and Engineering) (1867-present), both in Bogotá were highly influential in developing a new brand of engineering education in Latin America (ibid.). The curriculum adopted by the schools had a strong focus on the model imparted in the American Universities. In the *Escuela de Minas*, this model was brought by a young upper class elite, who was sent to America to conduct technical studies in civil and mining engineering (Mayor Mora, 1989; Murray, 1994). One of the most influential figures among these young elites was Tulio Ospina, founder and first director of the school, who obtained his degree in Mining and

Metallurgical Engineering at the University of California at Berkeley.

Ospina devoted himself on educating a generation of engineers who carried not only scientific and technical knowledge, but also the best moral ideals and values to drive the industrial and urban development of the region. He imparted a curriculum that combined applied sciences with practical training in order to bring students in close contact to the real problems. The use of laboratories, scientific field trips and internships became an integral component of the practical training (Mayor Mora, 1989; Murray, 1994). The *Escuela* also cultivated a set of values among its students such as honesty, integrity, discipline, audacity to think big, balance between private and public interests, and devotion to the profession (EE.PP.M, 2000, Mayor Mora, 1989). Tulio Ospina described the program imparted by the *Escuela* in the following way:

Is not scientific as it appears at the first glance, and that its only purpose is the science. Rather, is it a moral program, which refers to the character we want to cultivate in our students. In effect, in this program we do not take the responsibility to provide the Nation with wise, but rather industrious and honest men (Mayor Mora, 1989: 60-61) (Translated by author)¹⁴.

Being graduated from one of the most respected and prestigious educational institutions in Colombia secured for many young graduates a successful professional carrier. Engineers carried the status of owning the best moral values, which allowed them to occupy important technical and administrative positions with high degrees of responsibility (Mayor Mora, 1989). Particularly, engineers took leading positions in the public sector, where they imparted to their personnel ideals and values learned in the *Escuela* (Mayor Mora, 1989). At this time, engineers from the *Escuela de Minas* were considered technically and ethically the most appropriate professionals to lead the management of public assets in Antioquia (ibid).

One of the main public companies employing young graduates from the *Escuela* was EE.PP.M. According to Mayor Mora (1989), the company served as a laboratory where engineers applied not only their technical and managerial abilities, but also promoted a particular system of values cultivated by the *Escuela*. This is the case of the first director of EE.PP.M, the Engineer Oscar Baquero Pinillos (1955-1959), who implemented an entrepreneurial culture based on the following basic principles (EE.PP.M, 2000: 45-46):

¹⁴ No es científico aunque a primera vista parezca que debiera serlo, y que nuestra finalidad es la ciencia; es él un programa moral, que se refiere al carácter que deseamos formar a nuestros alumnos. En efecto, en aquel programa no nos comprometemos a dar a la Nación sabios, sino hombres laboriosos y honrados.

- 1) *Long-term and rigorous planning*: Development of strict planning projects and studies that foresee future challenges at the technical, financial and legislative levels.
- 2) *Transparency*: Responsibility to communicate to the public the different activities undertaken by the company because EE.PP.M is a public company that belongs to the citizens of Medellín.
- 3) *Affordability*: Realistic and responsible social tariffs that fit to the economic capacity of the users.
- 4) *Political autonomy for selecting staff*: The selection of staff was based on professional capacities rather than political inclinations. Additionally, a merit-based promotion system was implemented.
- 5) *Proper working conditions*: Creation of a self-identity among its workers in order to promote loyalty and strong compromise, which in turn facilitated stable working conditions and respect for common interest.
- 6) *Highly qualified administrative board*: The direction of the company was in the hands of high-qualified general managers and members of the board of directors with a broad experience in the private sector. This ensured the functioning of the company under a rigorous technical management and without any political interference.

The Engineer Luis Echavarría Villegas, second company's managing director (1959-1963), paid particular attention to secure a constant and transparent communication with the public (Ospina, 1966). As a result, a new department was established for keeping the public informed on a regular basis about the events undertaken by the company as well as the programs for the expansion of services (ibid.). Echavarría Villegas strongly claimed that, "as long as we have the support of the public our work will be less difficult" (ibid: 204)¹⁵. His mandate was also characterized for establishing of a system of reduced tariffs for the most vulnerable population, but without promoting wasteful behaviour. Therefore, it became essential the provision of affordable, equitable and good quality access to basic services in order to reduce the economic burden of low-income households (Ospina, 1966).

¹⁵ En la medida en que contemos con el apoyo de la ciudadanía será menos difícil nuestra labor.

The case of the *Escuela de Minas* illustrates how a successive generation of engineers played a key role in controlling the urbanization of Medellín, a process conducted under principles of social responsibility and respect for public assets. Engineers were able to rigorously coordinate the process of urban modernization in a way that all inhabitants without any distinction could enjoy a hygienic and comfortable life by securing access to all basic services (Ospina, 1966). They were considered to be the most appropriate actors to urbanize and dominate nature for the benefit of not only the region, but also the nation.

3.5 Water, a resource for maintaining urban social order

From the 1950s onwards, Medellín experienced an accelerated rate of migration from the rural areas of the Department of Antioquia motivated by the political violence and the job opportunities offered by the manufacturing industry (Botero Herrera, 1996; Coupé, 1996). A growing industrial sector demanded low-skilled labour for the production of products such as food, textiles, leather, beverage, tobacco, printing, paper and chemicals (Coupé, 1996). According to the *Anuario Estadístico de Antioquia 1973*, the city double its urban population passing from 358,189 inhabitants in 1951 to 772,887 in 1964 (Restrepo Uribe, 1981), many of them living in illegal settlements. These settlements known as "*Barrios Piratas*" (pirate neighbourhoods) or "*Barrios Marginales*" (marginal neighbourhoods) were built through land invasion and individual self-construction that did not follow any urban regulation (EE.PP.M, 1987). They experienced inadequate public services and basic infrastructure access (e.g. roads, footpaths). For many low-income households, this form of urban appropriation represented the only alternative to secure access to a piece of land. The number of houses built under this practice increased from 8,600 in 1958 to 15,200 in 1963 with an estimated population of 120,000 inhabitants (corresponding to 16,6 per cent of the total population) (Mejía B., 1987).

The inhabitants of these *barrios* experienced extremely unsanitary conditions in every conceivable respect. Water was consumed without any treatment, people defecated in the open and electricity services were illegally accessed. The impact on human health was enormous as lack of access to potable water resulted in a major cause of death, particularly among infant population. The problem of inadequate urban infrastructure and deplorable living conditions began to occupy the attention of EE.PP.M and municipal authorities, as urban populations strongly demanded state recognition through the supply of better services. In an increasingly informal context, the company assumed the role of legitimizing the state by ensuring legal and secure access to basic public services (EE.PP.M, 2000).

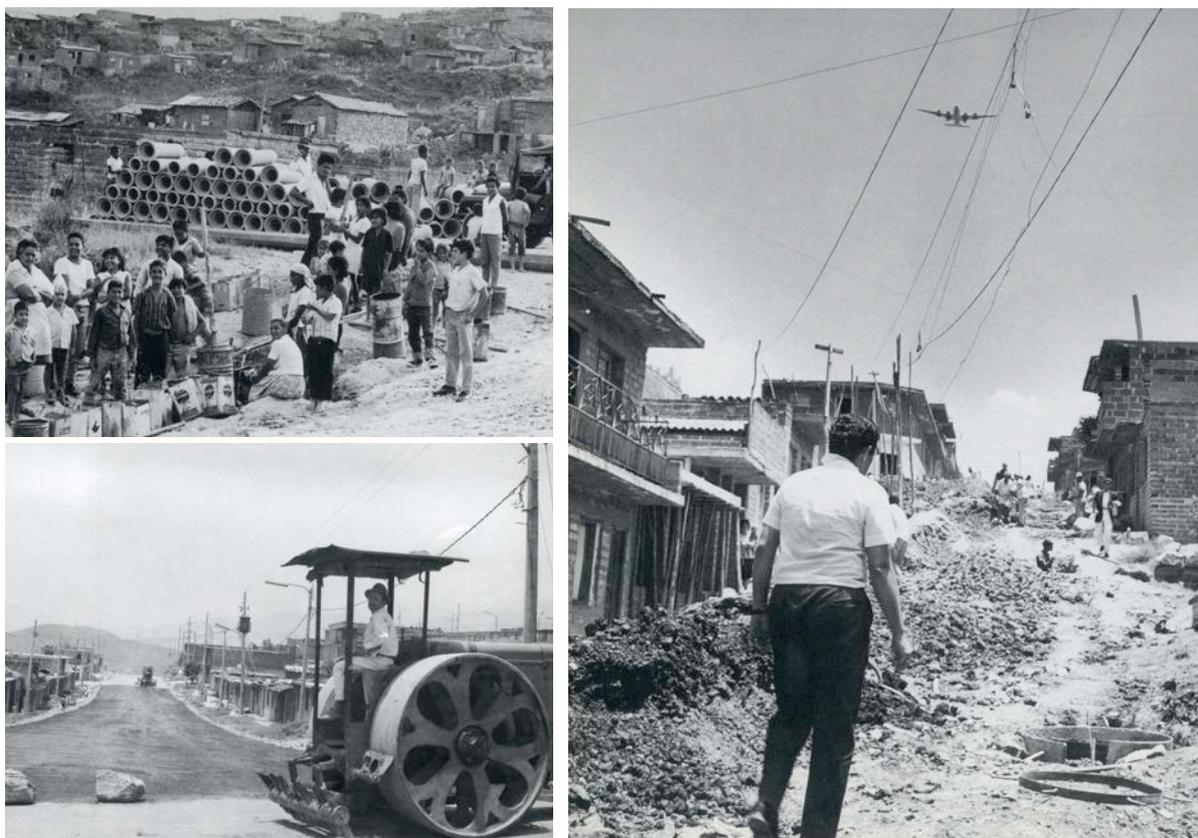
EE.PP.M official response to people's demands was to establish in 1964 the *Habilitación de Viviendas* program (HV, rehabilitation of homes). The program, which was created under the Engineer Alejandro Uribe Escobar, company's managing director between 1964 and 1967, aimed at providing access to electricity, water and sanitation services to low-income households (see Figure 7). HV was implemented in coordination with the Municipal Administration and it was initially financed by the *Fondo Rotatorio de Habilitacion de Viviendas*, created under the Accord 37 of 1964, and whose funds were obtained with the selling of the Olaya Herrera airport (Mejía B., 1987; Toro B., 1992).

EE.PP.M through the HV program undertook a massive process of formalization of basic public services according to the norms dictated by the Municipal Planning Office (Mejía B., 1987). The insertion of these *barrios* into EE.PP.M's infrastructure network was widely accepted among low-income populations because it not only secured formal access to the basic public services, but also facilitated land legalization. As tenure status was for a large proportion of the beneficiaries of the HV program was precarious and illegal, formalization of basic public services became a mechanism to obtain citizenship recognition, and consequently, it created a strong responsibility to pay for the service (EE.PP.M, 2000). In other words, citizen recognition was equated with the "moral responsibility" to pay for the services provided by EE.PP.M. The HV program clearly illustrates how Medellín's urbanization process becomes inextricably linked with the process of the urbanization of water, as land legalization became a necessary precondition not only secured the efficient circulation of water, but also the circulation of capital.

To be selected for the HV program, the company demanded from low-income households to be organized in *Juntas de Acción Comunal* (JACs, communal councils)¹⁶ in order to facilitate negotiations (Mejía B., 1987). HV consisted on financing the costs associated with the installation of infrastructure networks (e.g. material and labour) by charging low-interest loans. Water and sanitation services were financed for up to 120 months with an interest rate of 0,5, 1 and 2 per cent and electricity services for 100 months with an interest rate of 1 and 2 per cent (Mejía B., 1987). The company was responsible for covering the costs associated with the design and construction of complementary works such as storage tanks, potabilization plants, etc. By 2000, 40 per cent of the company's users were connected through the HV program (EE.PP.M, 2000).

¹⁶ JACs are defined as local organizations formed by citizens who engage voluntarily in different activities to contribute to the welfare and progress of their communities.

Figure 7 Legalization of different *barrios* in Medellín through the HV program



Source: EE.PP.M, 2005b.

With the implementation of the HV program, EE.PP.M became the first institution in Colombia in adjusting its administrative structure to better respond to the necessities of the low-income population (Mejía B., 1987). For the company, access to public services was considered essential for the development of a human person (EE.PP.M, 1973). It became unacceptable to exclude parts of city from permanent and good quality access to water while some sectors of the urban population could enjoy it (Medina O., 1987). As a result, in-house connection to the water infrastructure network became a “social norm” and recognized as an integral component of the modern citizen. A sentiment reflected in a speech given by the Engineer Víctor Suárez Vásquez, general manager of EE.PP.M (1973-1974) to the board of directors in 1973:

Within the development of a community, water occupies a privilege position as essential element for human subsistence. At the same time, having access to water in an abundant quantity, good quality and properly treated represents an index of progress and collective well-being. The lack of water is an indisputable symbol of backwardness and underdevelopment (Restrepo Uribe, 1981: 404) (Translated by author)¹⁷.

¹⁷ Dentro del desarrollo de la comunidad, el agua ocupa un lugar primordial como elemento indispensable para la subsistencia humana, y del mismo modo que disponer de ella en cantidad abundante, de buena calidad y

The expansion of water infrastructure networks could not be disentangled from the political and ideological interests to build a functional public realm. For EE.PP.M, the provision of efficient, good quality and affordable access to water was a necessary precondition to construct a distinct notion of “public”, in which water was perceived as a public good to be provided by the state through its public water company. This aspect was highlighted by Smith (2004:381) who argues: “the primary objective of the public sector historically has been to uphold equal and low-cost services as a public good, an objective that keeps equity considerations at the forefront of the provision of public services”. As such, during the municipalisation period water project emerged far away from market approaches, and therefore, EE.PP.M did not underestimate the necessary financial investments to make water universally available:

EE.PP.M has always considered water supply as an essential public service, and therefore, despite various difficulties, especially financial, the company has undertaken the necessary efforts to carry out development programs that the city constantly demands (Restrepo Uribe, 1981: 404) (Translated by author)¹⁸.

However, the HV program was not merely a techno-managerial project. The program facilitated the establishment of a new urban social order in which infrastructure networks served to control the chaotic urban growth of Medellín and the circulation of metabolized water in low-income areas. A wide coverage of services facilitated the control of illegal connections and the reduction of commercial losses (EE.PP.M, 2000). In the electricity sector, for instance, the company launched in 1969 an awareness campaign called “Operación Luz” (light operation) to reduce illegal electricity connections (EE.PP.M, 1970). Besides informing residents in low-income areas about the negative effects associated to illegal connections, the campaign aimed at producing moral subjects aware of the personal and collective implications of accessing electricity without paying for it as shown in Figure 8.

debidamente tratada es un índice de progreso y bienestar colectivos, el carecer de ella es un símbolo indiscutible de atraso y subdesarrollo.

¹⁸ Las empresas públicas han considerado en todo tiempo el acueducto como un servicio público esencial, y por ello, a pesar de las dificultades de diversa índole, especialmente financieras, han hecho esfuerzos necesarios para llevar a cabo los programas de desarrollo que constantemente demanda la ciudad.

Figure 8 The awareness campaign “Operación Luz” launched in 1969 to reduce illegal electricity connections



Note and Source: The first poster reads: You win with Operación Luz. Because: It eliminates the dangers of smuggling, ends up electricity losses that increase costs, and facilitates the enjoyment of access to safe electricity without fear. The second poster reads: Do not become an enemy for your neighbourhood. Do not put at risk your neighbourhood by smuggling electricity. Source: EP.PP.M, 1970:38-39.

Improvements in public health and hygienic also emerged as a primary social concern for the company. The extension of infrastructure networks became not only conducts through which water was transported, but also public health discourses were spread. The prevalence of an integrated mode of water provision, which was comprehensively developed through the HV program, facilitated the introduction of sanitary discourses. In 1969, for example, due to the severe problems of dental caries experienced particularly among the school population, the company worked in tandem with public health experts from the University of Antioquia and the *Secretaria de Salud Pública* (Department of Public Health) to introduce a water fluoridation program, which benefited 1,200,000 inhabitants (Gaviria Z., 1972; 1979). By 1979, the company acquired 1,430 tons of fluor directly imported from Denmark, Finland, Spain and U.S.A. (Toro, 1992), which was distributed in its four purification plants. Although the costs

associated to fluoridisation were relatively high, the company did not hesitate to implement this program due to the positive impacts on public health (Restrepo Uribe, 1981). Results showed that EE.PP.M reported a reduction of tooth loss by 42 per cent (Toro, 1992).

3.6 Water, a resource for furthering ecological expansion

The company began an ambitious program of expansion and modernization during the period 1976-1985, when Diego Calle Restrepo was assigned managing director of EE.PP.M. Calle Restrepo, an economist with extensive international as well as public-private experience, undertook the control of EE.PP.M under a period of a high political turbulence and financial crisis. Before his mandate, four directors of the company were forced to step down as well as several members of the technical personnel and heads of several divisions (EE.PP.M, 2000) due to conflicts with the City Council. The *Alianza Nacional Popular* (Anapo, National Popular Alliance), a political party created by the expresident Gustavo Rojas Pinilla (1953-1957), became majority in the City Council and imposed great resistance to EE.PP.M. Consequently, several conflicts emerged between the board of directors of the company and the City Council for the management of EE.PP.M as members of the Anapo intended to exert great influence in public assets, a sector traditionally dominated by the local elites (EE.PP.M, 2000).

Under Calle Restrepo, EE.PP.M experienced a period of significant transformations. First, the company underwent in 1981 a process of radical internal restructuring as the existing company's administrative, technical, operative and financial management was mainly absorbed by the electricity sector, thereby, considered unsuitable to sustain the growth of the city and the expansion of the company. Calle Restrepo granted administrative and financial autonomy to each of the sectors: Water and sanitation, electricity and telecommunication in order to ensure decentralization in decision-making and better response to the growth in consumption demands (EE.PP.M, 1985a).

Second, Calle's administration brought the process of modernization of the city even further with the introduction of large-scale and capital-intensive infrastructure projects. This technocratic paradigm predominantly focused on intensifying the control and domestication of nature's water located outside the boundaries of Medellín, thereby, expanding the city's ecological footprint even further. EE.PP.M began the operation of several hydroelectric power plants including Guatapé II (1979), La Ayurá (1983) and

Guadalupe IV¹⁹ (1985). Energy generation was further expanded with the construction of Las Playas (1988) and the multiple-use project Rio Grande II (1993) (EE.PP.M, 2000) (see Table 3). The latter project was used for water supply and electricity production and it was composed by two hydroelectric power plants (La Tasajera and Niquía), which diverted water from the Rio Grande II Reservoir. After completed the energy generation process, water was transported to Manantiales purification plant and further on distributed to the city of Medellín. The project received the financial support of the BIRF and the IDB for the acquisition of land, building of a tunnel, a tank, infrastructure networks, a treatment plant and a pumping station. Hydroelectric power plants exemplified EE.PP.M's power to dominate and urbanize nature, a necessary precondition to sustain the metabolism of the modern city and the capital expansion of the company.

Table 3 System of hydroelectric power plants built and completed during the administration of Diego Calle Restrepo

Hydroelectric power plants	Year	Generation Capacity (MW)
Guatapé II	1979	280
La Ayurá	1983	19
Guadalupe IV	1985	213
Las Playas	1988	240
Rio Grande II - La Tasajera	1993	306
- Niquía	1993	19

Source: Data derived from Toro B., 1996; EE.PP.M, 1980b.

The growing hydroelectric potential in the Department of Antioquia enabled the electrification of other regions close to Medellín. Electricity surplus, for example, was exported to areas such as Magdalena Medio, Bajo Cauca and Urabá to cover the demand of rural communities as well as the growing agro-industrial sector (EE.PP.M, 1985b). Between 1977 and 1985, 9,100 rural households were connected to electricity services, benefiting 56,500 inhabitants (ibid.). In 1983, the company intensified its ecological expansion by acquiring the *Empresa Antioqueña de Energía* (EADE, Antioquia Energy Company) in charge of supplying 100 municipalities in Antioquia and one municipality in the Department of Chocó (EE.PP.M, 2005a).

¹⁹ Guadalupe IV is also known as hydroelectric power plant Diego Calle Restrepo.

Calle Restrepo had a clear vision and able to plan for many years ahead. He was known in Antioquia as the "*Visionario for excelencia*" (visionary par excellence). During the nine years of his mandate, EE.PP.M achieved a period of stability. The company accomplished international recognition and consolidated its leadership at the national level for its efficiency and coverage of basic public services (Toro B.C., 1992). However, at the same time, his mandated based on the indisputable need to dominate nature was severely questioned for the massive displacement of *campesinos* (farmers) and the detrimental impacts on local populations due the construction of Guatapé II, considered "the most important engineering work in Antioquia" (EE.PP.M, 2000: 61). Guatapé II located 100 km from Medellín, required the submersion of 6,300 hectares of land to increase the storage capacity of El Peñol Reservoir from 75 to 1,200 million of cubic meters (Sáenz Z., 1988). This resulted in a direct displacement of 734 people from the Municipality of Guatapé and around 4 thousand from the Municipality of El Peñol (EE.PP.M, 2000) through the flooding of arable and grazing land as well as basic urban infrastructure such as schools, churches, hospitals, roads and houses (Sáenz Z., 1988).

The company was hardly criticized for its authoritarian behaviour. All decisions were taken in Medellín while local communities were merely perceived as passive subaltern agents (ibid.). Local populations were never informed about the benefits and impacts derived from the project and many were violently expropriated without adequate compensation. A widespread dissatisfaction with the negotiation process spurred social protests. Residents formed the *Movimiento de Pobladores de El Peñol y Guatapé* (Movement of Inhabitants from El Peñol y Guatapé) to press the company for adequate compensations. However, despite rising controversy, the project was implemented. Even today, the company continues facing on-going social struggles due to the socially and ecologically disastrous impacts strongly linked to the construction of hydroelectric power plants (see Chapter 4).

Although authors such as Karen Bakker (2010a) claim that since the late 1980s the construction of large-scale infrastructure projects such as dams has been diminished, countries such as Brazil (Belo-Monte), China (The Three Gorges Dam), Colombia (El Quimbo, Hidroituango), Guatemala (Xalalá) and Turkey (Ilisu), on the contrary, illustrate that building large dams still constitute an integral part of a national strategy for capital accumulation. For EE.PP.M, appropriation of nature through large-scale infrastructure projects continues being an indispensable mechanism to sustain the growth of the city as well as to extend and consolidate its international leadership in the sphere of basic public services, as it will be discussed in detail in Chapter 4.

3.7 Conclusion: The consolidation of the water, power and capital nexus

This chapter has provided historical evidence of how EE.PP.M's expansion during the municipalisation period has been closely intertwined to Medellín's urbanization process. This evidence shows how the control and domination of nature has become an integral part of the expansion of the company. To bring nature into the city, EE.PP.M strongly relied on the construction of large-scale and capital-intensive engineer projects largely supported by international loans and widely implemented during the administration of Diego Calle Restrepo. Taking advantage of the privilege topographic position and hydrological condition of the Department of Antioquia, where Medellín is the capital, the company embarked in the construction of hydroelectric power plants, purification plants, storage tanks, reservoirs and networks to secure the abundant flow of metabolized water into the city. Water (both for electricity generation and consumption) became an essential element to enable the functioning of the city and secure EE.PP.M's expansion.

This techno-managerial approach to water provision was initially supported by a local elite composed by engineers educated in the *Escuela Nacional de Minas*, a famous engineers school in charge of educating the new emerging elite of Antioquia. Not surprisingly, therefore, a significant number of members of the board of directors and general managers of EE.PP.M were educated as engineers in the National School of Mines. At the time, engineering was considered the most appropriate academic discipline to control and transform nature for the benefit not only of the region, but also the nation. In the hands of engineers, EE.PP.M undertook a significant role in the urbanization of Medellín. This, in turn, facilitated and legitimized the centralization of power over metabolized water. However, to secure the abundant flow of water into the city, the company relied on not only strict techno-managerial standards, but also particular notions and ideals of publicness, citizenship and modernity. For example, having access to water at home was considered an emblem of citizenship, a precondition to enjoy a dignified and modern life. Additionally, water was perceived as a public good to be provided by the state through its public company at affordable prices.

During the municipalisation period, the company paid particular attention to improving the living conditions of the growing population living in informal settlements, which strongly demanded state recognition through better public service provision. EE.PP.M responded to these demands by introducing the rehabilitation of homes (HV program), a program that simultaneously secured land legalization and access to basic public services (e.g. water, sanitation, electricity). For many inhabitants in low-income households, having legal access to EE.PP.M services was strongly supported as it represented the most viable mechanism to acquire citizenship recognition. However,

being recognized as a citizen entailed the “moral responsibility” to pay for the services provided by EE.PP.M. Therefore, the HV program besides ensuring the efficient circulation of metabolized water in low-income areas; also facilitated the circulation of capital. As a result, the HV program played a significant role in Medellín’s urbanization process as it not only served to improve access to basic public services, but also it inserted low-income areas into the spheres of money. In other words, the provision of basic supply services in low-income areas through the HV program served the twin goal of furthering the modernization of the city and securing citizenship status.

CHAPTER 4

EPM Closer to the World: Commercialization (1991-present)

4.1 Introduction

This chapter undertakes the second part of the historical analysis to illustrate how the further development of Medellín's urbanization process becomes deeply embedded in the positioning of EPM in the global economy. It traces how commercialization as a new emerging mode of neoliberal governance and the "successful" transnationalization of operations in other geographical areas have ensured that water provision in Medellín becomes part of a strategy for capital accumulation, while excluding large parts of the population specially the urban poor. Particular attention is paid to the drastically increment of disconnection for non-payment as a result of rising water tariffs, and the splintering of water supply networks (Graham and Marvin, 2001).

The paradoxes in water provision are traced by following the contradictory character of water: (a) Water, a source of economic growth, (b) Water, a source of socio-spatial fragmentation and differentiation, (c) Water, a source for conquering the Latin American Market, (d) Water, a source of revenue for the Municipality of Medellín, (e) Water, a source to enhance aesthetic and environmental values, and (f) Water, a source to differentiate between "good" and "bad" citizens. By revealing water's contradictory character, I aim to demonstrate how EPM during this commercialization period has established particular configurations between nature, society and urban infrastructure to facilitate strategies of capital accumulation while creating and reinforcing inequalities in access to water within the city.

4.2 Water, a source of economic growth

In compliance with the National Constitution of 1991 and the Law 142 of 1994²⁰, the Colombian government introduced new market-oriented reforms in the provision of basic public services (see Chapter 5). For the water supply sector, it entailed bringing companies in line with values such as competitiveness, organizational flexibility, financial

²⁰ This law governs decision-making concerning the delivery of municipal services in Colombia including regulation, control and monitoring. EPM was active in influencing the content of this law (Varela Barrios, 2009).

viability and generation of new market opportunities. To comply with the norms, the Mayor of Medellín, Sergio Naranjo Pérez (1995-1997) and the directives of the company initially supported the transformation of EE.PP.M into a *Sociedad de Economía Mixta* (Mixed Economy Company). They claimed that private capital was necessary to compete with multinational companies already present in Colombia, and with the capital acquired from the partial sale, it was possible to create a *Fondo de Inversión Social* (Social Investment Fund) to facilitate investments in local communities (Naranjo Pérez, 1995).

These institutional changes sparked controversial debates about the best option to manage a public utility company under market logics. Serious concerns were voiced about the possible privatization of the public company and the negative effects this would have on low-income population. Additionally, it was a strong concern about the far-reaching implications for changing the public character of the company and the distribution of its profits. This sentiment was expressed by a user, who defended the public character of EE.PP.M by claiming:

There are not reasons to sell the company because it is public and it belongs to the Municipality of Medellín, and it is private because it belongs to the citizens of Medellín, who contributed with loans for its creation. Who will take care or subsidized low-income households if EE.PP.M is privatized? (EE.PP.M, 2000: 80) (Translated by author)²¹.

Others refused any attempt to involve the private sector by expressing:

Why are we delivering the assets of Antioquia, the product of several generations who have contributed to the savings of EE.PP.M by paying month-by-month their bills to the private capital, if it has been demonstrated that it is well managed? EPM has more than three million shareholders and all contribute to the greatness of the company (EE.PP.M, 2000: 83) (Translated by author)²².

Many affirmed that there were no reasons for supporting the presence of private capital as the company proved since its inception that it could efficiently function as a public enterprise. Through an extensive and heated public debate, the Municipal Council approved in 1997 the transformation of EE.PP.M from a *Compañía Municipal* (municipal company) into an *Empresa Industrial y Comercial del Estado* (state-owned industrial and commercial company) (Accord 69 of 1997) with the Municipality of Medellín continuing retaining fully ownership and control over the company. Under the figure of state-owned

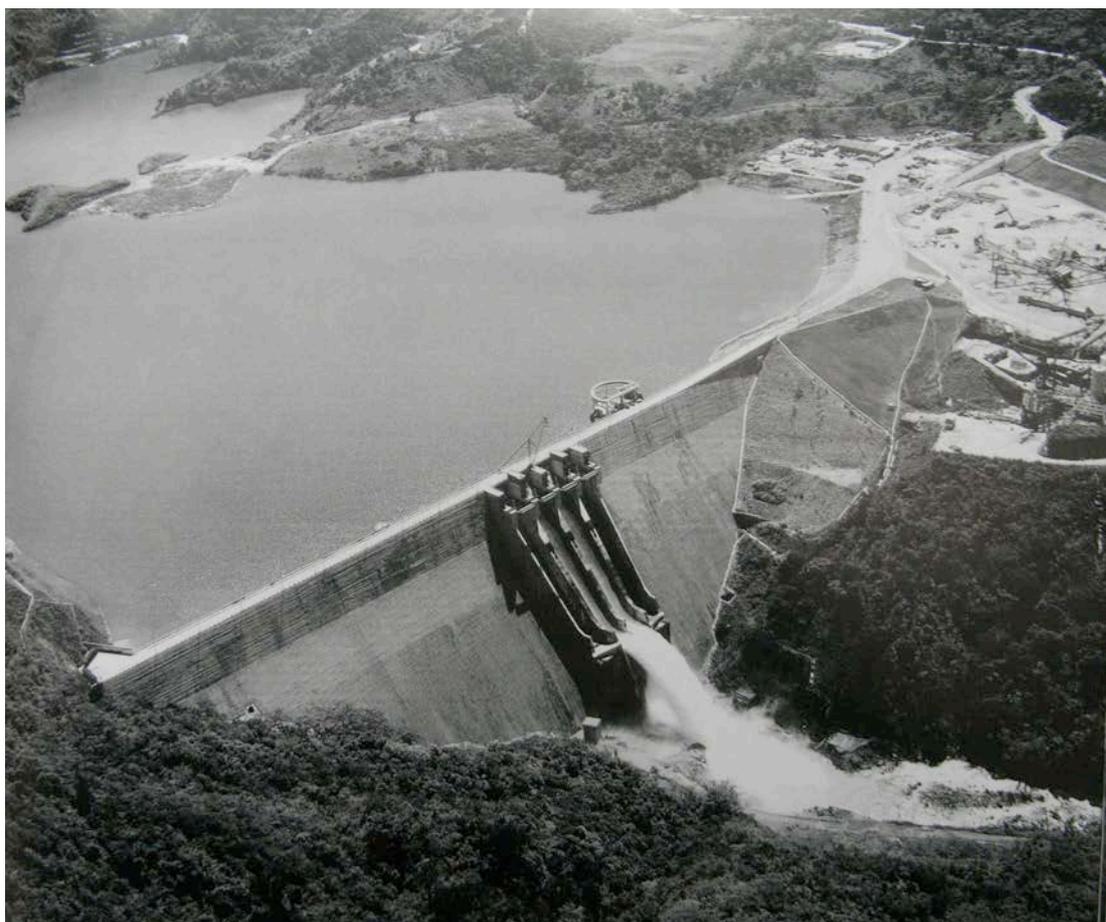
²¹ Por ningún motivo deben venderse porque es pública y del municipio, y es privada porque es de la ciudadanía, que colaboró con empréstitos para su creación. ¿Quién va a atender o a subsidiar los barrios pobres si se privatiza?

²² ¿Por qué se va a entregar el patrimonio de los antioqueños, fruto de varias generaciones que han contribuido al ahorro social concentrado en EE.PP.M, con el pago mes por mes de sus facturas de servicios públicos al capital privado, si se ha demostrado que está bien administrada?. Las EPM tiene más de tres millones de accionistas y todos contribuimos a la grandeza de las mismas.

industrial and commercial company, EE.PP.M undertook an internal restructuring guided by a *Cultura Empresarial* ethos (entrepreneurial culture). This form of state-entrepreneurial behaviour known as commercialization (Bakker, 2010a) led to the transformation of EE.PP.M into a *Grupo Empresarial EPM* (EPM Business Group), on 28 September 2000 (EE.PP.M, 2005a) with a service portfolio integrated by three strategic business units: electricity, water and telecommunications.

During the commercialization period, EPM continued its successive ecological conquest in the same ways as in the municipalization period (see Chapter 3). In 1995, the company embarked in the construction of Porce II hydroelectric power plant with a US\$ 328 million loan provided by the BID (EE.PP.M, 2000) (see Figure 9). In 2010, energy generation was expanded with Porce III, a hydroelectric power plant built with a US\$ 200 million loan also provided by the BID. With an installed capacity of 660 megawatts (MW), Porce III became the biggest power generation plant operated by EPM.

Figure 9 Hydroelectric power plant Porce II in operation since 2001



Source: EE.PP.M, 2005b.

Due to the saturation in the regional market through high coverage rates, EPM sought to exploit new opportunities in the national and international market. Domestic expansion took place in 2003 with the acquisition of the *Central Hidroeléctrica de Caldas* (CHEC, Caldas Hydroelectric Power Plant) and the *Empresa de Energía del Quindío* (EDEQ, Quindío Energy Company). With CHEC, EDEQ and EADE acquired in 1983, EPM secured coverage of 23 per cent in energy distribution in Colombia (EE.PP.M, 2005a). The same year, the company initiated its first international expansion by acquiring 75 per cent of the *Empresa Hidroecológica del Teribe S.A.* (HET, Teribe Hydro-ecological Enterprise) from Panama (EE.PP.M, 2005a). Energy expansion went ahead in 2009 with the acquisition of two national companies: *Centrales Eléctricas de Norte de Santander* (CENS, North Santander Power Stations) and *Electrificadora de Santander S.A.* (ESSA).

The company entered in the natural gas business in 1995. High-electricity tariffs and the problems associated with the energy rationing in 1992 facilitated the commercialization of gas in Medellín and its Metropolitan Area. The company reported an increment in customers from 1,882 in 1995 to 6,995 in 1999, showing the positive acceptance of the service not only in the residential, but also in the commercial and industrial sector (ibid.). Consequently, EPM became the first company in Colombia to introduce the "gas culture". The water sector undertook a regional and national expansion under the motto "*Fuente De Vida y Salud para la Comunidad*" (Source Life and Health for the Community). EPM participated in the constitution of *Aguas de Oriente* in 1999, *Aguas Nacionales* (previously known as *EPM Bogotá Aguas*) in 2002, *Aguas de Urabá* and *Aguas de Occidente* in 2006, *Aguas del Atrato* in 2008 to supply the city of Quibdó, capital of the Department of Chocó (EPM, 2011). In 2011, EPM acquires 85 per cent of the public company *Aguas de Malambo* to supply the Municipality of Malambo in the Department of Atlántico (Ibid.).

4.3 Water, a source of socio-spatial fragmentation and differentiation

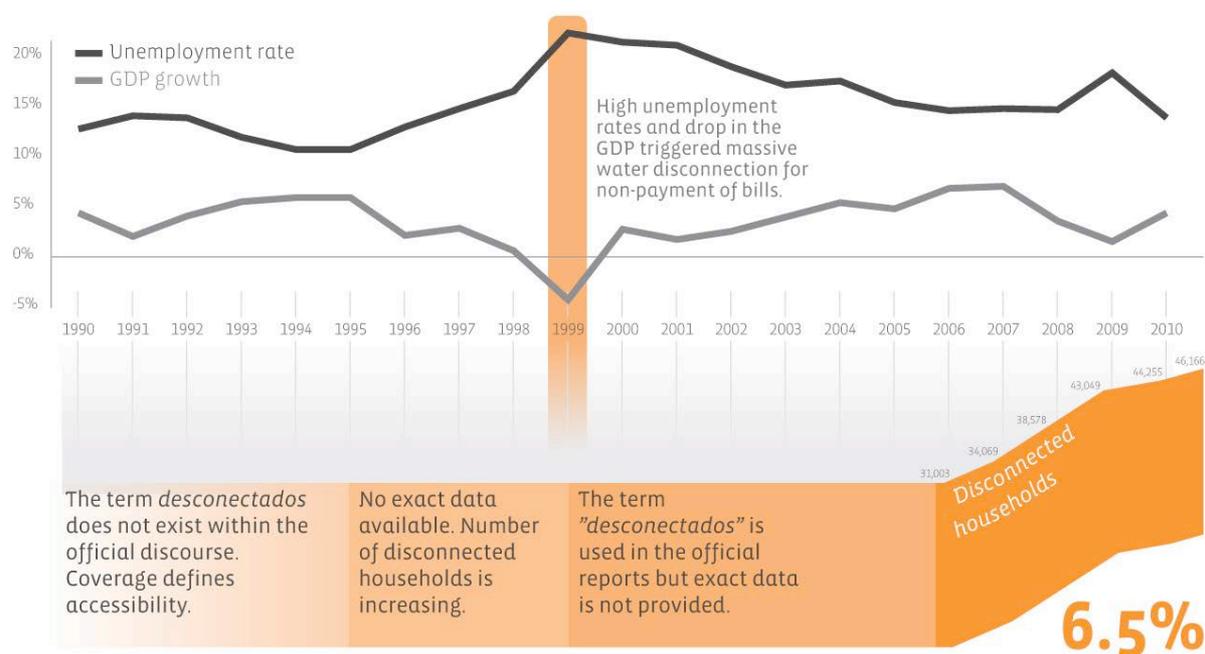
Although the commercialization of EPM facilitated the regional and national expansion, it also paved the way for the implementation of new forms of fragmentation and differentiation in access to water among customers. Commercialization initiatives in the water sector were consolidated through the introduction of market mechanisms, which consisted on recovering the full costs of water supply provision. As a result, the city reported an excessive increase in water tariffs²³ and reduction of levels of cross-subsidization. The implementation of cost-recovery strategies coincided with a period of

²³ For a more detailed discussion on cost-recovery measures adopted by EPM and how it contradicts with the right to water, see Chapter 5.

far-reaching economic decline marked by a drop in the national Gross Domestic Product (GDP) and rising unemployment rates (Figure 10). Considering that 68 per cent of EPM's customers are currently registered in the lowest socio-economic strata (Strata 1, 2 and 3) (EPM, 2013), it was not surprising that lack of affordable tariffs automatically resulted in growing levels of non-payment particularly among low-income households as illustrated by figure 11.

In response, the company enforced disconnection measures as a sanctioned mechanism, even though; the Constitutional Court forbids companies to disconnect a household for non-payment when is inhabited by an individual under constitutional protection²⁴. Reports estimate the number of households disconnected from non-payment of bills grew from around 31,000 in 2006 to around 46,166 in 2011 (near 6,5 per cent of the total). The attitude of the municipality towards disconnection was been ambiguous, as it has refused to intervene when EPM disconnects households for non-payment.

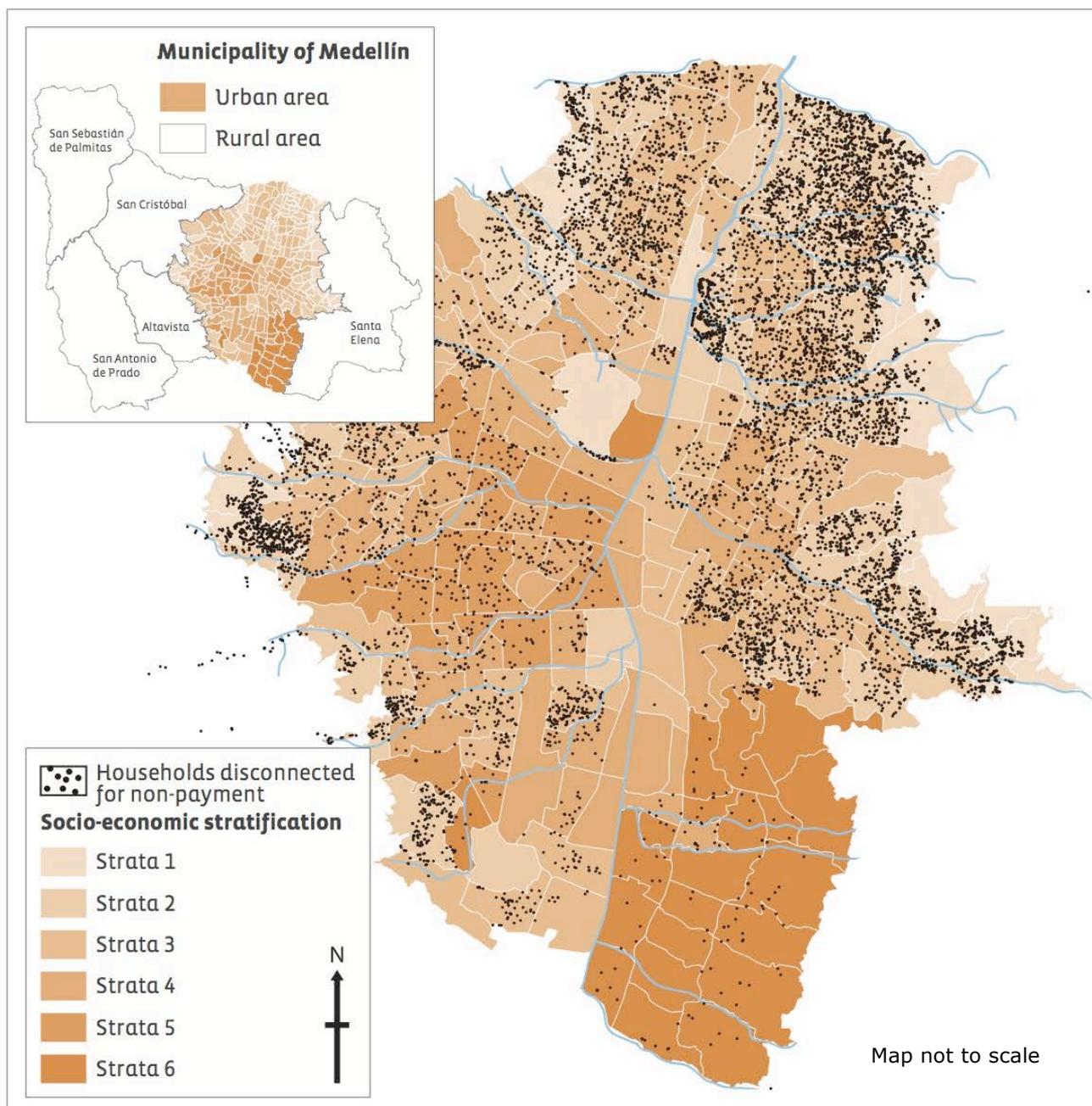
Figure 10 GDP, unemployment rate and growth of disconnection



Source: Compiled by the author from Castaño, et al., 2010; DANE, 2011a, 2011b; Banco de La República, 2001. Prepared by Juan Esteban Naranjo, 2013.

²⁴ For a more detailed discussion on the legal mechanisms that forbid companies to disconnect for non-payment under particular cases, see Chapter 5 and 6.

Figure 11 The city of Medellín showing socio-economic strata and households disconnected from water and electricity services for non-payment, 2011



Source: Base maps supplied by Medellín's Department of Administrative Planning (Socio-economic stratification) and EPM (Households disconnected from water and electricity services for non-payment). Prepared by Juan Esteban Naranjo, 2013.

The growing inequalities in term of access to water became visible not only through the rates of disconnection for non-payment, but also through differentiation in water consumption. In order to ensure a form of social equity, the company built a tariff structure according to the socio-economic strata of its users and levels of consumption as shown in Table 4. To be categorized in a particular socio-economic strata (Strata 1 the lowest and Strata 6 the highest), a household is evaluated according to the following criteria: building materials, location, quality of public services, transportation system, recreational amenities, etc. (González Borrero, 1987). Socio-cultural aspects are also taken into account such as the presence of children playing in the streets, doors constantly open and street decoration (ibid.).

Although this socio-economic stratification was introduced to reduce inequalities in access to water (via cross-subsidies²⁵), it became a based for deepening differentiation in water consumption. As Table 5 highlights, the highest socio-economic strata (Strata 6) tend to consume more, while 75 per cent of households located in the lowest socio-economic strata (Strata 1) consume less than 30 m³. Inequalities in service provision are brought even further as this solidarity mechanism is exclusively exercised for those households connected to the formal network, while largely excluding households located in “high-risks zones”.

Table 4 Water tariffs for the residential sector calculated according to the socio-economic strata and level of consumption * (January 1987)

Socio-economic strata	Fixed costs per user **	Variable costs according to the block of consumption (COP\$/m ³)			
		11-30 m ³	31-50 m ³	51-100 m ³	+ 100 m ³
Strata 1	92	2	29	36	44
Strata 2	185	4	29	36	44
Strata 3	445	12	29	36	44
Strata 4	755	22	29	36	44
Strata 5	856	22	29	36	44
Strata 6	1007	22	29	36	44

* Sewage tariffs correspond to 30 per cent of the total water tariff

** Fixed costs secure a consumption of 10 m³

Source: González, Borrero, 1987.

²⁵ With Law 142 of 1994 (Article 87), the state introduced a cross-subsidy policy in order to avoid restriction of access to water services for low-income households. It consists of charging higher water tariffs to residential consumers from the wealthier socio-economic strata (Strata 5 and 6) and commercial and industrial consumers in order to charge below average rates to households located in low socio-economic strata (Strata 1, 2 and 3). Strata 4 remains neutral with respect to cross-subsidy in the sense that consumers in Strata 4 pay no more than the marginal costs of water provision.

Table 5 Distribution of customers according to their block of consumption

Socio-economic strata	Block of consumption (m ³)				Total (%)
	0-30	31-50	51-100	+ 100	
Strata 1 (%)	75	18	6	1	100
Strata 2 (%)	65	24	10	1	100
Strata 3 (%)	61	26	12	1	100
Strata 4 (%)	60	27	12	1	100
Strata 5 (%)	44	35	18	3	100
Strata 6 (%)	33	32	27	8	100

Source: González, Borrero, 1987.

The commercialization of EPM has also produced strong material effects. The “modern infrastructural ideal” promoted during the municipalization period (see Chapter 3) became progressively undermined with the introduction of market-oriented reforms as formal networks became increasingly splintered and fragmented to facilitate the flow of metabolized water. In cases of non-payment, for instance, the company deploys differentiated technological strategies to force *desconectados* out of the network or to reduce consumption of EPM water. The splintering of the infrastructure networks has been facilitated by the mobilization of flow limiters, removal of conventional meters and pipes, and instalment of prepaid water systems²⁶. The mobilization of differentiated technological infrastructures has been accompanied by particular discourses of sustainability and efficiency to educate consumers in a new ethic of water use. This essential resource, which is to be considered a public good provided at affordable prices, is now presented as a commodity that can be cut off in cases of non-payment. As such, water has turned from a public good into a commodity that is delivered just to those who can afford it.

4.4. Water, a source for conquering the Latin American Market

To avoid monopolistic control in the energy sector, the *Comisión Reguladora de Energía y Gas* (CREG, Regulatory Commission for Electricity and Gas) passed the Resolution GREG 060 of 2007 to limit up to 30 per cent the participation of companies in the energy market in Colombia. As EPM reported 23,9 per cent in energy commercialization it was forced to growth outside the country (EPM, 2013). As a result, the company embarked upon an expansion into Latin America by covering not only electricity, but also telecommunication and water markets.

²⁶ For a more detailed discussion on prepaid systems, see Chapter 5.

The aftermath of the global financial crises that erupted in 2008 provided a suitable ground for the transnational expansion of the company into other countries in Latin America. As a result, in the late 2010 and early 2011, EPM launched itself on a path of rapid integration into the international market under the Civil Engineer Federico Restrepo Posada as a managing director (2008-2012). Since 2010, EPM group massively entered the Central American market by taking over the electric regulated utilities Eegsa (*Empresa de Electricidad de Guatemala*) from Guatemala, ENSA (*Elektra Noreste S.A.*) from Panama as well as DELSUR (*Electricidad del Sur*) from El Salvador. As such, EPM became a leading energy provider in Central America by covering a market of 1000 thousand customers in Guatemala, 351 thousand customers in Salvador and 380 thousand customers in Panama (EPM, 2013).

In 2013, the transnationalization of EPM Group went further (see Figure 12) with Juan Esteban Calle Restrepo, managing director between 2012 and 2016. The company entered the Chilean market by purchasing Los Cururos Wind Park located in the Coquimbo region through its subsidiary EPM Chile S.A. In the water sector, EPM entered the Mexican market by acquiring 80 per cent of the Mexican firm *Tecnología Intercontinental S.A.* (TICSA) in charge of design, construction and operation of wastewater treatment plants. The acquisition of TICSA represents the first venture of the company in the international water market. EPM also undertook the controversial fusion of its *UNE EPM Telecomunicaciones S.A.* subsidiary with the Swedish telecommunication company Millicom (Municipal Accord 106 of 2013). This decision was highly contested by the company's trade unions, local NGOs and social organizations that expressed a strong fear for the consequent privatisation of other public services and the significant deterioration of EPM assets. Despite broader resistance, the fusion could not be prevented and the Municipal Council granted the approval.

The same year, the Municipal Council also authorized the transformation of the *Empresas Varias de Medellín S.A. E.S.P.* (EMVARIAS) from *Empresa Industrial y Comercial del Estado* into a *Sociedad por acciones* (Joint Stock Company), in order to be acquired by EPM Business Group (Municipal Accord 107 of 2012). EMVARIAS has been in charge of solid waste collection, use and final disposal in Medellín since 1964. This new acquisition permitted EPM group to diversify its accumulation strategies by integrating solid waste collection as a new strategic business unit. The control of the solid waste collection business by EPM group was highly welcomed as it could facilitate the expansion of the service into the Colombian market and abroad (El Colombiano, 2 November 2013), and the opening of new opportunities for the management and disposal of hospital waste (El Colombiano, 10 October 2013).

At present, EPM Business Group is composed by a *Empresa Matrix* (parent company) located in Medellín and 55 subordinate companies, 20 in Colombia and 34 in Guatemala, El Salvador, Mexico, Panama, Chile, Cayman Islands, Bermuda, the United States and Spain (EPM, 2013). The company serves a market of around 27 million people; 20 million of them are located in Colombia, 4 million in Guatemala, 1,5 million in Panama and 1,4 in El Salvador (EPM, 2013). The group reported in 2013 revenues for COP\$ 12,5 billion (US\$ 4,1 million), in which the Central American subsidiaries contributed to 27 per cent (El Colombiano, 26 February 2014). The strategic business units contribute to the annual revenues in the following way: electricity and gas sector (74 per cent), telecommunication sector (17 per cent) and water sector (9 per cent) (El Colombiano, 18 March 2015).

One of the main goals of EPM is the further national and international geographic expansion to enhance its profitability and capital value. Under the slogan "*EPM más cerca del mundo*" (EPM closer to the World), the company acquired a new identity and implemented a long-term vision comprised in its *Meta Grande y Ambiciosa* (MEGA, Great and Ambitious Strategic Goal), which according to the *Sustainability Report 2013* is: "In 2022, the EPM Group will reach, with responsible-competitiveness criteria, US\$ 16 billion in earnings, with an EBITDA²⁷ of at least US\$ 5,5 billion with socio-economic and financial profitability, the latter being higher than the cost of capital"²⁸ (ibid.:n.d.).

²⁷ EBITDA: Earnings before interest, taxes, depreciation, and amortization.

²⁸ En el año 2022 el Grupo EPM alcanzará, con criterios de competitividad responsable, unos ingresos de US\$ 16,000 millones, con un EBITDA de al menos US\$ 5,500 millones con rentabilidad socio-económica y financiera, esta última, superior al costo de capital.

Figure 12 EPM business group and subsidiaries in Colombia and abroad



Source: EPM, 2013.

However, the transnationalization of EPM could not be possible without the intensification of water's domination and control. In other words, the continuous metabolization of water has become a fundamental component in EPM's capital expansion. For example, the construction of Pescadero Hidroituango (Hidroituango), the largest project for energy generation in Colombia with an installed capacity of 2,400 MW and an estimated cost of US\$ 5,508 million (EPM, 2013), is being built since 2013 to supply the growing energy market in Central America and to feed energy intensive industries. Hidroituango represents the most ambitious attempt of EPM to domesticate the waters flowing through the Cauca River.

Although the company's managing director has greatly honoured Hidroituango for its positive social impacts in terms of provision of road infrastructure, educational programs and basic services such as water and gas in the affected municipalities (Semana Sostenible, 2014), the project has not been widely greeted by the public. The company has been subject to intense criticism for neglecting its human rights obligations by forcibly expropriating land, restricting fisherman and artisanal miners the access to the river, their primary source of livelihood, and failing to provide proper compensation. Paradoxically, while the human right policy of the company was approved in 2012 (EPM, 2013), the same year hundreds of *campesinos* have been forcibly displaced by the project and in 2013 a leader of the *Ríos Vivos* Movement²⁹ (Living Rivers Movement) was violently killed (Amnesty International, 2013).

4.5 Water, a source of revenue for the Municipality of Medellín

There is not anything that generates more excitement that EPM's annual transfers to the Municipality of Medellín. According to the Municipal Accord 69 of 1997 (Article 13), EPM has to transfer to the Municipality of Medellín up to 30 per cent of its annual profit. In particular cases, extraordinary transfers can be done under the approval of the Municipal Council. In 2013, for example, the company transferred to the municipality a total financial surplus of COP\$ 1,183,493 million (US\$ 393 thousand) distributed in the following way: the company's ordinary transfers amounted to COP\$ 526,122 million (US\$ 174 thousand), which corresponded to 30 per cent of the 2012 profits while the extraordinary amounted to COP\$ 657,371 million (US\$ 219 thousand) (EPM, 2013).

The transnationalization of EPM is being built on the premise that more transfers will be given to the municipality to be invested for social programs in the city. The municipality employs EPM's transfers to financially support 32 per cent of the programs contained in the Development Plan of the city. These transfers are largely invested in education, health, leisure and sport, art and culture, public space as well as infrastructure as shown in Figure 13 (Medellín Cómo Vamos, 2013). In terms of infrastructure, financial resources are directed to repairing, replacing and extending networks to supply basic public services such as water, sewage, natural gas, and electricity (EPM, 2013). During this transnationalization phase, Medellín's urbanization process has become closely connected not only to the loans provided by international institutions as the municipalization period has shown, but also to the transfers done by EPM to the municipality.

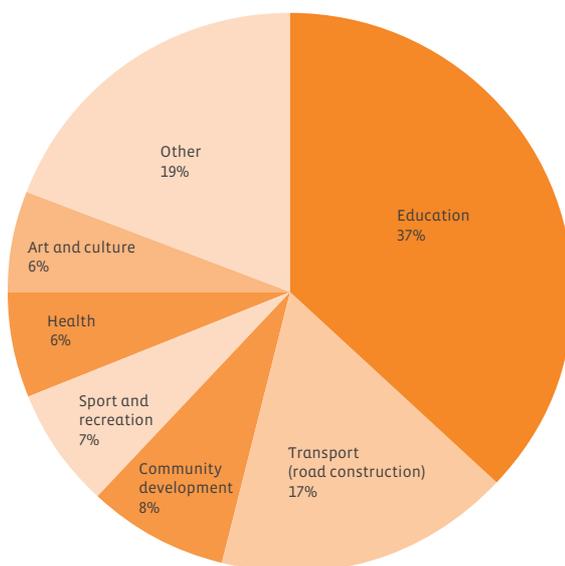
²⁹ The *Ríos Vivos* Movement has strongly opposed to the construction of the Hidroituango hydroelectric plant not only for the environmental impacts, but also for the social detriment generated to the local population. For more information, visit Rios Vivos website at: <http://debatehidroituango.blogspot.de>.

As discussed above EPM's transfers generate substantial revenues for the municipality. As a result, Medellín has become the city in Colombian with more public financial capacity to invest in its population. As a result, the Mayor of Medellín is frequently ranked in a top list of best politicians in the country (Las2Orillas, 1 November 2013). Since 2005, the transfers to the municipality have constantly increased a fact that gives EPM a privilege position to influence the planning and modernization of the city. This rise in transfers coincided with the consolidation of the company as a Business Group, followed by its successful transformation into a *multilatina* (see Figure 14). With this in mind, it is not surprising therefore, that the municipality has simultaneously adopted a passive role in mediating between the interests of citizens and the company, and an active role in supporting new imaginaries of the city that better fit with the commercialized logic of EPM. When interviewed, a municipal staff described the municipality-company relation in the following way:

It is like a relation between a rich son and a poor father. EPM transfers every year 30 per cent of its revenues to the municipality to execute the programs contained in the Development Plan. The position of the municipality as a receptor of significant economic resources makes it powerless to control EPM strategic decisions, particularly now when the company is successfully integrating in the international market (Translated by author).

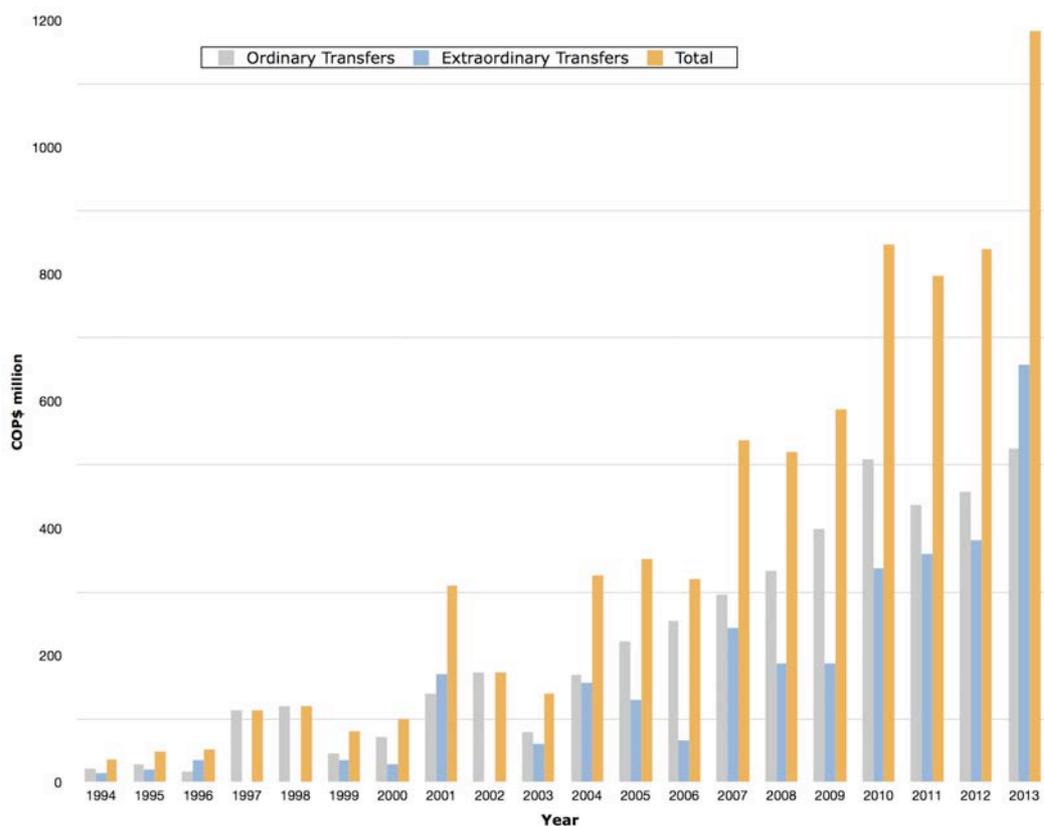
EPM Group is the second most important business group in Colombia, and the first in the field of public utilities (EPM, 2013). The national government is also a key beneficiary of EPM's economic growth. In 2012, for example, the company transferred COP\$ 924,000 million (US\$ 307 thousand) to the state regarding taxes and contributions, an amount that surpassed the transfers to the Municipality of Medellín (COP\$ 839,841 million) (US\$ 278 thousand) (El Colombiano, 24 April 2013). Consequently, EPM has become the second Colombian company in paying the highest amount of taxes to the national government behind the state oil company Ecopetrol (ibid.). Besides direct capital contribution to the state and the municipality, EPM constitutes the main employment generator in Medellín by providing over 15,900 direct jobs and 20,000 indirect jobs (EPM, 2011).

Figure 13 Distribution of EPM’s transfers to the municipality per sector in 2012



Source: *Medellín Cómo Vamos, 2013. Prepared by Juan Esteban Naranjo, 2013.*

Figure 14 EPM transfers to the municipality between 1994-2013



Source: *Data obtained from EPM annual reports.*

4.6 Water, a source to enhance aesthetic and environmental values

The commercialization of EPM has been centred on not only profit maximization, but also the constant transformation of nature by enhancing aesthetic and environmental values. This form of market environmentalism (Bakker, 2010a) has placed economic efficiency and environmental conservation initiatives in the forefront, while failing to meet social needs. Whilst disconnecting households for non-payment, EPM has redirected part of his financial resources to the enhancement of environmental and aesthetics values in the city such as the protection of public fountains, lakes and parks (e.g. *Parque de los Pies Descalzos* and *Parque de los Deseos*), the introduction of technological innovations such as water screens that combine architectural lighting and the implementation of reforestation programs (see Figure 15).

Additionally, EPM has undertaken a project to restore the water quality of Medellín River. By the early 1990s, as the river and its tributaries registered high levels of municipal and industrial pollution, the company initiated the construction of two wastewater treatment plants to partially treat sewage emitted by the city with loans provided by the Inter-American Development Bank (IDB). The San Fernando water treatment plant was opened in 1999 while the Bello water treatment plant will initiate operations in 2016 and is currently under construction by a Korean-Spanish consortium with a loan of US\$ 450 million (El Colombiano, 29 August 2011). Although, it is expected that water quality will improve with the implementation of Medellín River Sanitation Program, the costs are borne by the customers, who already experienced a significant increase in water tariffs through the increment of sewerage charges (see Chapter 5). Contrasting to the high levels of pollution of Medellín River, the company provides one of the best drinking water in the world surpassing the standards established by the World Health Organization. The recent instalment of water dispensers in sport complexes proves the high drinking water quality provided by the company.

Conservation initiatives have undertaken a pivotal role as the company has embarked in educating consumers on the importance to treat water as a fundamentally scarce commodity. Several programs have been introduced to re-educate poor consumers into a "payment culture" and to appreciate water as a "scarce" ecological resource, even though the city is located in an area of high water availability. Water saving campaigns such as "*pagar por el servicio y no por el desperdicio*" (pay for the service and not for the waste) have proved to be successful in reducing water consumption patterns and providing new meanings and cultural values to water.

Figure 15 Enhancing aesthetic and environmental values through the instalment of water dispensers (top left), constructions of fountains (bottom left) and implementation of reforestation programs (right)



Note and Source: The poster on the right reads: We are committed to protecting the habitat of various animals and plant species. In EPM we work on the quality of life of the community. Source: Photographs by Marcela López (top left), 2015; (bottom left and right), 2013.

Strategies for promoting conservation are also being reinforced through pedagogical displays of nature in the *Museo del Agua* (Water Museum) opened in 2011, the future establishment of a water research centre aiming at investigating the potential impacts of climate change on water availability (El Colombiano, 10 January 2012) and the creation of the *Fondo del Agua* (water fund), a public-private partnership to protect water basins that supply Riogrande II and La Fé, the main water reservoirs for the city of Medellín (El Colombiano, 25 October 2014). Additionally, the company has been very active in designing educational materials for schools to inculcate new values regarding the efficient use of public services and to learn to appreciate “public” goods. With super heroes such as *Los Cuidamundos* (see Figure 16), the school population learn the complicated and costly process of metabolizing nature and the central role that EPM plays in this process.

Figure 16 *Los Cuidamundos* represent the main basic public services provided by EPM (water, electricity and gas)



Source: EPM official website.

4.7 Water, a source to differentiate between “good” and “bad” citizens

The company has deployed a diversity of mechanisms to reward discipline costumers for maintaining the so-called “culture of payment”. Those who pay their bills on time are entitled to have access to different kinds of goods and services in the city. For example, by presenting the last paid EPM bill, people living in the socio-economic strata 1, 2 and 3 are awarded with free entrances to the most important cultural institutions in the city such as Museum of Antioquia, Water Museum, Museum of Modern Art (MAMM), the planetarium, as well as the Explora Park (see Figure 17). In November 2014, EPM launched the campaign *#somosbuenoshinchas* (*We are good football fans*) to encourage football fans to maintain the “culture of payment” and good behaviour in the football games (see Figure 18). EPM established an alliance with the main football clubs in Medellín, *Atlético Nacional* and *Deportivo Independiente Medellín*, to reward with football t-shirts and tickets to football games those fans that pay their bills on time.

Figure 17 Advertisement to promote free entrances to the Museo de Antioquia by presenting a paid EPM bill

MUSEO DE ANTIOQUIA

ENTRADA LIBRE

¡Todos los días, incluidos domingos y festivos!

ESTRATOS 1, 2 Y 3

Hasta 5 personas ingresan
con 1 cuenta de servicios públicos
Gracias al convenio de asociación con la
Secretaría de Cultura Ciudadana de Medellín.

Informes: Cra 52 No. 52-43 / Pbx (574) 251 36 36 / www.museodeantioquia.co



Note and Source: The advertisement reads: Free entrance, all days including Sundays and holidays. Socio-economic strata 1, 2 and 3 are allowed to enter up to 5 people by presenting a paid bill of public services thanks to the partnership agreement with the Secretary of Culture of Medellín. Source: Museo de Antioquia official website.

Figure 18 Campaign launched in November 2014 to reward the payment of EPM bills among fans supporting the main football clubs in Medellín (Atlético Nacional and Deportivo Independiente Medellín)



Note and Source: The campaign reads: We are good football fans. With a good behaviour, we all win. Source: EPM official website.

As low-income population represents an important target, the company has designed other mechanisms of redirecting markets towards them. For example, EPM officially launched *Tarjeta Grupo EPM* (EPM credit card) in 2008 (IDB, 2012) as an alternative method to provide accessible credit to low-income population. This initiative facilitates to purchase construction materials and energy or water-efficient appliances such as refrigerators, computers or washing machines at low interests rates. Additionally, it expects to encourage efficiency in electricity and water use by replacing inefficient house appliances and to enable low-income households to participate in the formal credit system. In this way, the company enables poor residents to increase their spending by purchasing products through fast and easy methods (IDB, 2012). However, not all residents are entitled to enjoy in the same way the benefits of the credit card. In order to qualify, beneficiaries are required not to have debts with the company as payments are done in instalments by incorporating them into the monthly EPM bill. By 2012, the company registered 121,771 people with access to EPM card (EPM, 2013).

These programs are presented as suitable mechanisms to empower low-income households and to construct a more inclusive city as they have facilitated to a certain extent a better redistribution of goods and services within the city. However, it is necessary to discuss more profound questions regarding the intensification of inequalities. Would not the implementation of social programs tied to the public services payment status increase the already protected social inequalities by completely excluding disconnected households, who in many of the cases are not considered citizens or suitable candidates for not fulfilling program requirements? To what extent do these programs contribute to blur the boundaries between citizen and consumer?

4.8 Conclusion: The transnationalization of the water, power and capital nexus

This chapter has attempted to illustrate how the city's contemporary urban waterscape has undergone not just a process of commercialization, but also it has been integrated into the circulation of networks of capital accumulation. It is no doubt that the flows of water through the urban waterscape have become increasingly integrated into EPM's accumulation strategy. Since the commercialization of the municipal-owned company in 1997, the metabolism of water has become an integral part of a competitive and profit-driven logic that surpasses the local, regional, national and international scale. The costs and benefits of the metabolic dynamic of the urbanization of water have been unevenly distributed in the city and are differently experienced by consumers depending on their economic, social and spatial condition.

Not surprisingly, therefore, low-income areas reported a dramatic increment of non-payment of bills due to the application of full-cost recovery strategies in the water tariffs. The company responded to non-payment by forcing households out of the formal water network systems or by reducing their water consumption through different means: installation of flow restrictors, removal of conventional meters and parts of pipes to avoid illegal re-connections. As such, the notion of water as an emblem of citizenship promoted during the municipal period (Chapter 3) is abandoned in favour of neoliberal logics that privilege those who can afford for it.

The radical transnationalization of EPM in 2010 brought water inequalities even further. The company has deployed aggressive expansion strategies to get into the top 50 multinationals by focussing on market and customer growth as well as the rise of transfers to its sole-owner, the Municipality of Medellín. Consequently, new forms of nature, society and urban infrastructure relations based on market interests have emerged. For example, water has been transformed from a public good into a "scarce" commodity available to those who can pay for it; citizens became categorized as

customers while prepaid systems are presented as an “innovative” solution to readdress inequalities as it adjust to the capacity to pay of the customer.

Besides profit maximization, the company has implemented different mechanisms to enhance environmental and aesthetic values and educate customers to become obedient subjects, thereby, maintaining the so-called “culture of payment”. This form of market environmentalism has improved investments in public fountains, parks, reforestation programs, treatment of Medellín River as well as provision of free entrances to the main cultural institutions in the city. As EPM’s transfers significantly contribute to the financial budget of the city municipality, it is not surprising that all these changes have occurred with the active support of the state.

CHAPTER 5

The State: Deepening Contradictions in Water Service Provision

5.1 Introduction

The production and reproduction of inequalities from a perspective of the interrelations between water, power and urban fragmentation, has to do with how water has been historically controlled and domesticated as illustrated in Chapter 3 and 4 and how uneven power relations are supported by particular institutional configurations and strategies. This chapter starts with an overview of the national context that regulates and organizes both the legislative, economic and ideological basis in which Medellín and its multi-utility company is taking decisions about service provision. Then, it exposes how this legislation amplifies the incompatibilities and internal contradictions between economic efficiency and the right to water. The main reason to bring into discussion these contrasting notions attributed to water (commodity vs. right) is to cast light on some of the crucial challenges affecting governance and how these influences water supply provision in Medellín, particularly as it relates to low-income households. These concerns were vividly discussed in *the Seventh Inter-American Dialog on Water Resource Management (D7)* held in Medellín from 13-19 November, 2011. As expressed by Rhonda Harris, Chair of the Inter-American Water Resources Network (IWRN) in an interview in relation to profits and rights:

While it is a human right issue it is also a financial issue. You are expecting safe water, but water has to be treated to be safe. The water that falls from the sky is not pure, right? You know that. So, the water that falls is not clean enough to drink and to make it safe human hands have to touch it, and if human hands have to touch it they might deserve to make a living wage. While it is a human right, you also have to realize that it costs money to clean it up and make it safe. So, if people do not pay for it you cannot afford to treat it and make it safe. So, it has to be a balance somewhere.

This statement clearly elucidates the polarized debates in which access to water has been embedded in recent years and the struggles to find a balance between economic efficiency and social equity. Following this line of argument, this chapter draws specifically on two contrasting and conflicting strategies: one the one hand, neoliberal

cost-recovery strategies, and on the other hand, the right to urban water. I adopt this approach in order to show how EPM position itself in this contradictory institutional and regulatory framework, and how it copes with the pressures ejected by the local communities when the right to urban water is not being met. Exposing the tensions and contradictions that produce water inequalities is particularly important in the field of neoliberalisation of nature in order to explore possibilities for democratic change.

5.2 Neoliberal cost-recovery strategies

In 1990s, Colombia implemented a serie of legislative reforms to incorporate market economy elements in the water supply and sanitation sector and to strengthen the business capabilities of the companies providing these services (Andres et al., 2010). First, the constitutional reform of 1991 introduced several neoliberal institutional changes particularly the economic liberalization of public services, which guarantee to both private and public operators free competition under the same conditions. The second central piece of legislation that regulates decision-making around the delivery of basic public services in the country is the Public Services Law 142 of 1994. This law established an institutional framework under which both public and private operators currently operate based on criteria such as recovering economic costs, increasing competition, and improving efficiency, while preserving state intervention tools in accordance with its social aims (Andres et al., 2010).

Additionally, the Law 142 of 1994 established two new independent regulatory agencies to promote cost-recovery strategies: the *Superintendencia de Servicios Públicos Domiciliarios* (SSPD, Superintendence for Public Utilities), which controls the performance of the public services sector and protects consumers' interests; and the *Comisión Reguladora de Agua Potable* (CRA, Regulatory Commission for Water and Sanitation), which is responsible for setting water and sanitation tariffs. Contrary to the often repeated refrain that neoliberalism entails the rolling back of state powers and that the market does not need state intervention, the creation of these two regulatory bodies illustrates how the state repositioned itself primarily through the function not of operator, but as a regulator and mediator within a new neoliberal framework. Therefore, rather than deregulating the water sector, neoliberalism has resulted in a profound reregulation of the water supply market.

Under this new institutional and regulatory framework, EPM transformed itself from a municipal company into a state-owned industrial and commercial company in 1997 (Accord 69 of 1997) as shown in Chapter 4. The adoption of this neoliberal institutional model entailed that the company runs on a competitive and profit-driven

logic while its ownership and management remains in public hands, a practice known as commercialization (Bakker, 2010a).

This section reviews cost-recovery strategies adopted and enforced by EPM under the new commercialization model and how these strategies have manifested themselves in the city of Medellín. Particular attention is paid to tariff rates, cross-subsidization schemes, control of UFW levels, policies of disconnection for non-payment, implementation of prepaid meters, and the discursive representation of water as a “scarce” economic good. Additionally, this chapter illustrates the main obstacles and challenges faced by EPM to control the commodification of water in order to capture the full costs associated with service provision.

5.2.1 Water pricing

Access to water in Colombia is determined by a tariff-setting process that seeks to recover all or most of the costs associated with the provision of the service. The rationale for cost-recovery is that prices should reflect the full costs of water and sanitation services to finance the extension and upgrade of infrastructure networks on the long-term basis, particularly in low-income areas. Another argument to introduce cost-recovery is that charging full price reduces wasteful consumption patterns that lead to environmental deterioration. Price mechanisms are introduced as a strategy to reduce consumption and promote conservation. Prior to the application of cost-recovery methods, the country was characterized by providing low water tariffs and poor metering methods that were reflected not only in the low financial sustainability of service providers, but also in the high levels of water consumption and high indexes of unaccounted for water (UFW) (Andres et al., 2010).

While water tariffs remained stable in Medellín during the period 1970 to 1986 with low-levels of cost-recovery (Uribe and Valencia, 2005), prices experienced a sharp rise since commercialization. To secure cost-recovery, EPM introduced a new methodology to calculate tariffs according to the average fixed and variable costs of the service. Fixed costs (\$/user) are subsidized and are always charged to users regardless of consumption. Additionally, they reflect the costs involved in administrative expenses, insurances, billing and answering queries. Variable costs (\$/consumed m³) rely on the consumption in cubic meters of the users and they are subsidized up to 20 m³. They include chemical inputs, equipment replacement, maintenance, water losses and costs of energy used for pumping water. The topographic characteristics of Medellín permit that water flows by gravity to the city. This condition provides an exceptional advantage for the company to reduce energy costs involved in water distribution. This is one of the

main reasons why water tariffs in Medellín are lower than in cities such as Bogotá or Barranquilla, where the companies incur in high-energy costs for pumping³⁰.

The implementation of a new tariff and pricing system resulted in substantial increases of water charges well above the inflation rate. Such increases were distributed highly uneven in different socio-economic strata. Fixed costs experienced an increment of 162,36 per cent in the lowest socio-economic strata (Strata 1) while the highest socio-economic strata (Strata 6) reported 63,46 per cent (Contraloría General de Medellín, 2003). Variable costs also increased significantly in low-income households, which experienced an increment of 948,46 per cent (Strata 1), 413,81 per cent (Strata 2) and 335,36 per cent (Strata 3) for the first 20 m³ consumed, while the wealthiest households (Strata 6) reported the minimal increment of 102,01 per cent (see Table 6).

Table 6 Water tariffs in Medellín per socio-economic strata between 1998 and 2003

Socio-economic strata	Tariff for basic consumption (COP\$/block tariff 0-20 m ³ /month)						
	1998	1999	2000	2001	2002	2003	Increment (%)
Strata 1	29,95	42,65	70,78	154,93	228,38	314,00	948,46
Strata 2	87,83	141,99	221,03	300,44	368,97	451,28	413,81
Strata 3	212,15	310,72	454,41	615,20	754,24	923,60	335,36
Strata 4	506,39	716,30	814,64	891,95	944,92	1,011.04	99,66
Strata 5	590,84	859,56	977,55	1,070.34	1,133.89	1,213.24	105.34
Strata 6	600,57	859,56	977,55	1,070.34	1,133.89	1,213.24	102,01

Source: Contraloría General de Medellín, 2003.

EPM charges simultaneously for water and sanitation services. Consequently, users are not allowed to pay for these services separated. As sewage services cannot be accurately measured and priced on a volumetric basis, the company uses the same amount of cubic meters of potable water as reference for charging the collection and treatment of wastewater, although rates are different. Between 1998 and 2003, the lowest socio-economic strata in the city (Strata 1, 2 and 3) reported the highest increment for the first 20 m³ of wastewater discharge, corresponding to 1031,16 per cent, 501,65 per cent and 461,86 per cent respectively while the strata 6 reported the minimal increment of 132 per cent (see Table 7). In 2012, the company registered the most expensive sewerage charges per cubic meter in the country (EPM, 2013). One of the main drivers behind high sewerage rates is that more investment is being devoted to

³⁰ In 2012, water tariffs were reported in the following cities: Medellín (COP\$1,607), Barranquilla (COP\$2,041) and Bogota (COP\$2,894) (EPM, 2013).

the construction of a water treatment plant that will initiate operations in 2015 in order to upgrade water quality of Medellín's river as discussed in Chapter 4.

Table 7 Sanitation tariffs in Medellín per socio-economic strata between 1998 and 2003

Socio-economic strata	Tariff for sewage services (COP\$/0-20 m ³ /month)						
	1998	1999	2000	2001	2002	2003	Increment (%)
Strata 1	20,25	33,33	58,27	117,29	168,80	229,06	1031,16
Strata 2	52,14	88,20	140,73	200,45	252,01	313,68	501,65
Strata 3	115,91	184,56	285,79	405,74	517,16	651,23	461,86
Strata 4	316,04	481,33	586,87	639,28	677,25	724,64	129,29
Strata 5	368,74	577,60	700,65	767,15	812,70	869,57	135,82
Strata 6	374,82	577,60	700,65	767,15	812,70	869,57	132,00

Source: Contraloría General de Medellín, 2003.

5.2.2 Cross-subsidization

Another factor that has significantly contributed to the increment in water prices is the limitation of cross-subsidization between consumers. EPM like many other companies in the country adopted a system of cross-subsidization which is calculated according to the socio-economic strata of the user (Law 142 of 1994, Articles 89 and 99). The government established a tariff scale in accordance to the socio-economic strata of different users in order to facilitate access to basic public services in low-income areas (Strata 1, 2 and 3) while demanding a greater burden on wealthy areas (Strata 5 and 6), residential and commercial users. Strata 4 remains neutral with respect to cross-subsidy in the sense that users in Strata 4 pay no more than the marginal costs of water provision. As such, the low-income strata (1, 2 and 3) receive a maximum subsidize of 50 per cent, 40 per cent and 15 per cent respectively, which is applicable to the first 20 m³ per month (Law 142 of 1994, Article 88).

However, cross-subsidization has been slowly reduced as it was considered a major contributor to the financial deficit experienced in the water sector between 1998 and 2003 (Contraloría General de Medellín, 2003). Reasons for dismantling subsidization of tariffs were attributed to the imbalance between high numbers of households demanding subsidize and low number of costumers contributing to cross-subsidy. This clearly shows that deep social economic inequalities make the cross-subsidization scheme economically not feasible in Colombia.

As prices have dramatically risen, water consumption has fallen in Medellín. The company reported lower water consumption between 1997 and 2001 as it is shown in Table 8. Despite that higher water prices became a suitable mechanism to introduce conservation incentives; it generated severe impacts on low-income population. The steadily increment in water tariffs coincided with a period of economic recession. In 1999, the country experienced a drop in the GDP (-4,2 per cent), which lead to an increment in the unemployment rate (29,9 per cent). This situation contributed to a dramatic increment of households unable to pay their bills, which consequently were disconnected from the service by the water company. In an interview conducted in 2011, a member of the League of Public Service Users of Antioquia argued that EPM initiated the implementation of disconnection policies around 1999, however, just until 2006 the number of households disconnected for non-payment was officially incorporated for the first time in the company reports (EPM, 2006).

Table 8 Average water consumption per socio-economic strata in 1997 and 2001

Socio-economic strata	Consumption rate (m³/household/month) 1997	Consumption rate (m³/household/month) 2001	Consumption decrease (%)
Strata 1	17,9	13,8	22,9
Strata 2	19,7	14,9	24,4
Strata 3	19,6	16,0	18,4
Strata 4	20,8	18,0	13,5
Strata 5	24,7	20,2	18,21
Strata 6	36,0	26,8	25,6

Source: Own calculations based on Barrera-Osorio and Olivera, 2007.

5.2.3 Unaccounted for water

High water prices are also linked to physical and commercial losses. According to reports provided by the water company around 35 per cent of Medellín's potable water is being lost through leakages in the distribution networks (physical losses) as well as meter inaccuracies and illegal connections (commercial losses) (EPM, 2013). A small percentage is reported as unbilled authorized consumption. EPM produces every year between 280 to 290 million m³ from which around 180 to 190 million m³ are billed to consumers while the remaining 112 million is lost through the EPM system as indicated in Table 9.

According to the tariff regulation established by the CRA, water companies can incorporate the costs associated to unaccounted for water (UFW) (up to 30 per cent) in the bills (CRA, 2007) while the rest has to be covered by utility companies. Although, EPM maintains the levels of UFW below the overall levels of Latin America, which are estimated to be 42 per cent (Jouravlev, 2004), there is an amount of 5 per cent of UFW that places a huge pressure to recover costs associated with service provision.

Table 9 Unaccounted for water (UFW)

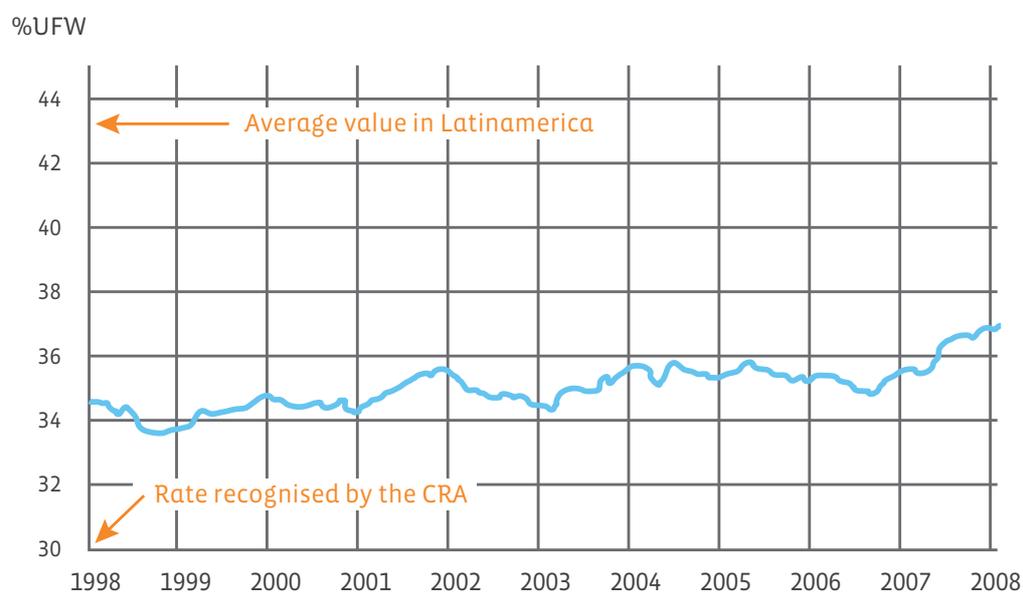
Source	Million m ³ per year	Percentage
Physical losses		
Leakages	66	20
Commercial losses		
Faulty meters	13	4
Illegal connections	18	6
Others		
Unbilled authorized consumption	15	5
Total unaccounted for water	112	35

Source: Own calculations based on data provided by EPM.

According to an interview conducted with a staff member of EPM, the complexities and challenges of managing the UFW are enormous. Solutions cannot merely rely on technical aspects as the company operates in a complex social, political and economical context that is difficult to control and requires urgent attention. To illustrate this point, the increasing number of households disconnected for non-payment in 2007 triggered an increment of illegal connections, which consequently increased the amount of UFW.

As a response, the company introduced in 2008 a program called *Estrategía Integral de Agua No Contabilizada* (Comprehensive Strategy for UFW). The program aimed at reducing UFW rates by targeting faulty meters, leakages and reducing illegal connections. The implementation of this program relies on a strong interaction between company, users and the government (Yepes, 2009). The company is responsible for the adequate maintenance and investment of the infrastructure networks. Users are in charge of reporting damages and being active part of a culture of a rational use of potable water, while the state engages in developing suitable programs to reduce UFW (e.g. legalize informal settlements, create job possibilities, subsidize basic water consumption, etc.).

Figure 19 Increment of UFW over time



Source: Yepes, 2009:56. Prepared by Juan Esteban Naranjo, 2013.

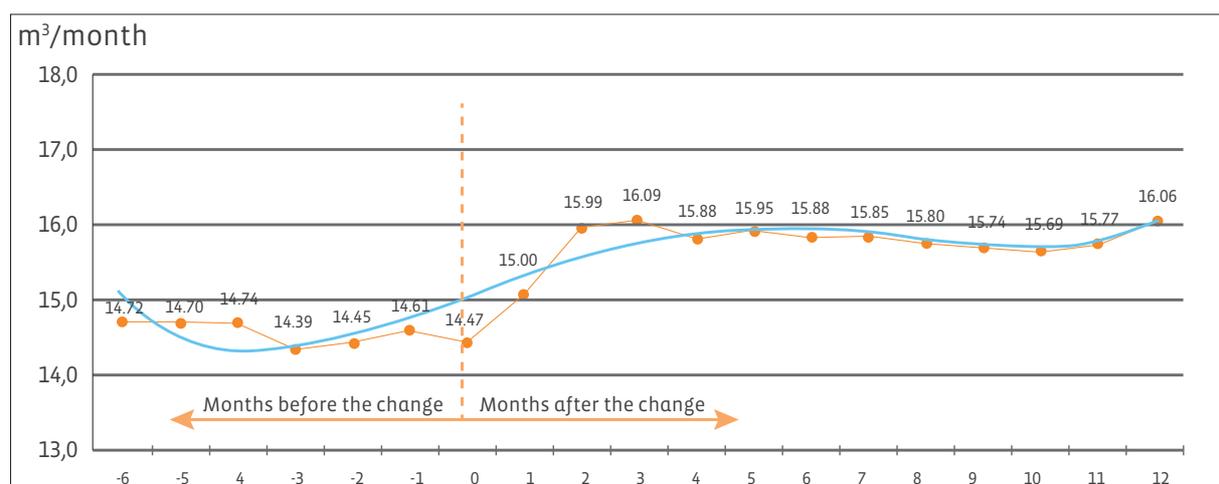
Faulty meters and leaky pipes

In the logic of cost-recovery, urban water needs to be metered. In Medellín the majority of water is metered and users pay for their water on a volumetric basis. The company faces the problem of inaccurate and faulty meters, which leads to the registration of the wrong consumption. To cope with this problem, EPM undertook a meter replacement program in all socio-economic strata on those meters than are older than ten years. With the introduction of new meters, the company has decreased the apparent losses occurring as a result of meter inaccuracies. Figure 20 shows how UFW levels have been

significantly reduced after the implementation of the meter replacement program. According to an interview conducted to one of the staff of EPM, the program already replaced 120 thousand meters leading to an increment in billing collection by nine per cent. However, the metering system continues posing huge challenges to reduce UFW as meters are constantly being destroyed, robbed or manipulated³¹.

Figure 20 Reduction of UFW after the implementation of a meter replacement program

Source: *Mejoramiento en la micromedición. PowerPoint graphic displayed at 7^o Environmental*



Seminar: *Rational and Efficient Use of Resources, September 12-13, 2012. Prepared by Juan Esteban Naranjo, 2013.*

The company has also implemented a program to efficiently respond to leakages when they occur. Nowadays, it is estimated that the average time spent in attending a customer is less than 13 hours. These technical aspects have been complemented with educational campaigns, which have been extensively promoted in different communication media to involve users in reporting damages and to educate them in the culture of UFW. According to a staff of EPM, the campaign “*cada gota que se pierde nos duele*” (every drop that is lost hurt us), proved to be a successful mechanism in forging public acceptance of the economic value of water as the report of minor damages increased from 30 to 40 per cent.

³¹ Water meters are usually manipulated by being turned outside down or inserting magnetic objects.

Illegal connections

For the water company, UFW results not only from technical problems faced by the network system, but also from illegal connections deployed by disconnected households, which try to secure water on a daily basis. These connections are mostly located in the peripheries of Medellín, where households are unserved by the formal network³². It has become a challenge for EPM not only to control illegal practices, but also to reduce consumption patterns as per capita water consumption of unserved households is higher compare to the average domestic consumption per month of a regular user. One of the main reasons behind these high levels of consumption is that the displaced population from rural areas undertake activities that require a significant amount of water such as crop irrigation and animal husbandry. Additionally, a staff of EPM expressed that it is very common to find houses in the peripheries of the city with water running constantly in toilets cisterns and sinks without taps because people do not understand the real costs involved in the production of potable water.

EPM recognizes that despite the illegal tenure status, immediate actions have to be taken because in the long term these households will consolidate and growth in size. For EPM one of the main priorities is to educate people to change their water consumption habits. The company claims that urban water cannot be run without any control and without paying for it because it involves an expensive process (e.g. abstraction, treatment and distribution). A staff of the water company explained that when a person is provided with water services it acquires citizenship recognition, and therefore, it has the obligation to comply with certain rules. In this case, it has the “duty” to pay for the service. This argument demonstrates how citizenship recognition is interpreted in narrow economic terms, in which financial obligations become a precondition to enjoy basic rights.

Besides illegal connections in low-income urban areas, the municipality has reported 187 illegal car-washing facilities, which register water losses of 34,400 m³ per month (El Mundo, 18 September 2012). These activities are usually taking place in bus terminals primarily located in the peripheries of Medellín (see Figure 21). Water accessibility is secured by connecting illegally to the formal infrastructure network or by manipulating the valves that regulate pressure. Many of these car-washing facilities have been operating for more than 20 years and services are provided to different vehicles such as buses, taxis, private cars and motorbikes. According to a staff from the Department of Unaccounted for Water of EPM, each of these car washing locations

³² Informal/Illegal practices employed by disconnected households to secure access to water are shown in closer detail in Chapter 7.

expend an average of 300 m³, from which 200 m³ is being wasted (El Mundo, 18 September 2012). He also claims that illegal car washing requires a complex treatment not only because many low-income families derive their basic income from these activities (it is estimated that around 10,000 people live from illegal car-washing), but also because water is being used without paying for it³³.

Figure 21 Illegal car-washing activities in the peripheries of Medellín



Source: Photograph by Marcela López, 2014.

In order to get a comprehensive picture on the main difficulties faced by the company to control illegal car-washing activities, it is necessary to understand the technical and political aspects in which this problem is embedded. Technically, the flows of water are difficult to control because it is an “uncooperative” resource (Bakker, 2004). It means that EPM’s efforts to intervene illegal car-washing activities are constantly subverted as devices installed by the contractors to obstruct the flow of water are easily altered or modified. Politically, car-washing operations are becoming closely tied up to a lucrative economy controlled by criminal bands (paramilitary groups) that charge extortion fees to people employed in this informal economy (El Tiempo, 20 May 2013). By taking into account the complexity of the problem, the company and the municipality have initiated a pilot project in the *barrio* Trinidad (comuna 15), an area of Medellín that registers the highest number of car-washing operations. This project aims at legalizing car-washing activities by providing dignifying salaries, adequate places and equipment for working and as well as issuing all required licenses (El Colombiano, 19 July 2013).

³³ Comisión Accidental No. 134 of 2008. Acta No. 01, Medellín.

5.2.4 Disconnection for non-payment

Another strategy of cost-recovery is disconnection, a punitive measure adopted by companies to secure the payment of bills. According to the Law 142 of 1994, companies in Colombia are not allowed to supply water services for free and inability to pay ends up in disconnection. This law grants water companies the power to suspend households for non-payment of bills between a period of two to seven months (Article 140) and cut off households for non-payment of more than seven monthly bills (Article 141). EPM adheres with strictly rigor to the national law by widely implementing disconnection policies as a debt control mechanism. The company affirms that policies of disconnection are not being implemented as an arbitrary decision that ignores the fundamental rights, but rather, they are based on a series of legislative and constitutional requirements (see Sentence T-925 of 2012)³⁴.

If services are not disconnected for reasons of non-payment, in practice they will become a free good, thereby, posing a burden to customers that pay their bills on time and threatening the sustainability of the companies (Palacios Mejía, 1997). EPM claims that poverty does not excuse people from the social duty to contribute to the financing of state expenditures (Sentence T-925 of 2012). Additionally, a staff of EPM commented in an interview conducted in 2013, "We are not a company that guarantees human rights. It is hard to admit it but we are operating under market logics". He also claimed that in cases where satisfaction of basic needs is unmet, it is the state that has the responsibility to ensure the provision of services (National Constitution, Article 365) and not the companies.

Another rationale for disconnection for non-payment is based on the intensive costs involved in water infrastructure systems. Water needs to be extracted, purified and distributed before it reaches individual households, a process that requires high operative costs for companies. The director of the Water Department at EPM affirmed that "the payment for the service does not go directly to the company but rather to pay for the real costs involved in the service provision"³⁵. However, an analysis of financial sustainability across 19 water companies in Latin America shows that EPM's operating income of US\$ 1,43 per m³ is the highest in comparison to the average operating costs of US\$ 0,64 per m³ (Fernández et al., 2009). Given that 23 cent of the total users of EPM are reported in the high and medium socio economic strata, it is not surprising therefore, that the bulk of its water revenues comes from low-income users.

³⁴ For further information see: República de Colombia, Corte Constitucional, Decision T-925 of 2012 [M.P. Alexei Julio Estrada].

³⁵ Notes taken during a presentation by Francisco Piedrahita; director of EPM's Water Department at the Seventh-Inter-American Dialogue on Water Management, Plaza Mayor, Medellín, 18 November 2011.

In 2012, EPM reported a deficit of COP\$ 55,872 million (US\$ 19,3 million) for non-payment of bills mainly from costumers located in the socio-economic strata 1, 2 and 3 (El Colombiano, 9 December 2012). There are several social organizations that are advocating the forgiveness of debts in order to facilitate again the insertion of disconnected households in the formal system³⁶. They affirm that debts related to non-payment constitute one of the main obstacles for low-income households to regain formal access to water. However, the company affirms that doing so could encourage a “non-payment culture”, which consequently, will produce a reduction in the company's revenues. As expressed by Mónica Ruíz, director of Marketing, Transmission and Distribution of Energy at EPM in relation to non-payment (Samudio and Cuevas, 2013):

When you start to forgive the debts, what you are saying to the user is that it is the same to pay or not to pay. A disciplined user that all his life has paid his bills will become demotivated if his neighbor does not pay and the company does not react to it ... First, we are talking about *public money* ... In EPM when we forgive the debts we are putting at risk the money of all of the citizens of Medellín ... We cannot play with public money (Translated by author) (Emphasis added).

The above statement indicates how the non-payment of bills has a profound impact on the financial budget of the municipality through EPM's revenues. This is one of the main reasons why the company has deployed the “public ownership” narrative to defend and legitimize policies of disconnection for non-payment and to reinforce the “moral responsibility” to pay for water services. See Chapter 6 for a more detailed analysis on how low-income households experience and perceive disconnection policies.

5.2.5 Prepaid systems

Prepaid meters constitute another strategy for the enforcement of cost-recovery. As a response to the increment in the number of disconnected households for non-payment, the company has introduced prepaid technologies as the ultimate solution for debt recovery. Although a tariff system has not been implemented for prepaid water, EPM initiated negotiations with the Regulatory Commission for Water and Sanitation (CRA) to restructure the legal and institutional framework governing the water supply sector to favour the introduction of prepaid meters for water provision. This procedure already took place with the Regulatory Commission for Electricity and Gas (CREG) for the implementation of prepaid electricity systems starting in 2007. According to an interview

³⁶ See Chapter 6 for a more detail analysis of social organizations (e.g. *Mesa Interbarriar de Desconectados*) demanding concrete solutions to the problem of disconnection.

conducted with an engineer of the company, the introduction of prepaid water meters is technically feasible, the only obstacle lies on the tariff-setting that needs to be adjusted together with the CRA in order to make the technology commercially viable. In case of being approved, Medellín will become a pioneer city in prepaid water systems in Latin America.

In Colombia there are not meter manufacturers, however, potential international firms to provide prepaid systems to EPM are located in China, Taiwan, Korea and Mexico. Nevertheless, the company foresees the production of its own prepaid water meters in a medium-term. To achieve this goal, EPM has invested COP\$ 100,000 million (US\$ 34,5 million) in a fund that supports science, technology and innovation (CT+i) with a strong focus on public services, information and communication technologies (El Colombiano, 9 March 2013).

EPM expects to implement prepaid systems that consist on loading a token (digital card) from licensed vendors. These cards permit accurate monitoring of water consumption, detection of illegal connections and manipulation of meters. Another technical advantage is that the meter immediately blocks when it is manipulated. This feature is especially important to detect and control illegal connections to the formal system. Prepaid meters are delivered in commodate to the users because of the high costs involved in the implementation. While each conventional meter costs between COP\$ 80,000 to 120,000 (US\$ 30-40), the company estimates that the capital costs of installing each prepaid meters are around COP\$ 640,000 (US\$ 220), a relative high price to be borne by households that already report debts between COP\$ 300,000 to 1,300 million (US\$ 150-670). The company is expected to finance these costs through particular programs offered by the municipality and international agencies to the vulnerable population.

Prepaid systems become not only a mechanism of debt recovery, but also to control consumption according to the capacity to pay. According to Von Schnitzler (2008), prepaid meters can be understood as a pedagogical device that facilitates residents to calculate and economize their water consumption. The company claims that prepaid systems represent a suitable technical solution that adapts to the needs of low-income households. It enables customers not to expend more than they can afford while systematically paying their debts, as 10 per cent of every water or electricity purchase is redirected toward paying down debts. As one of the engineers of EPM expressed in relation to prepaid meters:

The effects of prepaid systems are amazing and we are delighted with them. As users are responsible for recharging the meter they are more aware of their water consumption, they learn not to waste water, not to leave the taps open, to repair toilets and not to spend hours in the shower, while simultaneously it facilitates the payment of debts with EPM (Translated by author)³⁷.

Due to the positive results obtained during a pilot phase conducted in 2011, the company is in favour of expanding prepaid water systems in all new social housing units as well as in rural areas. The company foresees that 35,000 households will have access to water through prepaid systems by 2017 (EPM, 2015). Although the Municipality of Medellín has been broadly supportive of prepaid meters because of being “pro-poor”, little has been said about the deeply contradictory character of this technology, in terms of its failure to resolve the tensions arising from the commitment to provide universal and affordable water services. For example, Aníbal Gaviria, Mayor of Medellín (2012-2015), was broadly supportive of prepaid technologies by claiming that this initiative will be able to drive innovation in solving problems of social inequities and violence affecting the city (El Colombiano, 9 March 2013)³⁸.

5.2.6 Water as a scarce commodity

A central objective of cost-recovery is the reconfiguration of socio-natural relations through the ideological representation of water as a “scarce” commodity. As Swyngedouw (2004: 47) rightly notes, “the discursive construction of water as a ‘scarce’ good becomes an important part of a strategy of commodification, if not privatization”³⁹. The privilege hydrological conditions of Medellín facilitate the production of 300 million m³ annually of potable water from La Fé, Piedras Blancas and Riogrande Reservoirs. Water is transported into the city through an extensive distribution system comprised by 10 purification plants, 34 pumping stations, 110 storage tanks and a complex network of 3599 km of pipelines which transport 288,5 million m³ of water on a daily basis during 24 hours to 971,755 costumers (EPM, 2011). This amount of water is well enough to guarantee water supply service to the whole urban population.

³⁷ El sistema prepago tiene un efecto buenísimo y ese efecto nos encanta a nosotros. Como los usuarios saben que tienen que hacer la recarga, son más reponsables en el consumo, no malgastan agua, no dejan las canillas abiertas, reparan los equipos hidrosanitarions y no se demoran horas en el baño, mientras simultaneamente se facilita el pago de las deudas con EPM.

³⁸ A more detail discussion on how disconnected households for non-payment experience the use of prepaid water systems is provided in Chapter 6.

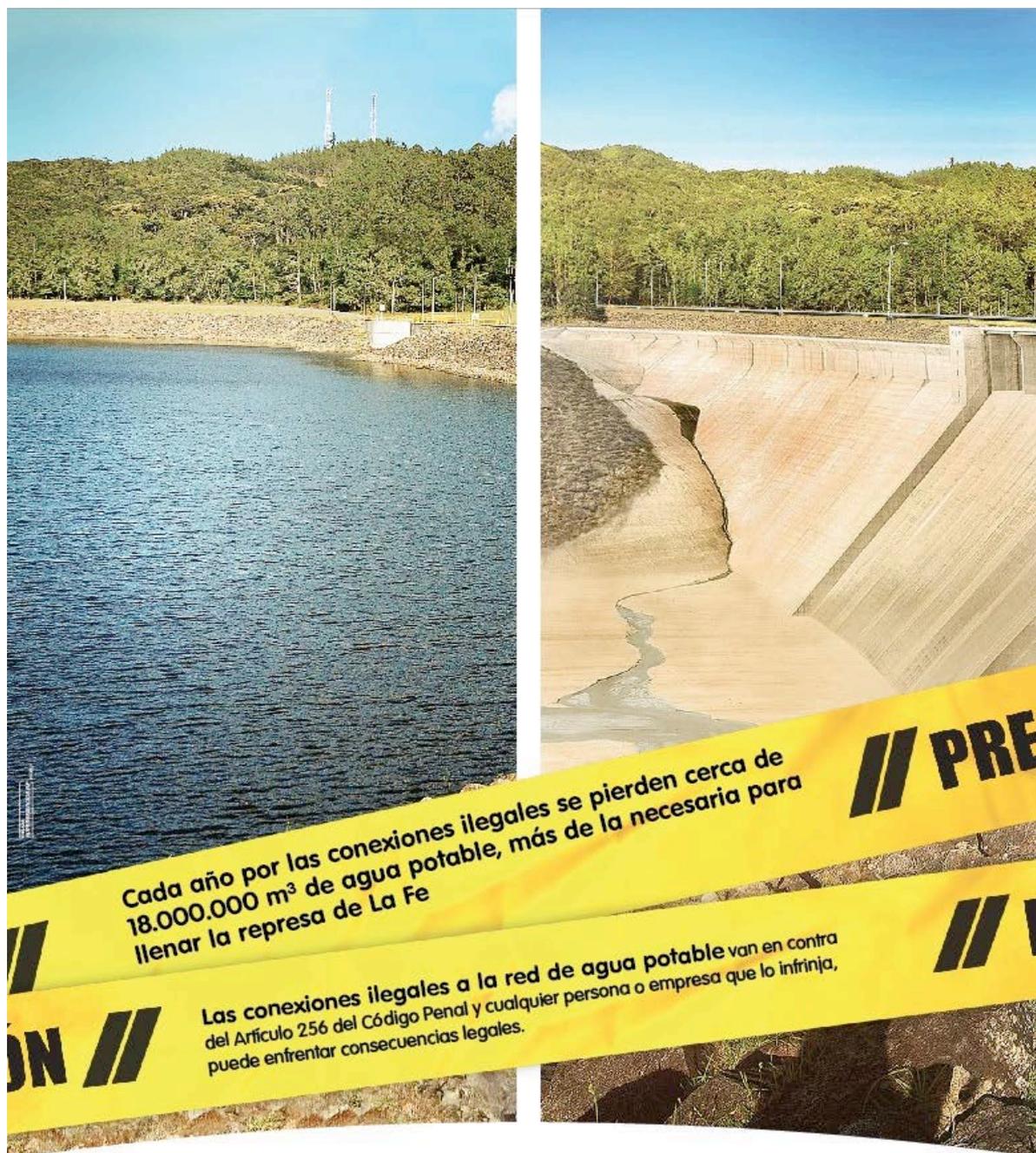
³⁹ An analytical distinction between commodification and privatization is introduced in Chapter 2.

However, despite that water circulates abundantly in the hydrologic cycle, it is discursively presented as a “scarce” ecological resource as soon as it circulates in the urban space. Under the impossibility of the company to fully insert urban water into dynamics of capital accumulation, this manufactured scarcity serves as an alignment tool to support market interests. In this sense, the scarcity of water in Medellín is economically and socio-politically rather than naturally produced in order to serve economic interests.

The company often invokes water as a victim that needs to be saved from human activities such as pollution, wasteful consumption and climate change. This new discursively representation of nature, which is disentangled from any social and political relations, has become the centre of recent public awareness campaigns. In 2013, for example, a public campaign was launched in the local newspapers, radio and TV to criminalize illegal practices to the formal infrastructure network as they have contributed to dehydrate potable natural reserves essential to sustain urban life (see Figure 22). The campaign shows how EPM loses every year around 18 million m³ of potable water, more than is needed to fill *La Represa de la Fé*, the main reservoir that supplies water to Medellín. Here, a stark image of a dried-up dam is deployed to portrait a defenceless and vulnerable nature in danger to disappear and to depict apocalyptic visions generated as consequence of accessing water without paying for it. With the use of nature as crisis, EPM aims to introduce the powerful rhetoric of water “scarcity” in the everyday consciousness of Medellín's population to justify that water is not a free and abundant resource.

In this campaign, however, not only environmental issues are a central concern, illegal practices are also presented as the ultimate threat to the company's revenues. As a response, EPM has implemented draconian laws such as the Colombian Criminal Code (Article 256) to send up to six years to prison people that connect illegally to the formal water network. However, what such a campaign does is to demonize *desconectados* and their everyday practices while maintaining largely unobservable how they are forced to set up illegal arrangements as consequence of policies of disconnection, and denial of affordable and equitable services. The attachment of new meanings and values to nature (water) has enormous implications for inequalities in Medellín as it serves to legitimize policies of disconnection while EPM avoids the political controversial aspects inherent of such policies. Additionally, the campaign has contributed to the fragmentation of civil society in Medellín as people are caught in contrasting visions of treating water as a commodity or right as it will be further explained below.

Figure 22 Public awareness campaign launched in 2013 by EPM to reduce illegal connections



Ingresa a www.epm.com.co y conoce más de este delito y sus consecuencias.

Búscanos también en:   



Note and Source: The campaign reads: 'Every years 18,000,000 m³ of potable water are lost due to illegal connections, more than what is needed to fill La Fé reservoir. Illegal connections to the formal network go against the Criminal Code (Article 256) and any person or enterprise that connects illegally might face criminal consequences'. Source: EPM official website.

5.3 The right to urban water

Policies of disconnection for non-payment or for illegal land tenure status have sparked evident contradictions with the fundamental rights established in the National Constitution. In this case, the Constitutional Court becomes a crucial institution for enforcing human rights and the *acciones de tutela* (tutelary actions) become the most efficient and simplified judicial mechanism to protect these rights when they are violated. Although Colombia has not explicitly recognized the human right to water in its Constitution, the National Court has relied on other rights in order to derive the right to water. The Court has deployed innovative approaches that are based not only on national guarantees of the right to water, but also include references to international human rights law to support their decisions.

At the international level, for instance, the Court has placed its reasoning mainly on the General Comment 15 of the United Nations Committee on Economic, Social and Cultural Rights (CESCR) and the July 2010 United Nations resolution adopted by the General Assembly. The CESCR released in 2002 the General Comment 15, explicitly recognizing for the first time that every person has the right to "sufficient, safe, acceptable, physically accessible, and affordable water for personal and domestic uses"⁴⁰. More recently, the United Nations General Assembly adopted in 2010 a resolution on the right to water and sanitation (A/Res/64/292), which acknowledges that the right is legally binding and calls upon States and international organisations to provide safe, clean, accessible and affordable drinking water and sanitation for all⁴¹. These two major international instruments have become milestones for the Colombian Courts to derive the human right to water.

At the national level, the Court basically derives its claims on the rights enshrined in the Colombian Constitution by recognizing that access to water is associated to a number of other fundamental rights, most prominently the right to life (Article 11) and the right to health (Article 49). Furthermore, the Court claims that access to safe water is indispensable to the realization of the right to a healthy environment (Article 79) and the right to adequate housing (Article 51), and to the protection of the rights of the child (Article 44). Additionally, concerning the social purpose of the State (*Estado Social de Derecho*), the article 366 establishes the state's obligation to satisfy unmet needs regarding health, education, environmental sanitation and potable water. Although the Constitutional Court acknowledges that disconnection for non-payment constitutes a

⁴⁰ For further information see: Committee on Economic, Social and Cultural Rights (CESCR), *General Comment 15, The right to water (Arts 11 and 12 of the International Covenant on Economic, Social and Cultural Rights)*, [20/01/2003].

⁴¹ For further information see: UN General Assembly, *A/Res/64/292, Human right to water and sanitation*, [28/07/2010].

legal action as it is authorized by regulation, in the Decision T-717 of 2010⁴² (*Rada Yubey Calle Arenas & Others v EPM and the Municipality of Medellín*) the same Court held that this action has a limit when: (i) a household is inhabited by an individual under special constitutional protection, (ii) disconnection deprives the individual of its own constitutional rights, and (iii) non-payment occurs due to involuntary, insuperable and uncontrollable circumstances.

Tutelary actions have become useful instruments to adjudicate on the obligation to fulfil the human right to water when it is denied. Disconnected households in Medellín have resorted to this legislative mechanism to challenge EPM through the Colombian Court system (see, for example, Decision T-1104 of 2005⁴³ and Decision T-925 of 2012). In these cases, the Constitutional Court held that the company has the constitutional duty to re-connect the water service and makes clear that it is forbidden to disconnect a household for non-payment when it is inhabited by an individual under constitutional protection. In Decision T-925 of 2012 (*Gustavo Enrique Osorio Vélez v EPM*), for example, the judge ordered EPM to include the petitioner into a payment program that fits with his economy capacity by stating that:

EPM in a period of five days is obliged to establish a payment agreement with Mr Gustavo Enrique Osorio Vélez, which offers flexible and broad instalments in order to enable him to meet its contractual obligations resulting from the consumption of potable water ... if the petitioner does not have enough economic resources to pay its debts, the company is obliged to install a flow limiter in order to guarantee a minimum of 50 litres/person/day until Mr Osorio assumes the capability to reach the payment agreement (Translated by author)⁴⁴.

Additionally, the judge delegated certain responsibility to the municipality regarding the progressive realization of the human right to water. He ordered to include the petitioner and his family in a program that provides a minimum amount of water free of charge by claiming:

The Court obliges the Municipality of Medellín in a period of five days to initiate the relevant procedures to study the requirements stipulated in the Municipal Agreement 06 of 2009 to consider the possibility to include the petitioner and his family in the program "*Mínimo Vital de Agua Potable*" (Translated by author)⁴⁵.

⁴² For further information see: República de Colombia, Corte Constitucional, Decision T-717 of 2010 [M.P. María Victoria Calle].

⁴³ For further information see: República de Colombia, Corte Constitucional, Decision T-1104 of 2005 [M.P. Jaime Araújo Rentería].

⁴⁴ For Further information see: República de Colombia, Corte Constitucional, Decision T-925 of 2012 [M.P. Alexei Julio Estrada].

⁴⁵ Ibid.

Regarding households unserved by the formal infrastructure networks of the company, I draw on two court cases that provide the basis for rethinking the extent to which the lack of infrastructure also constitutes a violation of the fundamental right to water. The first case refers to the Decision T-1104 of 2005 (*Jaime Castro López v EE.PP.M*), where the applicant demanded the water company for refusing to incorporate him as a client. Mr Castro claimed that EPM has rejected several times to connect his house to the water service because the infrastructure networks of the company do not cover the area where he lives. In order to obtain water, he is forced to extend a rubber hose to the houses of two neighbours who are located 4 and 10 meters away and who are formally supplied by the water company. He expressed the desire to have legal access to the service and affirms that the position of EPM constitutes a violation of the right to have a dignified live. In response, EPM argued that water could not be provided to the house inhabited by Mr Castro because it is not technically possible. Additionally, the company claimed that it does not have any legal obligation, unless the petitioner covers the full costs of the extension of the network including the technical studies.

High Court Judge Jaime Araújo Rentería ruled in favour of the applicant and claimed that the position of the company obliges the petitioner and his family to live in conditions of marginality and illegality. Furthermore, the Court argued that the technical requirements to extend the network represent an economic obstacle for the formal connection to water infrastructure network, an aspect that has been also expressed by Mr Castro:

EE.PP.M talks about a series of requirements, including an infrastructural plan IGAC in a scale 1:2000, for me a person that lives in the lowest socio-economic strata it is impossible to pay, as this technical study costs more than my property...

Based on this reasoning, the Court ordered EPM to connect the petitioner to the formal water network and to undertake all the necessary costs involved in the technical studies. Additionally, the Court states that the company is obliged to establish a payment system over time that allows the petitioner to pay back the costs associated with the installation.

The second case refers to the Decision C-1189 of 2008⁴⁶, which declared unconstitutional the Article 99 of the Law 812 of 2003⁴⁷. This case also represents Constitutional Court's efforts to support the provision of water services in illegal

⁴⁶ For further information see: República de Colombia, Corte Constitucional, Decision C-1189 of 2008 [M.P. Manuel José Cepeda Espinosa].

⁴⁷ The Law 812 of 2003 (Article 99) establishes that it is forbidden to investment public money in illegal settlements, and therefore, companies are unable to provide basic public services in these areas.

settlements. The Court contended that “eventually is it possible to invest public resources only in the situations where is proved a threat or violation of fundamental rights of the people who came to the illegal settlements in circumstances of extreme poverty, marginality, violence or forced displacement”, and the State has not provided any alternative solution. Supporters of the decision such as the citizens Antanas Mockus and Florián Borbón claimed that it is unacceptable to forbid investments to upgrade basic services in illegal settlements because it constitutes a violation of the fundamental rights enshrined in the National Constitution. Additionally, they argued that it is unacceptable that municipalities do not develop affirmative actions to prevent the formation of illegal settlements as they count with legal and constitutional mechanisms to do so.

Both decisions (Decision T-1104 of 2005 and Decision C-1189 of 2008) have been the focus of strong scrutiny and critique as some might argue that the provision of basic public services in illegal settlements should be responsibility of the state rather than the companies. This reasoning is based on grounds that water companies should not hold the entire responsibility to guarantee access to water to the unserved population as their financial sustainability is being put into risk (Arias Mejía, 2009; Bernal Pulido, 2012). Others such as Tito Simón Ávila Suárez, representative of the Ministry of Environment, Housing and Territorial Development, also claimed that it is inappropriate to invest public resources on illegal settlements as it can contribute to a chaotic and disorganize urban growth (See Decision C-1189 of 2008).

The court cases described above clearly demonstrate how a human right to water has the potential to empower people by providing them with legal entitlements, so that, they can hold the State and the water company accountable to live up to its obligations. However, reality shows that the ability of *desconectados* to act on their own behalf is very limited as discussed more in depth in Chapter 6. In an interview conducted in 2011, the Lawyer Bibiana Salazar Restrepo from the Cultural and Ecological NGO Penca de Sábila affirms that although tutelary actions are accessible to all, they are not used and promoted enough because people do not have the empowerment to understand neither the meaning of the human right to water nor the legal procedure to enforce this regulatory mechanism. In sum, despite the existence of legal mechanisms that protect the right to water, *desconectados* lack the power to defend their rights and to demand better water policies.

5.4 Bridging the gap: Balancing social, environmental and economic responsibility

The controversy arising from disconnecting households in low-income areas and the pressure to guarantee the right to water has prompted the company to reshape its institutional framework by twinning economic efficiency with social equity. Partly as a response to cope with legislative gaps, EPM introduced in 2008 the *Brigadas Comunitarias de Mitigación al Riesgo* (Community Brigades for Risk Mitigation), a program that is part of its "Corporate Social Responsibility Policy". The program aims at reducing UFW in informal settlements as consequence of the proliferation of illegal connections. The land use plan of the city does not authorize EPM to provide basic public services in illegal settlements because they are located in areas designated as "high-risk zones". However, these informal settlements secure access to water on a daily basis by connecting illegally to EPM system. For the water company, these illegal practices have become a major threat because they disturb not only the management and operation of the water system, but also the "culture of payment". As a result, unserved population has become an important target for the company in order to reduce UFW levels.

Traditionally, EPM has dealt with UFW from a technical and commercial perspective with unsatisfied results. Among EPM officials there was a lack of awareness of the multidimensional character of water, leaving complex social aspects largely unaddressed. They claimed that social problems have to be handled by the state while the company should adopt a technical-managerial approach to control the flows of metabolized water. Consequently, many low-income areas became impenetrable for EPM as a staff of the company affirmed that contractors were impeded from executing basic activities such as deliver bills, carry out meter reading, conduct reparations or report illegal connections. Additionally, EPM's staff was in some cases subject to robbery and attacks. Acknowledging the paramount importance of taking community necessities into account, the company began the implementation of a mitigation program to deal with UFW not only from a technical, but also from a social perspective. In this sense, *Brigadas Comunitarias* generates a win-win situation: the company recovers commercial losses while simultaneously low-income households secure access to water.

For the implementation of the program, EPM establishes contacts with leaders of a particular *barrio*. Once the program has been accepted among the local community, the company intervenes individual households and their constructed infrastructure. EPM invites its staff to join the *brigadas* during half a day on a volunteer basis to take part in technical, educational and recreational activities (see Figure 23). These services are provided free of charge to the community. Technically, EPM replaces the artisanal

infraestructure installed by the community for better quality pipes in order to guarantee zero leakages. These new pipes are connected to a communal meter in order to control water consumption levels in reference to the average domestic monthly consumption in the city.

Figure 23 Activities developed during the *Brigadas Comunitarias de Mitigación al Riesgo*: Instalment of a communal meter (top left), execution of a recreational program (top right) and replacement of pipes (bottom left and right)



Source: (top left and bottom right and left) photograph by Marcela López, 2014; (top right) photograph by Jaime Lesmes, 2014.

Technical aspects are complemented with educational campaigns rested on teaching beneficiaries door-to-door how to change their daily consumption habits and to appreciate the value of potable water. Additionally, recreational activities are organized for children, who are treated as agents in need to be educated in a new neoliberal logic. Thus, the pedagogical program of EPM centres on the formation of disciplined subjects that acknowledge not only the economic value of water, but, more fundamentally, EPM as an active actor providing well-being and better life quality as shown in Figure 24. The

program also aims at influencing the organizational structure of the community by creating a *Mesa Comunitaria del Agua* (self-organized water committee). This new organization receives support of EPM, which offers particular training programs on leadership, conflict resolution and civil culture in order to stimulate better cooperation between community members, preserve the water infrastructure, organize collection of fees, control water expending and report irregularities to the company.

In 2012, the company invested COP\$ 2,200 million (US\$ 751 million) to connect 1,886 households located in informal settlements (representing around 6 per cent of the total) and installed 12 communal meters in the whole city (EPM, 2013). EPM is now trying to capture the attention of donors to expand the program in other low-income urban areas. The possibilities of obtaining international support are high as the program is being presented as a strategy for realizing the right to water and as an instrument to achieving the targets of the Millennium Development Goals (MDGs) and the principles stipulated in the United Nations Global Compact⁴⁸.

By law, EPM is not authorized to charge individual households for water services in unserved areas. Nevertheless, the company is working with the Regulatory Commission for Water and Sanitation to implement a system of payment called "*venta en bloque*". Instead of charging individual households, this mechanism consists of issuing a collective bill with the consumption registered in the communal meter. EPM expects to transfer responsibilities to the *Juntas de Acción Comunal* (JAC) (communal councils) for the management of communal meters and charging of fees. However, one of the major challenges for the company is how to implement a market policy that does not exclude low-income households. Failing to do so could trigger more disconnections for non-payment. Chapter 7 addresses more in detail how disconnected households experience the implementation of the program.

⁴⁸ EPM has participated since 2006 in the United Nations Global Compact, a platform that promotes the engagement of business and non-business organizations in areas of human rights, labour, environment, anti-corruption.

Figure 24 Drawing of a kid during the brigade expressing gratitude to EMP for connecting her neighbourhood to the formal water system



Note and Source: The drawing reads: Thank you EPM by Manuela Rojas. Source: Photograph by Jaime Lesmes, 2014.

5.5 Conclusions: Commodity or right?

This chapter has illustrated in detail how EPM manoeuvres in a contradictory neoliberal agenda set up by the state through a process of re-regulation: On the one hand, the Colombian state has established a regulatory framework that obliges companies to implement cost-recovery strategies to increase competitiveness and efficiency, and on the other hand, exists international and national mechanisms that oblige service providers to guarantee water access regardless of people's ability to pay. The neoliberalisation of nature, although deeply contradictory, required a strong state intervention. It entails that the state not only creates, but also regulates the market for water provision. However, far from being "neutral" in relation to the market, the national state has placed a strong emphasis on supply while abandoning issues of affordability and equity.

For EPM, the adoption of a neoliberal framework for the provision of water services has entailed the rigorous implementation of cost-recovery strategies, while undermining the right to urban water. Cost-recovery has triggered high water prices, reduced cross-subsidization, triggered disconnection for non-payment and supported the implementation of prepaid technologies. Additionally, it has introduced a new rhetoric of natural scarcity by discursively representing water as a "scarce" commodity. These cost-recovery measures were experienced differently among water users according to their socio-economic stratification, and as they were not accompanied by specific public policies they primarily affected low-income households.

However, one of the most powerful tools deployed by *desconectados* to secure access to water is the legal recognition of the right to water. Although this right has not been enshrined in the National Constitution, the Constitutional Court has played an important role in halting disconnection for non-payment and authorizing the extension of formal infrastructure networks in informal settlements. Tutelary actions have become an important legislative mechanism to defend the right to water; however, they have not been widely implemented due to the lack of political empowerment of *desconectados*. The municipality instead of mediating between company and citizens interests, as different court cases introduced before have shown, it has opted to keep itself silent and complicit, particularly now when its financial budget strongly depends on the annual transfers of EPM as shown in Chapter 4.

To counteract the adverse effects of cost-recovery policies and to respond to the obligations emerging from the right to water, EPM introduced the *Brigadas Comunitarias de Mitigación al Riesgo*, a program that simultaneously allows reducing UFW levels while securing accessibility in some unserved areas of Medellín. It is interesting to observe how neoliberal approaches adopted by EPM have contributed to generate alternatives to commodification. In this case, a desire on the part of EPM to reduce commercial losses has facilitated the implementation of new strategies to allow the temporal integration of some low-income areas into the formal water system.

The company is slowly acknowledging that the neoliberalisation of urban water can no longer be understood merely as a technical and managerial project while neglecting social, political, environmental and economic issues. It is not enough to install or remove pipes, valves, meters or prepaid technologies and introduce a tariff scheme to fully control the flows of water. High levels of UFW show that water flows through the urban waterscape in unexpected and uncontrollable ways, especially when it is infused with right meanings. Therefore, *desconectados* need to be widely involved in decision-making in order to make the company and the municipality more accountable and transparent.

CHAPTER 6

Los Desconectados: Struggling to Pay Water Bills

6.1 Introduction

As the governance of water has been increasingly re-centred around market notions in the last decades as shown in Chapter 5, disconnection for non-payment in Medellín has been interpreted as a problem mainly related to poverty (EPM, 2011; Nuñez et al., 2011), leaving non-economic aspects largely unaddressed. Much of what we know about disconnection is that it is a phenomenon associated to the inability to pay, and while this aspect is important, it fails to capture the ways in which current water policies systematically exclude *desconectados* from water access. As the managing director of EPM put it:

Non-payment, which leads to the suspension of public services, is a problem where many socioeconomic variables come together and EPM does not have impact on all of them. This is the case of job offer, educational level, health conditions, and public order among others. Despite this, EPM is currently working on particular programs to target people with very low-income levels and that adapt to their flow of income (Calle Restrepo, 2014) (Translated by author)⁴⁹.

This chapter examines how low-income households perceive the policies of disconnection for non-payment and the difficulties they face to participate in programs of reconnection offered by EPM. Additionally, it explores the concrete ways in which disconnected households experience new strategies offered by the water company and the municipality to redress inequalities in water distribution (e.g. prepaid systems and a free water allowance program), and how they organize themselves to express their concerns and what impact they have. I propose “governance failure” (Bakker, 2010a) as a useful analytic to address these questions. The concept of governance failure permits

⁴⁹ El problema de la morosidad, que lleva a la suspensión de los servicios públicos es un problema en el que confluyen muchas variables socioeconómicas de las cuales EPM no tiene impacto en todas, tales como la oferta de empleo, el nivel de educación, condiciones de salud, orden público entre otras. A pesar de esto, EPM viene trabajando en ofertas orientadas a la población con niveles de ingresos muy bajos y busca adaptarse a las condiciones de flujo de ingreso.

conducting detailed empirical examinations of the main factors (economic and non-economic) surrounding water access among Medellín's poorest population. By doing so, I demonstrate how institutional arrangements fail to provide low-income households with affordable and adequate urban supply services, even though they are entitled to this fundamental right as already mentioned in Chapter 5.

6.2 Economic and non-economic factors leading to disconnection for non-payment

6.2.1 Inability to pay

The reasons contributing to non-payment are multiple and complex. Unsurprisingly, according to a survey developed by the author, the most common reason for non-payment of water bills is inability to pay. From the 66 households surveyed, 71 per cent affirmed that they did not have enough economic resources to afford their bills. This problem goes beyond the level of a single household, however, and is linked to structural inequalities in the city, such as low educational levels, exclusion from employment opportunities, strong dependence on the informal economy, high levels of violence and large size of the families. In 2011, the unemployment rate stood at 17,9 per cent and the population depending on work in the informal sector according to official statistics accounted for 47 per cent (Alcaldía de Medellín, 2011).

In the survey conducted, 77 per cent of households reported living on less than a minimum wage salary (COP\$ 535,600 or US\$ 182 per month) and experienced fluctuating income. These problems were compounded with extremely low levels of education and literacy (73 per cent reached only the primary school level) and the size of families usually exceeded the city's household average of 4 members, according to the 2011 Medellín census. Additionally, multiple-disconnection was a prevailing condition experienced by the majority of households surveyed. They faced disconnection not only of water, but also electricity, gas and telephone services. In these cases, inability to pay their basic public services also force households to cut back on other key basic areas such as food, clothing, education, health care and transportation, often to the own detriment of family members.

Although, water is delivered at subsidized rates to low-income areas as discussed in Chapter 5, consumers continue paying a relatively high proportion of their monthly income for water bills. Studies have documented that households located in the lower socio-economic strata spend per month more than 30 per cent of their income on water instead of average 3 to 7 per cent (Contraloría General de Medellín, 2003). This amount stands in stark contrast to other Latin American countries such as Uruguay, where users

spend 0,92 per cent of their monthly household income in the payment of water and sanitation bills according to the State Sewage and Water Works Company (OSE, *Obras Sanitarias del Estado*) (Machado, 2014).

According to the World Bank, household expenditures on basic public services above five per cent of monthly household income are considered unaffordable for the poor (Komives et al., 2005). Similarly, the UNDP *Human Development Report 2006* assumes that 3 per cent of monthly household income constitutes an appropriate standard (UNDP, 2006). Clearly, consumers that earn less than a minimum wage are struggling to pay their bills to EPM as they absorb a significant proportion of their earnings.

6.2.2 Unawareness of legal mechanisms to reclaim the right to water

The institutional framework governing access to water in Colombia provides insights into the tensions and contradictions inherent in processes of capital accumulation as discussed in Chapter 5. The paradoxical character of these policies can be reflected, on the one hand, in aggressive cost-recovery strategies, and, on the other hand, on a language of rights, inclusion and social equity. The impact of full cost-recovery pricing on low-income households is supported by Law 142 of 1994, which grants water utilities the power to disconnect a household for non-payment of services (Article 140 and Article 141). This law may conflict with a duty to protect the right to water. Although the National Constitution does not explicitly mention the right to water, it recognizes the right to health and clean environment. According to the Article 366 of the Constitution, the state is required to find solutions for the unmet needs in terms of education, health, environmental sanitation and water provision. In addition, Colombia supported the resolution adopted by the United Nations on 28 July 2010, which declares that access to clean water and sanitation is a fundamental human right. The recognition of these rights, therefore, imposes certain responsibilities on both state and non-state actors that may be enforced by courts.

In Colombia, the Constitutional Court plays an important role in enforcing the right to water by enabling individuals and communities to regain access to the service through legal means after being disconnected as discussed in Chapter 5. It does so by prohibiting any service provider from disconnecting a household when it is inhabited by individuals under special constitutional protection (Decision T-717 of 2010) such as children (Decision T-546 of 2009), Internally Displaced People (IDPs), people with

physical disabilities, elders and single mothers (Decision T-092 of 2011)⁵⁰. *Desconectados* are provided with official sanctioned mechanisms such as *acciones de tutelas* (tutelary actions), *derechos de petición* (right of petition) and *acciones populares* (popular actions), which enable direct requests to any judge in the country for the protection of fundamental rights when they are violated.

To put this in contexts, an applicant Mrs Borja living in the *barrio* El Limonar, installed a tutelary action with the assistance of the local NGO Penca de Sábila after three months of being disconnected for non-payment. In the claim, Mrs Borja stated that she was unemployed, her husband had an accident and he was unable to work. She was also responsible for her daughter who was also unemployed and her two-year-old granddaughter. She requested to be immediately re-connected to the service and to have access to a minimum of amount of water free of charge. Additionally, she expressed the willingness to enter into an agreement with EPM and pay her debts according to her economic capacity. In her case, a judge found a violation of the constitutional right to water as follows:

Nor can be ignored the special circumstances surrounding this particular case, which undermine the fundamental right to health and human dignity of the applicant and her family. The lack of adequate water services in her home might produce personal difficulties, which could trigger the deterioration of health conditions of the entire family members (Municipal Criminal Court decision of Medellín, 2010) (Translated by author)⁵¹.

An interim injunction was issued on 5 October 2010 ordering EPM to immediately restore the service and the Municipality to include the applicant and her family into a program that provides a minimum free basic water allowance. According to an interview conducted with a staff member of EPM at the *Oficina de Atención al Cliente* (Customer Services Office), water supply must be re-connected in less than 48 hours when the court finds a violation to the right to water, otherwise, the company can be subject to strict sanctions for non-compliance.

⁵⁰ For further information see: Republica de Colombia, Corte Constitucional, Decision Decision T-717 of 2010 [M.P. María Victoria Calle]; T-546 of 2009 [M.P. María Victoria Calle]; Decision T-092 of 2011 [M.P. Humberto Antonio Sierra].

⁵¹ For further information see: Republica de Colombia, Rama Judicial de Poder Público, Juzgado Treinta y Dos Penal Municipal, Medellín, "Borja v. Empresas Públicas de Medellín y Municipio de Medellín" [Juez Álvaro Diego Quintero Giraldo, 05/10/2010].

The case introduced above, however, represents one of the few successful examples where a disconnected household via tutelary actions obliged the company to re-connect the service. However, in an interview conducted on 26 March 2013, 15 months after the household survey was undertaken, Mrs Borja revealed that a group of contractors from EPM have attempted several times to disconnect her house from the water service without being previously informed. According to Mrs Borja, contractors informed her that the tutelary action was expired, a decision that she strongly contested by claiming that the Constitutional Court obliges the company to provide a free amount of water until a member of the family has the economic capacity to pay the debts. At the time of the interview, all family members were unemployed and they feared that EPM might disconnect the house once again without adequate notice.

This case study exemplifies how the vulnerable population in Colombia has to resort to courts for the protection of their fundamental rights. However, empirical evidence shows that the extent to which rights are realized depends on the level of access to legal advice and representation, which for the case of *desconectados* it is minimal. Analysis of household survey data indicates that household involvement in decision-making is very limited. The majority of the respondents replied that they have little community organization and poor participation to address their concerns about debts and fears of water disconnection. Additionally, this survey found out that 95 per cent of households did not submit any legal action after being disconnected for a variety of reasons: the majority of the respondents were not aware of the existence of legal mechanisms that guarantee the right to water; others simply did not trust in such mechanisms as the municipality has refused to intervene when EPM disconnects a household for non-payment.

A significant number of respondents also expressed that high levels of debt leave them with culpability and shame even if they are able to reclaim their rights. As one respondent from the *barrio* Buenos Aires expressed: "*Queda muy duro no pagar y encima ir a exigir derechos*" (it is hard not to pay and additionally demand rights). The increasing levels of anxiety and guiltiness of disconnected households might be interpreted not only as a concern for losing the material access to EPM water, but also as a fear of being categorized as "bad" and "undesirable" citizens.

6.2.3 Complexity in bill formats

One other problem for households located in low-income areas is the implementation of a sophisticated water bill format, which has proved to be too complex to understand (El Colombiano, 13 January 2012). This billing system, however, has been awarded in 2005

by the Institute for International Research (IIR) in London for integrating in a single bill multiple basic public services. A bill contains detailed information on the amount of water consumption and sewage disposal registered in cubic meters on a monthly basis, costs related to consumption, rate structure according to the socio-economic strata, a fixed monthly rate, debts with the company, interests, credits from subsidy schemes and additional charges (e.g. for field visits). In 2015, in order to overcome these communication barriers, EPM launched a new format that presents bill information contained in a way that is visually more accessible and understandable for the users. Although exceeding the scope of this paper, a comprehensive study is required to evaluate the impact of the new billing format.

Regarding payment, the company offers its customers the possibility to pay their bills in person at company's offices or through a variety of electronic payment options such as Internet, interactive voice response (IVR) systems, telephone payment which requires the use of a debit card and direct transfers in cash machines. Ironically, households located in the socio-economic strata 1, 2 and 3, which represent 77 per cent of the total users of water services, have very low levels of Internet connections, a large proportion of them do not own a debit card and also have had their electricity services disconnected. From 27,256 households, which experienced electricity disconnection in the city in 2011, 82 per cent are located in low-income areas.

In my conducted survey, many respondents expressed having literacy skills too low to interpret monthly consumption and debt management. The complexity in reading the bills has led to numerous misunderstandings and significant mistrust between consumers and the company. According to the conducted survey, for many of the households it is unclear how tariffs are established, and in the majority of the cases they presume that the company is charging more than it should or is charging for a service that has not been provided. This situation has generated resentment among households who feel that disconnection is partly attributable to incorrect metering or higher bills without proper justification. For instance, one of the household owners in the *barrio* Manrique claimed that in order to minimize her water bills, she collects rainwater, flushes the toilet and cleans the floors with water from the washing. However, she does not understand why her efforts to reduce water consumption are not being reflected in the bills, which continue to absorb a significant part of her monthly income. She also expressed a sense of injustice at paying excessively high prices for a service that was not used while the company reports exorbitant profits.

The findings in this survey also illustrate that a large proportion of households are unable to properly communicate with local authorities and employees of EPM. This is due to the inability to understand the criteria used to calculate bills. One of the respondents of the survey located in the *barrio* La Cruz claimed that he was very confused by the method used to determine tariff structures. According to the information provided in the bill, he could not understand which percentage of the total price was designated to pay current consumption, interest rates, debts and sanctions. He expressed discontent for simply having to pay for a bill regardless of understanding its content.

Another aspect that deteriorates communication is the non-existent relation between the company and long-term disconnected users for non-payment. In the survey of 66 households, 28 per cent of households registered more than three years without water services provided by the company. It was not surprising therefore to find out that the majority of them did not know how high their debts were, since debt payment is an obligatory pre-requisite to obtain legal access to the service. The majority also responded they did not have contact with the company in the past years as debt payment is an obligatory to obtain legal accessibility to the service. This poor communication makes it difficult for disconnected households to regain legal water access while this situation entrenches them further in accumulated debts. In order to overcome this communication gap, several local NGOs organize workshops to assist *desconectados* on how to interpret their bills and to provide information about possible legal strategies to enforce the right to water. EPM through its department of *Educación al Cliente* also provides training courses to guide low-income communities and the schooling population in the interpretation of bills (e.g. *Lectura a Tu Medida*). However, results of the survey showed that the impacts of such programs continue to have a limited effect.

6.2.4 Inflexible payment programs

The water company has established diverse mechanisms that facilitate *desconectados* to pay off a portion of their debts in order to continue having access to the service. Among the programs offered by the company include *Paga a Tu Medida* (pay according to your needs), *Plan Reconciliémonos* (let's reconcile) and the 80/20 Program (clients pays 80 per cent of the debts and the company refinance 20 per cent). Although these alternative programs are being designed to fit the different abilities of low-income households to pay for the service, they are leaving many of users feeling helpless in how to deal with their accumulated debts, while simultaneously paying their monthly bills. The majority of survey respondents expressed opinions that the company does not offer

suitable solutions for legal reconnection, that the programs established to refinance the debts do not fit with their actual economic conditions and that they are too strict. When a household is unable to keep up with payments, it is automatically excluded from the program and falls again into a situation of disconnection. This evidence is backed by studies developed by the water company, which demonstrate that a household reconnected through these programs has a high probability to be once more disconnected (Vélez, 2008).

A majority (66 per cent) of the households surveyed replied that they have approached the company to make an arrangement in order to pay their previous bills. However, they expressed that despite the motivation to pay, their actual economic condition make paying off their debts simply unaffordable. They admitted that their debts with the company are a result of the “inability to pay” and not to the “unwillingness to pay”. A large proportion of the households felt that the company adopts rigid approaches for debt management, which makes difficult to become debt-free. The findings in this survey illustrate that 71 per cent of households reported to have debts with the company that range from US\$ 150 to 600, a relative high amount compared to a minimum wage salary. Recognizing that payment programs do not fit to the economic capacity of disconnected households, the company is rapidly moving toward the implementation of prepaid systems as a suitable mechanism that not only facilitates debt recovery but also fits to the economic capacity of *desconectados* as discussed below.

In the absence of fair and affordable tariffs that adjust to users' socio-economic conditions, many households find themselves obliged to use illegal mechanisms to re-connect regardless of the strict sanctions imposed by the water company as will be further explored below. According to the conducted survey, 27 per cent of the households surveyed declared to have access to water services gained through illegal methods⁵². The majority of respondents claimed that disconnection for non-payment is an injustice, and therefore, illegal re-connection was defended as the only way to secure access to a basic right that is being denied by the water company and the municipality. EPM, in return, severely punish illegal practices when discovered by proceeding with strict economic sanctions and confiscation of equipment that makes it nearly impossible for a household to re-connect illegally. This sanction varies according to the socio-economic strata of the family and it ranges from US\$ 100 to 500. In some cases, sanctions can also lead to house eviction. Disconnection activities are being outsourced by the company, which sends contractors to remove portions of pipes or confiscate water

⁵² For a greater detail on the informal practices employed by disconnected households to secure access to water see Chapter 7.

meters. As contractors are often employed on a temporary basis, they often lack understanding of consumer relation protocols and the legal implications involved in water disconnection. This situation has led to the erosion of the human right to water and an increase of conflicts between the company and users.

6.3 Litros de Amor: A minimum to live with dignity or a maximum to survive?

The introduction of the *Litros de Amor* ("litres of love") program or minimum amount of water free of charge has been another strategy deployed in the city to reduce disconnection rates and prevent illegal re-connections. The free water policy was introduced by the municipality in cooperation with the water company, in which the municipality finances the costs involved in the program and transfers them directly to EPM. Between January 2013 and February 2014, the municipality invested around COP\$ 3,915 millones de pesos (US\$ 1,3 millones) to cover the cost associated to the implementation of the program (El Colombiano, 24 March 2014). Thus, Medellín becomes the first city in Colombia to guarantee a free basic water allowance for those unable to afford access on their own which consist of 2,5 m³ of water per person per month. This amounts to about 10 m³ per household per month for a household of four people. The free water policy became regulated in 2011 by the Municipal Agreement 06 of 2009 and it was implemented through the city's development plan.

The initiative to introduce a free water policy was initially proposed in 2006 by the *Comité Nacional en defensa del Agua y de la Vida* (CNDAV, National Committee for the Defense of Water and Life), one of the biggest social movements in the country. Although the National Congress rejected the initiative in 2010, the Municipality of Medellín adopted such a free water allowance policy as a way to move towards the progressive realization of the human right to water. In order to qualify, families must be categorized as internally displaced people (IDPs) or be part of the anti-poverty program *Medellín Solidaria*⁵³. Additionally, beneficiaries must own their home located in the socio-economic strata 1, 2 and 3, must have a connection to the formal infrastructure network and must not have debts with the water company.

⁵³ *Medellín Solidaria* is a program established by the Municipality of Medellín to assist those families living in extreme poverty. The program offers health and educational services and provides training on improving social relations and job opportunities. Based on the 2010 census figures, 22 per cent of the total population lives below the poverty line, representing approximately 520,000 people. *Medellín Solidaria* benefits 45,000 families, or approximately 180,000 people. These figures show that the scope of the program is still limited, since only a small percentage of the population living in poverty actually has even the chance of access to a minimum amount of water free of charge.

In 2009, the program registered 17,098 beneficiaries and by September 2011, the number of households included in the program reached 32,591, representing some 162,955 people. Despite this significant increment, in June 2012 the figure dropped to 19,438 households, representing some 108,607 people according to reports provided by the municipality⁵⁴. The reasons of this fall could be explained as a combined result of no information, difficulties to fulfil the requirements and limited amount of beneficiaries.

With the provision of a free water allowance, it is expected that beneficiaries cover their essential necessities and therefore help them to maintain adequate levels of hygiene and avoid negative public health effects. According to the World Health Organization, 50 litres per person per day is required to cover basic needs (WHO, 1993). Following this recommendation, the program complies with the standard and serves as a platform to instruct beneficiaries on how to distribute the free monthly basic allowance according to the following basic needs: 500 litres for personal hygiene, 500 litres for consumption including food preparation and hydration, 833 litres for domestic cleanliness and 667 litres for laundry. Additionally, educational programs have been targeting schools in order to train children in saving water practices as already mentioned in Chapter 5.

Although it is recognized that the initiative represents a significant effort to progressively realize the right to water and to reduce inequalities in access, it has been questioned by many social groups for several reasons: first, the minimum amount of water provided by the program can quickly turn into a maximum for low-income households. The minimum amount of water offered by the program (2,5 m³/person/month) is around half of the average household water consumption in Medellín. Second, this apparently progressive policy reform seems to serve the interests of the company by facilitating debt recovery as beneficiaries are required to pay their water bills completely or make an arrangement to begin paying off their debts before gaining eligibility to the program. Third, the program has become too narrowly targeted as debt payment becomes a precondition to access the basic allowance. As a result, disconnected households are unable to qualify. Fourth, it is expected that individual households limit their water consumption as the program largely operates via a combination of educational campaigns aiming at promoting an environmental responsible behaviour while water is increasingly framed as a fundamentally scarce resource. In 2014, for example, the company reported the saving of 96,160 m³ of potable water as a result of the "good behaviour" of the beneficiaries (El Colombiano, 24 March 2014). Fifth,

⁵⁴ Response to the tutelary action No 2012010081141680FE submitted by the Personería de Medellín to the Municipality of Medellín [Luis Fernando Suárez Veléz, 21/08/2012].

the program coverage is insignificant given the magnitude of Medellín's population without access to potable water and excludes households whose tenure status is not recognized.

For the reasons discussed above, the program has proved to have a limited impact on reducing disconnection rates. In an interview, a staff of the municipality affirmed that 60 disconnected households (fewer than 0,2 per cent of the total households disconnected from water services) have been included in the program in 2011. Their accessibility to a free basic water allowance was done via tutelary actions, which in turn obliged the company to provide the service. However, for many of these families, access to a minimum amount of water free of charge depends on a flow limiter, which is installed by the water company to guarantee a maximum volume of 50 m³ of water per day, and therefore, users avoid surpassing this amount. Additionally, the program has not been adequately communicated in areas where rates of disconnection are high. This evidence is supported by the results of the household survey, which reveal that 80 per cent of the households were not aware of the existence of the program. To conclude, rather than offering a direct solution to the problem of disconnection, *Litros de Amor* might be perceived as an alternative for those households that are in high risk of falling into permanent disconnection for non-payment.

6.4 Prepaid water systems: From disconnection to self-disconnection

The water company has begun to introduce "smart" metering technologies (Marvin and Guy, 1997; Marvin et al., 2011) as part of its strategic plan to reduce rates of disconnection for non-payment and prevent illegal consumption patterns. These technologies have taken the form of prepayment meters that have been initially imported from South Africa, a "pioneer" country in developing and exporting prepayment technologies for the delivering of basic public services (McDonald, 2007; Ruiters, 2007; von Schnitzler, 2008). Between 2007 and 2011, EPM installed 79,120 pre-payment electricity meters – 68 per cent of them in previously disconnected households and 98 per cent in households in the lowest socio-economic strata (Figure 25). In 2015, prepaid water technologies were officially introduced in the socio-economic strata 1, 2 and 3, after the positive results of a pilot project conducted during 18 months in 350 disconnected households (EPM, 2015).

As noted above, prepayment systems are being widely offered in areas with a low-payment capacity and that are associated with non-payment, debts and disconnection, all of which raise substantial transaction costs for the company. In the electricity sector, the company offers prepaid meters as part of a loan and the

installation is free of charge. Customers are required to purchase a set amount of electricity in advance by obtaining prepaid credits from licensed vendors in denominations that are available from COP\$ 2,000 (US\$ 0,70) (Vélez, 2008). A PIN number is introduced and the meter is recharged, 90 per cent of this electricity purchase is used for consumption while the remaining 10 per cent is redirected toward paying down debts (for which no interest is charged). For prepaid water, denominations are available from COP\$ 5.000 hasta 100.000 (US\$ 1,7-35) (EPM, 2015). According to Mónica Ruíz, director of Marketing, Transmission and Distribution of Energy at EPM, the prepaid system is a beneficial mechanism because it allows users to comfortably pay back their debts in a period of 15 to 20 years (Samudio and Cuevas, 2013).

Figure 25 Prepaid electricity meter installed in a household located in the *barrio El Limonar*



Source: Photograph by Marcela López, 2011.

Although prepaid water systems may be presented as a socially and ecological progressive policy to reduce water disconnection and formalize illegal consumption, it has become a subject of much heated debate for the possible negative impacts on low-income households. For some, prepaid interventions represent a mechanism used by the company to obscure one of the darkest sides of the provision of water in the city. With

pre-payment technologies, EPM avoids the political implications of disconnecting households that are too poor to pay their bills by giving them the “freedom” to self-disconnect from the network when they run out of money. In this sense, prepaid meters might be interpreted as devices that depoliticise what has become an explicit political conflict (Von Schnitzler, 2008) as the water company reduces conflicts and restores its social corporate responsibility image while customers silently and individually self-disconnect.

Prepayment has also profound implications in reshaping users and company relations as the latter reduces contact to a minimum with low-income users by leaving them to deal directly with the prepaid meter. In this regard, a prepaid meter operates as an “obligatory” intermediary (Marvin et al., 2011). Although exceeding the scope of this research, a comprehensive study is required to unravel the possible impacts of prepaid water systems on low-income households.

Another aspect that questions the feasibility and efficiency of the prepayment system is that it might be associated with widening and reinforcing existing inequalities in the city. For some sectors, this mechanism constructs socially and spatially differentiated consumption practices while failing to resolve the underlying tensions and contradictions inherent in the process of disconnection. In an interview, a member of the League of Public Service Users of Antioquia argued in respect to prepaid technologies:

Prepayment provides more advantages to the water company as the system is used as a strategy to make money out of the urban poor by recovering debts and avoiding transaction costs involved in debt management and disconnection policies.

For others, the implementation of prepaid systems also serve the company to control and regulate water consumption patterns by forcing households to adjust to the rhythms of a technical device that restricts the flow of water according to the buying capacity of a user. Prepayment systems might be seen as an attempt of the company and the municipality to re-educate low-income consumers into a “payment culture” by inserting them into modern forms of rationality. In other words, within the logic of prepayment it is “central not only to make water calculable, but, more fundamentally, to creating a calculative rationality” (Von Schnitzler, 2008: 902). As such, EPM by providing prepaid water incorporates *desconectados* into a capitalist market and turns them into self-disciplining capitalist subjects.

Nevertheless, for many, the introduction of prepaid meters is associated with a positive change. The company claims that prepaid technologies allow customers monitoring and controlling easily their water expenditures, avoid receiving unaffordable monthly bills, legalize their consumption, reduce their debts and repair water leakage on their property. For Francisco Piedrahíta, director of the Water Management Department at EPM, the introduction of prepaid water systems represents an important step in the rationalization of the services as consumers no longer have to worry about their monthly bills, but instead, they become more aware of their daily consumption and more cautious about water use (El Mundo, 11 June 2011). Another positive outcome of this technology was highlighted by a staff member of the company who claims that prepaid systems allow the company to better adapt to users' needs and styles instead of users adapting to the complex billing format of the company.

For electricity, EPM has reported a reduction in consumption of 60 per cent while the average electricity bill fell between 20 and 25 per cent. The pilot project in water reported an average consumption of 9,7 m³/household/month, representing a significant reduction of 29 per cent compare to the consumption in the conventional water system (EPM, 2013). In actuality, the company has received 7,000 applications from new users that are interested in accessing water through prepaid means, a significant amount that proves the successful acceptance of this new technology.

According to a survey conducted by the water company to evaluate customer perceptions on prepaid electricity, 93 per cent of respondents reported high levels of satisfaction with the service. They claimed that prepayment is a user-friendly technology; it facilitates consumption control, reduces debts with the company, prevents illegal connections and helps users acquire a "saving culture" (Vélez, 2008). The company has teamed up with community leaders to pursue the use of prepaid systems and has involved families in educational programs to change their behaviour towards consumption. These programs have been structured around topics such as budget management, self-esteem, family motivation, efficient cooking and maintenance of electrical appliances. However, despite of efforts made by the water company to educate users on how to manage pre-payment technologies, this process should not be confused with genuine public participation. Educational programs have the tendency to impose from above rather than consulting and negotiating, leaving little room for public discussions on how customers experience prepaid systems.

The findings of this survey also showed that 42 per cent of households have access to electricity through prepayment and claimed to be supportive of the technology. Most households expressed strong satisfaction with the use of prepaid electricity meters as it provides an alternative to regain legal access, avoid sanctions, reduce fear of being

disconnected and progressively pay their debts to the water company. Furthermore, they perceived the prepaid system as a positive solution to improve health and quality of life. As a respondent of the survey put it, "*pasar de no tener nada de agua a tener algo hace mucha diferencia*" (passing from not having water to have some, makes a significant difference).

Although the introduction of prepaid electricity meters was found in the survey widely welcomed among consumers, the question remains whether prepayment is morally and ethically accepted for water, as it is a non-substitutable resource essential for life. In South Africa and Namibia, for example, the implementation of prepaid water meters has proved to be a contested issue as it continues to perpetuate inequalities created through apartheid laws (Harvey, 2005; LaRRI, 2005; Loftus, 2006a; McDonald, 2007; Ruiters, 2007). While EPM justifies the relative merits of prepaid water and households do recognize that this system is the only immediate solution to avoid disconnection for non-payment and repaid debts; its social implications for the low-income population are deeply troubling and should be observed over the medium and long-term.

6.5 Raising the voice: *Mesa Interbarrial de Desconectados*

Against the neoliberalisation of nature that perpetuates selective and uneven access to water there are movements in Medellín that struggle to find alternative solutions to the current system of water supply provision based on principles of justice and equality. Groups such as the *Mesa Interbarrial de Desconectados*⁵⁵ (Roundtable of Disconnection) seek to transform and extend the content of citizenship rights and to demand concrete solutions to the problem of disconnection alongside issues such as housing and land tenure. Formed in 2009, this community-based movement articulated different initiatives that were already addressing the problem of public services in different areas of Medellín. In an interview in 2011, a movement activist claimed that bringing together these dispersed struggles was a necessary step to create enough political representation when reclaiming rights.

Under the slogan "*unión y lucha por la dignidad*" (union and struggle for dignity) the movement articulates water rights to other rights. The struggle over water rights in Medellín entails the right to have a dignified life which can be realized by securing adequate housing, access to basic public services, tenure legality and participation in decision-making. In a broader sense, the needs of the movement are constructed around wide demands for the right to the city, a perspective that has been influential in

⁵⁵ For more information, visit the Mesa Interbarrial de Desconectados website at: <http://mesainterbarrialdedesconectados.blogspot.de>

campaign's language. To make their claims heard, the roundtable has deployed actions that range from providing legal support (e.g. tutelary actions, right of petition) to involvement in educational campaigns, mass parades, protests and participation in municipal events. Legally, one of the most important victories of the movement was the approval in 2009 of the tutelary action (T-546 of 2009)⁵⁶ that forbids EPM to disconnect households inhabited by children.

Educational campaigns also constitute a key component within the movement's agenda to resist the neoliberalisation of urban water. The *Escuela Interbarrial* (Inter-neighbourhood school) is part of a pedagogical process where community leaders share ideas and experiences as well as get training on issues related to urban planning, housing, public services and the right to the city. The newsletter *Boletín Vida Digna* is published on a monthly basis to increased awareness of rights amongst vulnerable population and to provide a vehicle for *desconectados* to speak out and express their worries, aspirations and dreams. The movement also has designed stickers, which are being placed in water and electricity meters to aware people and contractors that households inhabited by vulnerable population cannot be disconnected (see Figure 26). According to Claudia Serna, another activist of the movement, it is crucial that people are informed about their rights. She claims that people will never defend the right to water if they do not know that they can have access to it even without paying for it because it is a right and is protected by the national constitution (La Pluma, 2013).

As mentioned above, local mobilizations also constitute an important pillar to inform the public, create awareness, engage the community and facilitate dialog without deploying any kind of violence. The most common mechanisms of mobilization are marches, carnivals, festivals and theatre performances organized in different *barrios* in Medellín. The most important mobilization takes place on the 10 of December, a day celebrated worldwide as a Human Rights Day and a day proclaimed in Medellín as the *Día de los Desconectados*. The event aims at making visible the problem of disconnection to a wide public audience and to protests against the *Alumbrado Navideño* (Christmas Lights), an expensive display of lights along the Medellín River during Christmas time. Protesters oppose the high costs invested in the decoration of the river while thousands of families in low-socio economic areas are forced to live in darkness as consequence of non-payment.

⁵⁶ For further information see: Republica de Colombia, Corte Constitucional, Decision T-546 of 2009 [M.P. María Victoria Calle].

Figure 26 Awareness campaign placed in the electricity meter located in the façade of a low-income household to prevent disconnection



Note and Source: The sticker reads: 'This house is inhabited by children, avoid disconnection (Decision T-546/09)'. Source: Photograph by Marcela López, 2011.

The mobilization is accompanied by a symbolic act where people burn water and electricity bills to express discontent for the unaffordable tariffs. Theatre performances are commonly deployed as a didactic tool to communicate the problem of disconnection and to engage a broad audience. One of the most remarkable performances organized by the movement took place in front of the municipal administration building. Under the slogan “*Que se quemen las facturas, no las niñas y los niños de nuestros barrios*” (Bills should burn, not our children in the barrios), the movements brought into public debate the death of two small girls whose house was burned to the ground while they were lighted with candles because electricity was disconnected for non-payment.

The movement has also pushed the problem of disconnection at the political level. Members have represented the needs of *desconectados* in municipal events (e.g. debates in the Municipal Council) in order to press political representatives to work on public interests by reconsidering the actual water policies. The main demands include:

- Eliminate debts of disconnected households and establish a system that provides affordable tariffs.
- Establish a program that guarantees a minimum amount of water and electricity

free of charge to all households located in the socio-economic strata 1, 2 and 3.

- Create a solidarity fund to help families with difficulties to pay bills.
- Facilitate the participation of low-income households in the elaboration of the Land Use Plan.
- Provide solutions instead of evictions and demolitions to those households located in the so-called "high-risks" zones.

For the movement, it is unacceptable that low-income households are forced to use wood to cook, candles for light and consume water from unsafe sources (e.g. contaminated streams) when Medellín has one of the most efficient public utility companies in Latin America. For this reason, the current economic transformation of EPM has been highly questioned by members of the movement. They completely oppose the commodified logic adopted by the company as it fails to recognize water as public good. The movement also protests against prepaid systems and programs of refinanciation, which insert the low-income population into market logics while neglecting their rights. For the roundtable, EPM is best known as the "*Multinacional de la Desconexión*" (The multinational of disconnection) as it has failed to find possibilities for achieving the right to water despite of the pressure of social movements and the Constitutional Court to halt disconnection for non-payment.

International connections have enabled the movement to draw the attention of the international community. One of the most remarkable and recent achievements was the Resolution A/HRC/NGO/33 passed by the United Nations General Assembly on 14 February 2014. The Roundtable of Disconnection prepared a declaration, which was debated in the Human Right Council to ask the Colombian State to meet its obligations with respect to access to drinking water and sanitation. Although this declaration imposes moral instead of legal obligations, it represents an important legal mechanism to pressure the government to meet people's demands. The same year, from 6 to 9 of April, the roundtable took an active role in the organization of the *Foro Social Urbano Alternativo y Popular* (Alternative and Popular Urban-Social Forum) in Medellín, where the VII World Urban Forum (WUF7) was taking place. Here, members of the movement contributed to the construction of a proposal that not only questioned the actual urban development model, but also generated alternatives. Another significant international recognition was the Danielle Mitterrand price obtained in 2013 from the France Libertés Foundation for the struggle to secure access to basic services (La Pluma, 2013).

6.6 Conclusion: Beyond the inability to pay

Analysing the institutional dimension of disconnection for non-payment through the concept of governance failure opens up new possibilities to understand water inequalities beyond economic determinism. This evidence is backed by findings from the household survey which indicate that reasons for non-payment are numerous and complex and go beyond the inability to pay. Manifold causes undermine household's capability to pay for the service including complexity in bill formats, distrust in the government, little information on legal mechanisms to reclaim the right to water, inflexible payment programs as well as low communication skills and participation.

As a response to the mounting pressure from civil society organizations to find concrete solutions to the problem of disconnection for non-payment, the municipality and EPM introduced a free basic water policy or *Litros de Amor* program in 2009 and the prepaid water system in 2015. Although *Litros de Amor* and pre-payment methods might be presented as socially and ecological progressive policies to reduce disconnection for non-payment and formalize illegal consumption, their effects on low-income users are far from being neutral. These two policies might exacerbate water inequalities as they intend to insert *desconectados* into a capitalist market and turn them into self-disciplining capitalist subjects.

Prepayment strategies establish suitable conditions for EPM to manage its financial debts and to avoid the political implications of disconnecting those households that are too poor to pay their bills by giving them the "freedom" to self-disconnect from the network when they run out of money. *Litros de Amor* has been considered to be a significant effort to realize the right to water; however, it falls into the trap of reducing access by quickly turning the minimum amount of water of 2,5 m³/person/month into the maximum amount available for survival. Moreover, the program has become narrowly targeted, as beneficiaries are required to pay their debts to the company in order to be able to qualify. These two "progressive" policies illustrate how the paradoxical flow of water through the urban waterscape both as a commodity and a right embodies the tensions and contradictions inherent in process of capital accumulation.

For many *desconectados* the question of gaining access to water access is far from being a mere technical or managerial procedure and goes into the direction of citizenship rights. The political program of the Roundtable of Disconnection shows that the struggles over access to water are part of a confrontation to redress inequalities and injustice in a city that excludes thousands of people from the enjoyment of dignify public supply services, adequate housing and secure land tenure status, which prevent them from fully exercising citizenship rights.

CHAPTER 7

Heterogeneous Waters: Shaping Forms of Everyday Governance

7.1 Introduction

Contemporary studies over water access have been primarily analysed how urban waterscapes reflect the interests of companies either public or private while little has been known about the everyday practices of low-income households that are excluded or disconnected from the formal infrastructure networks to secure access to water on a daily basis (Ahlers et al., 2014). This research seeks to contribute to this scientific lacunae by exploring how the profound changes in Medellín's contemporary urban waterscape are attributed not just to the transformation of EPM into a *multilatina* as discussed in Chapter 4, but also to *desconectados* strategies as they attempt secure not only the material access to water, but also to claim citizenship recognition. By reorienting the attention towards *informal practices*, this research focuses on how Medellín's urban waterscape is being decommodified as *desconectados* try to secure access to water on a daily basis. This study does not define informal as opposite to formal. Rather than conceptualizing informal practices as something undesirable, unsustainable, inefficient, to be eliminated or in need to be formalized and regulated, they are understood as a result of the articulation and interaction between diverse social, political, ecological and economic processes.

This chapter engages with the concept of nature's materiality (Bakker and Bridge, 2006; Castree, 2005; Sultana, 2013) to argue that the different types of water flowing through the urban waterscape play an important role in influencing the material, discursive and institutional strategies deployed by *desconectados* to secure access to water. Therefore, I demonstrate how informal practices are substantially shaped not only by the biophysical and spatial character of water itself, but also by how water is legally and technically differentiated by the company. Paying attention to material characteristics such as raw/potable, abundant/scarce, safe/unsafe, legal/illegal, physical/commercial loss allows us to better understand how different practices to secure access to water are constructed, mobilized and consolidated and how distinct notions of "public" are being made. By adopting this perspective, I also want to show how the agency of heterogeneous nature (water) provides a promising entry point to contribute to current debates on alternatives to privatization and commercialization in water supply provision (McDonald and Ruiters, 2012).

7.2 Medellín's informal urban waterscape

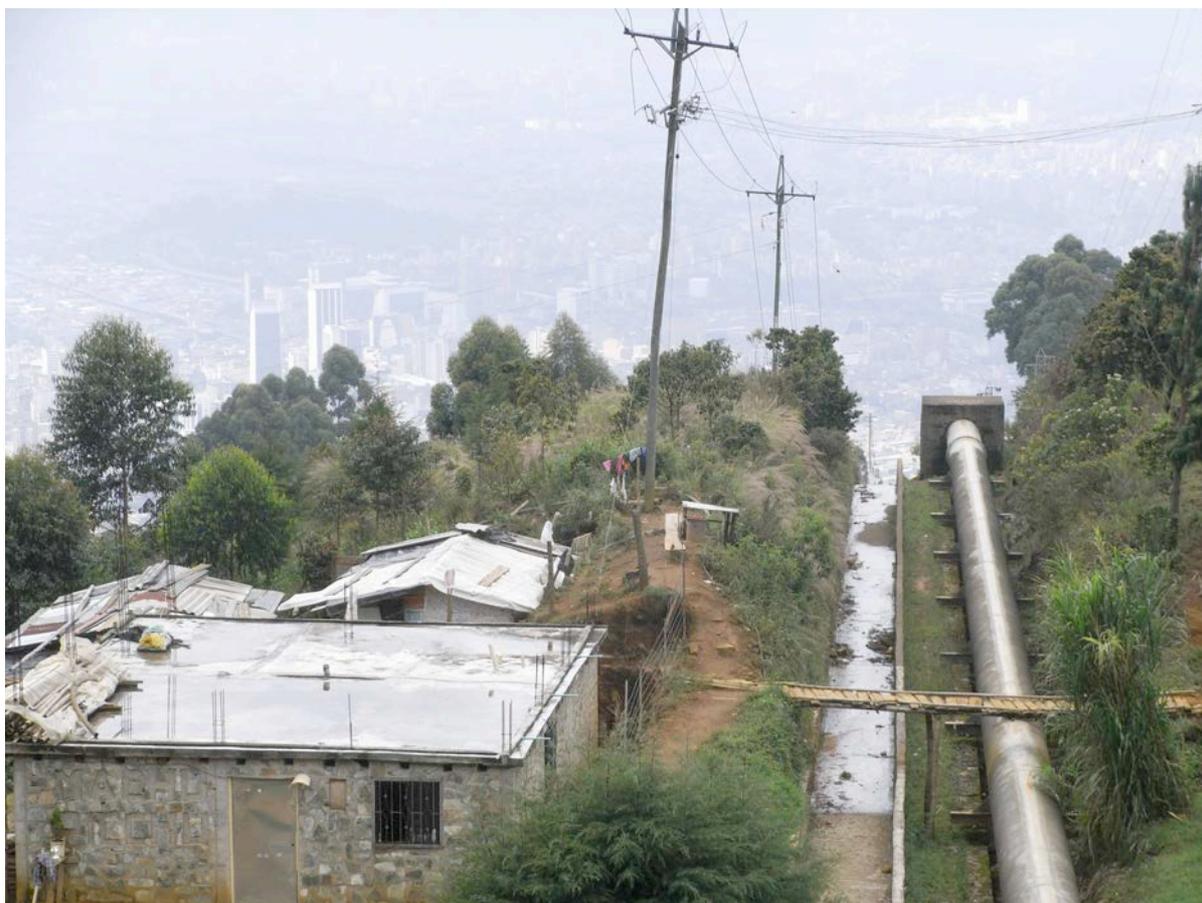
Official reports estimate that by 2011, around 13 per cent of the households in the city (affecting approximately 300,000 people) are denied access to water for non-payment of bills or because their land tenure status remains illegitimate as consequence of being located in the so-called "high-risk zones" (see Figure 27). Whilst the company claims coverage of 99 per cent in water services (EPM, 2013), this research traces the complex informal urban waterscape that emerges as consequence of disconnection and stands in stark contrast to the formal infrastructure networks of the water company.

This analysis permits tracing the multiple informal practices existing in Medellín's waterscape and how the material dimension of these practices is strongly influenced by the different types of water disconnected households use. Surprisingly, there is not just one kind of water circulating in Medellín's urban waterscape (EPM water). Instead, there are different types of water circulating through different systems of enmeshed pipes, tubes, meters and valves before they reach individual households. Whether water is raw/potable, safe/unsafe, abundant/scarce, legal/illegal or constitutes a physical/commercial loss can come to influence the ways *desconectados* secure access to water and determine the extent to which EPM intervenes infrastructures and modes of household/community organization.

For *desconectados*, these informal practices emerged and consolidated according to everyday routines of their everyday life and constitute a strategy to cope with uncertainty, despair and abandonment of the state. Additionally, securing access to water becomes a deeply political issue as informal practices in many cases articulate political claims such as the right to citizenship. Consequently, *desconectados* articulate different meanings and values to water in order to legitimize specific practices and social interactions. In Medellín, much of these practices are legitimized and consolidated according to what people consider as "public". The ways how *desconectados* interpret different notion of "public" has become essential to challenge and confront dominant water governance institutions and ideologies that exclude a significant part of the population from the enjoyment of affordable and adequate water supply services.

For analytical reasons, informal practices are examined in relation to two different forms of disconnection: non-payment and illegitimate land tenure status. Each form of disconnection is analysed according to the variables introduced in Table 2: Length of disconnection, type of water, socio-technical arrangements, company intervention and perceptions towards the notion of "public".

Figure 27 Households by-passed by the infrastructure network of EPM



Source: Photograph by Marcela López, 2011.

7.2.1 Disconnection for non-payment

The first form of disconnection applies to those households unable to pay their bills. The company classifies its customers in two categories according to the length of disconnection: *suspended* (non-payment of bills between a period of two to seven months) and *cut off* (non-payment of more than seven monthly bills). By September 2011, the city registered 21,757 households suspended from the water service, and 24,409 households completely cut off from the formal infrastructure network. As shown more in depth in Chapter 6, the reasons of disconnection are complex and go beyond the inability to pay. However, the absence of feasible alternatives that facilitate *desconectados* to be legally reconnected to EPM's infrastructure network has forced them to deploy different informal and illegal practices to cope with the lack of access to water as I explore below.

7.2.1.1 Suspended: Solidarity responses to temporal interruption

By law, the company has the power to suspend those households that fail to pay their bills in a period of two to seven months. In this first phase of disconnection, EPM installs a tricked valve to temporarily restrict the flow of water into the house until debts are paid. This is the case of Doña Natalia, a single mother of three living in El Limonar, one of the poorest *barríos* in the city. On 18 October 2011, her house was suspended for non-payment. The water company sent a notice incorporated in the bill informing the following:

According to our records, you have not paid your bills in the last three months and the current bill. We want to point out that without the payment of three more bills you will definitively lose the right to the service. In order to avoid being completely cut off, we invite you to pay your bills in any of our cash pay stations or by using electronic means. If you need financing you can communicate to the telephone 44 44 100 to make an appointment. Once you pay off your debts, Empresas Públicas de Medellín will re-connect your services. Please omit this message if you have already paid off your debts (Translated by the author)⁵⁷.

Doña Natalia managed to prevent temporarily disconnection by convincing contractors of the water company of her precarious living condition. In response, they proceed to install a flow limiter to permit a minimum supply of 50 litres/person/day, which according to the WHO represents the amount of water necessary to cover most basic needs (OHCHR, 2011). Few weeks after, however, she fell into complete disconnection as another group of contractors interrupted the flow of water into her house by introducing a trickle valve in the water supply pipe while she was absent. This example clearly illustrates how successful negotiations are highly dependent on a combination between persuasion of the customer and sensitiveness of the contractor rather than citizens entitle to the fundamental right to water. In an interview with an engineer of a consulting company in charge of disconnection for non-payment, he admitted that in some cases contractors are unwilling to undertake disconnections due to the poor conditions in which families are forced to live.

⁵⁷ De acuerdo con nuestros registros, la suscripción asociada a su factura presenta saldos pendientes de [3] cuentas vencidas y adicionalmente los de la actual factura. Es conveniente anotar, que con 3 cuentas adicionales no pagadas perderá definitivamente el derecho al servicio, ocasionando **el corte definitivo**. Para evitar esto, le invitamos a que cancele su factura en cualquiera de las entidades o los medios electrónicos relacionados en la portada de documento de cobro. En caso de que requiera acceder a una financiación puede comunicarse con el teléfono 44 44 100 para concertar una cita. Por favor hacer caso omiso de esta comunicación, si al recibo de la misma usted ya ha cancelado su factura.

In cases of suspension, households deploy a myriad of individual socio-technical arrangements mainly based on specific form of solidarity to secure access to water on an everyday basis. The majority of the households surveyed reported that solidarity among family members; friends and neighbours constitute a prevailing practice during this first phase of disconnection. This include giving buckets of water without any costs, sharing facilities such as kitchens and toilets, extending rubber hoses from one house to another or reusing water (e.g. flushing toilets or cleaning floors with used laundry water). Other informal arrangements include sharing bills between households or charging per bucket of water. As many feel ashamed to periodically ask for water, especially to other neighbours that face similar financial difficulties, suspended households complement their informal access with artisanal systems of collecting rainwater or fetching water directly from the streams, activities that according to the respondents is mostly undertaken by women and children. These activities, as other scholars have documented, not only increase the daily workload of women and children, who spend a considerable amount of time and energy walking long distances to fetch water and carry heavy buckets, but also pose serious health threats as often these streams are contaminated (Brown, 2010; Sultana, 2009).

Moving temporarily to the house of a family member also represents a different form of solidarity. The survey revealed that 68 per cent of households have employed this short-term solution in a situation of suspension. In this case, respondents revealed that basic personal and domestic needs are covered such as showering, cooking, laundry and dish-washing while through family efforts money is collected to pay back bills in order to avoid accumulation of more debts, which lead to a permanent cut off. This clearly shows that for many households in this first phase, the intention to secure access through illegal practices is minimal and there is a strong desire to regain access to EPM water in order to put an end to the uncertainties and informalities they are forced to live with after disconnection. However, the majority of the respondents expressed a strong discontent and confusion for having to pay excessively high prices for a service that is considered as a public good, which is provided by a public company.

As low-income households constitute an important potential market for the water company (40 per cent of the actual clients are registered in the socio-economic strata 1 and 2 and 37 per cent in the socio-economic strata 3), diverse mechanisms have been established to facilitate *desconectados* paying off a portion of their debts in order to restore the service. As discussed in Chapter 6, many households have approached the company to pay back their debts; however, they are often unable to keep with the payment, as programs to refinance debts do not fit their economic conditions. Consequently, many of these households fall into the cut off phase, a condition that

makes them helpless to formally recover the service and pay off their debts, and force them into illegality to cover their daily needs.

7.2.1.2 Cut off: Illegal responses to permanent disconnection

The second category of non-payment corresponds to those households that have been completely cut off from the service for non-paying more than seven monthly bills. Disconnection activities are being outsourced by the company, which sends contractors to remove portions of pipes or water meters located directly outside the house, even though the latter is property of the households (see Figure 28). As contractors are often employed on a temporary basis, they have little expertise in consumer relation protocols and are unaware of the legal implications involved in water disconnection. When a house is cut off, there is not much negotiation from the customer's side to halt disconnection, as they feel ashamed of not having economic means to pay their bills.

The majority of the respondents felt disappointed because they consider that EPM is making money out of the poor and as a public company, it should provide water services sufficient and affordable for all. This sentiment was expressed by a resident of the *barrio* Villatina:

EPM is making lots of money by forcing poor households to pay expensive bills. As a public company, EPM should provide a service that is affordable, efficient and sufficient in quantity, instead of criminalizing us for not being able to pay our bills ... We want to pay for the service but we do not have money ... we do not have any other alternative except obtaining water illegally. We know that this is not good but this is out of necessity. Can you tell me how can we survive without water?

For households that have been completely cut off, paying for illegal service connection to the existing infrastructure network make them more prone to complex networks of manipulation and extortion, as these practices have become a flourishing business after massive disconnections are undertaken by contractors of the company. Some respondents of the survey informed that local plumbers are hired to remove trickle valves installed by the contractors or to build an illegal pipe connection from the house to the water main for up to US\$ 10 (COP \$30,000). Additionally, many residents admitted that securing access to water is becoming increasingly connected to the complex world of criminalized bands (e.g. paramilitary groups) operating in the area. In this context, these groups take control over the water supply to exercise authority over others. In some cases, they become the ultimate authority to decide who is permitted to access the network and who is excluded, who pays for it and who does not.

Figure 28 Removal of a water meter by contractors of EPM to avoid illegal reconnections



Source: Photograph by Marcela López, 2011.

A woman in the *barrio* La Cruz reported in an interview that while contractors of EPM were disconnecting her house, she implored to maintain access to water, as it was necessary to cover basic needs especially in her house inhabited by seven people including a three-month infant. The contractors explained that they could not offer any solution as they were following orders dictated by the company. Accordingly, they proceeded by removing the conventional meter in order to completely obstruct the flow of water into the house. After few days, she could temporary reversed disconnection as an illegal system was built by "*los muchachos*", paramilitary groups operating in the area. For many cut off households, securing access to water has become increasingly intertwined with the interests of paramilitaries, which use illegal reconnection activities as a source of profitable business. In the electricity sector, for instance, this situation was reached uncontrollable levels as paramilitaries groups have created particular alliances with "*ingenieros de fraude*" (people with technical skills to conduct illegal connections or alter the electricity system) to prevent EPM intervening illegal energy connections (El Colombiano, 25 February 2014). In this context, paramilitaries emerge as new actors controlling the flows of water throughout low-income areas and restructuring power relations inside the neighbourhoods.

In sum, obtaining water through illegal methods means that punitive measures from EPM will be more severe, debts with the company will escalate and the possibility to deploy legal actions to regain access (e.g. tutelary actions) or to qualify for the free water allowance program becomes undermined.

7.2.2 Disconnection for illegitimate land tenure status

The second form of disconnection corresponds to those households excluded from the formal infrastructure network of EPM. Households that are located on the so-called "high-risks zones" according to the *Plan de Ordenamiento Territorial* (Land Use Plan) are denied formal access to basic public services. This aspect has become an object of heated debate during the last couple of years in Colombia (Arias Mejía, 2009; Bernal Pulido, 2012; Ramirez Grisales, 2010) where land tenure status and technical and political arguments are commonly deployed. First, regarding land tenure status, some actors argue that it is inappropriate to invest public resources on illegal settlements as it can contribute to a chaotic and disorganized urban growth. They further claim that the invest of public money in illegal settlement needs to be forbidden in order to prevent risks and control urban sprawl, protect areas of environmental significance and urban land rights, promote housing projects that fulfil minimum standards as well as stimulate the development of organize and secure cities. Opponents claim that it is unacceptable to forbid investments to upgrade basic services in illegal settlements because it constitutes a violation of the fundamental rights enshrined in the National Constitution. This discussion is addressed more in depth in Chapter 5.

Second, "high-risk zones" pose serious technical difficulties for the constructions of infrastructure networks. Ironically, large-scale infrastructure projects have recently being built in these areas such as a police station, a water purification plant and massive transportation (aerial cable-car lines which are connected to the city's metro system). Furthermore, one of the most affluent neighbourhoods in Medellín is located at the same topographic level where luxurious apartments of 25 floors with swimming pools are supplied with a continuous service without posing any technical problem. Additionally, EPM delivers everyday between 3 and 4 m³ of water by truck to a private university that cannot access to water through the formal infrastructure network because it surpass the urban perimeter. Having access to water through tankers is more expensive than through the conventional water system, however, in this case the costs are borne by customers. This example clearly illustrates how the political, social, spatial and economic dynamics shaping the urban perimeter are manipulated to exclude particular citizens, especially the urban poor, while the needs of profitable clients are satisfied.

Third, struggles to be connected to the formal water infrastructure network becomes a deeply political issue as securing EPM water determines who enjoys citizenship rights and who is excluded. This aspect is particularly relevant for settlers of these "high-risk zones", who are predominantly *campesinos* (farmers) violently forced to migrate to the city as a consequence of the more than fifty years of armed conflict

between the state, the left- and right-wing groups. From the 1990s onwards, as conflict intensified, thousands of people have been displaced from other municipalities and have found refuge in the perilous slopes that ring the city. These new residents must compete in the already saturated labour market, which consequently has led to the growth of informal economy (Personería de Medellín, 2011). Houses in these areas are mainly built with cardboard, wood and recycled materials. Accessibility is difficult as they are only reachable by foot through steep and narrow paths. Drainage systems are inadequate and the electricity supply is poor. Illegal settlements are constantly exposed to floods; droughts, fires and mudslides, and residents consequently live under permanent uncertainty, abandonment and despair.

As their tenure status is illegal, they live under constant threat of eviction from municipal authorities and extortion from local paramilitaries groups. As such, absence of property rights and struggles for legalization of land and enjoyment of minimal conditions to guarantee a dignify life constitute the daily realities in these peripheries. These areas have transformed into a permanent occupation, in which communities have consolidated and are growing in size (see Figure 29). Access to water is increasingly secured through informal/illegal practices. For EPM, these practices have come to be seen as a major threat not only to the “culture of payment”, but also to the company’s revenues, as they contribute significantly to increasing levels of unaccounted for water (UFW). According to the company, around 35 per cent of Medellín's potable water is reported as UFW (EPM, 2013) lost through leakages in the distribution networks (physical losses) as well as meter inaccuracies and illegal connections (commercial losses). The growing number of illegal connections demonstrates that the water company faces significant challenges to fully commodifying water and creating “obedient” citizens that better respond to the necessities of the market.

The following two case studies illustrate different informal/illegal practices deployed in two *barrios* located just outside the urban perimeter: Bello Oriente and Pinares de Oriente. Both *barrios* are located in northeastern Medellín, an area of the city characterized by unstable steep slopes and high water availability due to their proximity to a highly dense technological system of water provision owned by EPM. However, what makes these two case studies especially interesting is that despite sharing similar geographical and socio-economic conditions, residents of the two neighbourhoods employ different practices to secure access according to the official designated types of water they use. Similarly, the ways in which the water company intervenes in these unserved areas is also differentiated based on the ways in which water is used.

Figure 29 The *barrio* Santo Domingo Savio in the periphery of Medellín is categorized as a “high-risk zone”



Source: Photograph by Marcela López, 2014.

7.2.2.1 Unserved: Citizenship recognition through collective struggle

For the inhabitants of the *barrio* Bello Oriente, the exclusion from the formal infrastructure system, illegal tenure status and precarious living conditions have contributed to the formation of new social organizations and networks, which are increasingly important to demand access to basic public services. For instance, access to water has been secured for almost five decades by constructing alternative infrastructures, which operate on community-based models. Due to their proximity to one of EPM's water tanks, the community has built a parasite plug-in infrastructure with their own resources. This self-built system captures wasted raw water that overflows the daily levelling of the company's tank and through a system of plastic pipes that run above the ground, water flows kilometres via gravity before it reaches individual houses. The infrastructure consists of a cascade aerator, in which raw water flows in a thin layer down steps, a storage tank and a tangled mass of water pipes as shown in Figure 30.

Although this infrastructure system appears very chaotic and inefficient, it has a strong organizational logic behind it. The management is handled by a *fontanero* (a person who is paid on a weekly basis by the community). This person's tasks include repairing tubes from fissures and cracks, fixing blockages, cleaning the tank of suspended objects after heavy rain and ensuring that every single house has access to a sufficient amount of water. Currently, the system supplies approximately 150 households with almost 24-hour water service. When a new resident moves into the area, access to water has to be arranged through the *fontanero*, who charges a small fee for instalment and maintenance of the system, but not for the amount of water being consumed. However, the *fontanero* does not receive a fix income as it depends on the ability to pay of the households served.

For many inhabitants in Bello Oriente, the water that flows from EPM's tank is considered a public good, rather than an economic good. This assumption is based on the grounds that a strict payment system would add to the exclusion and marginality in which people are already forced to live. As one community leader said:

The majority of people who settle down in this area have been displaced by paramilitaries and guerrilla groups. They were forced to abandon their land and to look for refuge in a city that has denied all sorts of rights. We try to help these families as much as we can. Access to water is the main right that is guaranteed to the inhabitants of this barrio. Everybody in Bello Oriente has access to water regardless of their capacity to pay ... Also, households should not experience scarcity while water that runs abundantly in the area, is being wasted by the company.

This community-based system not only serves to secure access to water, it is considered a powerful tool for citizenship recognition. In a conversation with a group of community leaders, they recounted how the establishment of a water system that does not exclude anybody has generated strong community cohesion and facilitated the demand of other basic public services (housing, education, health, etc.). One of the leaders further added: "Having a unifying position has helped us to voice concerns and to gain social and political legitimacy, which has facilitated negotiations with municipal authorities and staff of the water company".

Figure 30 Alternative infrastructure built by inhabitants of Bello Oriente to capture raw water that overflows a tank of the company



Source: Photograph by Marcela López, 2011.

Despite that community leaders have exerted pressure on EPM to demand technical support; they have not received any concrete response. They have particularly demanded better water quality as it has deteriorated in the last couple of years. In an interview with Don Segundo, the *fontanero* of Bello Oriente, he noted that:

Sometimes water comes down from the tank very dirty, particularly after rain. This water is not safe for drinking, people usually get very sick, particularly children. I tell them not to drink this water because it is unsafe, but they are thirsty, they do not have a choice but to drink it ... EPM told us that we have to improve this water because it is not suitable for consumption. We have proposed the construction of a water treatment plant but they told us that it is very expensive. I can build it, I have the skills for that, but I need the support of EPM. We want our water to have similar quality standards as EPM water.

Although EPM recognizes the importance of providing safe water, a community leader questioned the passive position adapted to the company in relation to community claims. For him, the company only takes action when there is a potential for profits. Another community leader interviewed felt that the decision of EPM to tolerate the use of raw water is mainly driven by environmental concerns such as reducing water losses (physical losses), rather than social concerns such as improving the living conditions of marginalized population.

7.2.2.2 Temporary served: Citizen recognition through individual struggle

As an everyday survival strategy, inhabitants of another *barrio*, Pinares de Oriente, secure access to water by connecting illegally to EPM infrastructure networks that supply potable water to regularized areas. These practices are characterized by individual rather than collective connections to the formal system leading to a “spaghetization” of the network (see Figure 31). A multitude of pipes that differ in material, length and diameter have been connected to the main distributional system to deliver water to individual households. The major problem with this system is profuse leakage of potable water, which produces not only significant levels of UFW, but also it increases the probability of mudslides. Additionally, the illegal construction of parallel systems of water supply has affected the efficiency of the formal service. As illegal connections are difficult to control for EPM, they are usually detected by formal users who complain to the company about bad water quality and insufficient water pressure leading to the regularly interruption of water flow. Consequently, informal settlements have become a source of tension with adjacent formal neighbourhoods that experience poor water supply due to the proliferation of illegal connections.

In order to avoid water conflicts and reduce UFW, EPM introduced in 2008 the program *Brigadas Comunitarias de Mitigación al Riesgo* (Community Brigades for Risk Mitigation), as part of its social responsibility policy (the program is addressed more in depth in Chapter 5). *Brigadas Comunitarias* includes replacing the pipes installed by the community for better-quality infrastructure in order to reduce leakages. Additionally, the company installs communal meters to monitor overall water consumption levels. These services are provided free of charge. Technical interventions are complemented with educational and training programs aiming at introducing new “values” such as the intelligent use of water, leadership, civil culture and appreciation of what constitutes a “public” and scarce good. Therefore, *Brigadas Comunitarias* can be seen as a program that facilitates access to adequate water services, while at the same time actively disciplining water users and increasing EPM presence and control over informal settlements.

Figure 31 Spaghetization of EPM's water network



Source: Photograph by EPM.

The program has been widely accepted by the residents of Pinares de Oriente, despite being presented as a temporal solution. As with Bello Oriente, the desire to be connected to EPM water in this *barrío* is strongly linked to notions of citizenship and land tenure status. As one old woman expressed: "We believe that having access to EPM water will give us citizen recognition, so that we no longer have to fear being evicted". This position clearly shows that EPM becomes an influential actor in defining and materializing citizenship rights. Additionally, preferences for EPM water are strongly associated with notions of "public". This perspective is captured by a community leader who claimed: "We want to have access to EPM water like other regularized areas in the city because it is public water. We do not want to rely any more on illegality to obtain water".

The majority of residents interviewed expressed the desire to have individual meters instead of a collective meter. This preference is attributed to the inextricably connection between water rights and property rights. When asked why, an old woman said: "It give us hope that we can reclaim rights over our property, so EPM will never disconnect us from the water service". This statement clearly illustrates that having

access to EPM water strengthens household's claims to secure land tenure. Following Nikhil Anand (2011: 545), securing an individual meter in Medellín can be referred to as *hydraulic citizenship* – "a form of belonging to the city enabled by social and material claims made to the city's water infrastructure". Another issue that came out from the interviews was affordability. Many residents collectively expressed fear and worry about not being able to pay for water, particularly the water accessed through prepaid meters. As one woman noted: "We heard that EPM is installing prepaid water meters. We do not want prepaid meters in our houses as we cannot afford the costs associated with this service".

It should also be noted that high levels of water consumption in unserved areas are a concern, as the water consumption habits of residents are largely derived from rural areas where water typically flows more abundantly and it is not serviced by centralized municipal water systems. People who are displaced from rural areas and settle down in Medellín's low-income areas are not therefore accustomed to treating water as a relatively scarce good and they lack of what Von Schnitzler (2008) calls "calculative rationality". Rural inhabitants tend to consume water without any limitation because they simply believe that it is a "gift of nature" that does not have any cost. Consequently, per capita water consumption in these households is higher compare to the average domestic consumption in the city. According to a staff member of EPM, unserved areas report an average monthly consumption of 40 m³ per household while formal households report 20 m³.

Beneficiaries of the program expressed that it is very difficult to maintain the consumption levels established by EPM in the program, especially as the number of inhabitants continually grows. In a field visit to Pinares de Oriente with an EPM team, it was observed that the communal meter registered a significant increase in water consumption. When one of the company staff asked why, a community member explained:

We know that EPM established a limit for water consumption. But, two weeks ago came three families displaced from other municipalities by armed groups. We could not refuse to connect them to the EPM system; nobody can live without water ... Also, my son got married. We cannot live together; I do not have enough space for more people. He constructed last week a house next to mine and he also got connected to the EPM system. Families are getting bigger and they need more water. It is hard to keep these consumption limits.

By law, EPM is not authorized to charge individual households for water services in unserved areas. Nevertheless, the company is working with the Regulatory Commission for Water and Sanitation (CRA) to implement a system of payment called *venta en bloque* (block sale). Instead of charging to individual households, this mechanism consists on issuing a collective bill with the consumption registered in the communal meter. EPM expects to transfer responsibilities to the *Juntas de Acción Comunal* (JACs) for the management of these shared meters and for collecting fees. However, the implementation of this system poses serious commercial obstacles to the company. By transferring certain responsibilities to the community, EPM can consolidate and reproduce hierarchies of power within the *barrio*, particularly in cases where criminal groups exert exclusive control over water to serve their own interests.

7.3 Conclusion: Decommodifying the neoliberal urban waterscape

This chapter has illustrated how *desconectados* secure access to water and claim their citizenship status by deploying particular informal practices. The results show that the shape and form of these practices are strongly influenced not only by the biophysical and spatial characteristics of water itself, but also by how water is technically and legally differentiated by the company. If water is raw/potable, safe/unsafe, abundant/scarce, legal/illegal or classified as a physical/commercial loss can influence the ways *desconectados* secure access to water and determine the extent to which EPM intervenes infrastructures and modes of household/community organization. I demonstrated that pay greater attention to water's materiality can come to influence daily practices of access to water and contribute to current debates on alternatives to privatization and commercialization.

I have examined informal practices in relation to two different forms of disconnection (see Table 10): for non-payment and for illegitimate land tenure status. Households disconnected for non-payment are categorized by EPM as *suspended* (accumulation of 2-7 monthly bills) and *cut off* (accumulation of more than 7 monthly bills) and results show that their informal practices to secure access to water are highly influenced by how water is legally differentiated by EPM. For suspended households, solidarity responses to temporal disconnection represent the most common practice to secure access to water. They commonly rely on family members, friends and neighbours to secure access to water while money is collected to pay back the accumulated bills. However, when they fail to pay off their debts, the water company bring them in a cut off phase. In many cases, *desconectados* in this phase are forced to connect illegally to the formal system despite the strict sanctions imposed by EPM. In the majority of these

cases, negotiations take place with local plumbers or paramilitary groups to facilitate illegal connections to facilitate access to EPM water.

Households excluded from the formal water system because of their illegitimate land tenure status are classified as *unserved* and *temporality served*. Drawing on two informal *barrios* located just outside the urban perimeter: Bello Oriente (unserved) and Pinares de Oriente (temporary served), this chapter has illustrated how practices to secure access to water are also significantly influenced by the agency of heterogeneous water. In Bello Oriente, access to raw, abundant, unsafe and legal water has facilitated more cooperation between community members; less dependence on EPM and it has created more awareness about water leakages and waste. The case of Pinares de Oriente showed that having access to potable, scarce, safe and illegal water has forced EPM to cooperate with the inhabitants of this *barrio* differently. In this case, a desire on the part of EPM to reduce commercial losses has facilitated the implementation of new strategies (e.g. *Brigadas Comunitarias*) that allow temporary integration into the formal water system. This shows that neoliberal approaches towards water services (e.g. reduction of commercial losses); have facilitated the implementation of new strategies to allow temporal integration of unrecognized areas in the formal water system.

In their struggle to secure access to water, *desconectados* also articulate different perceptions of “public” according to the types of water they use. *Desconectados* for non-payment expressed completely confusion about the public character of EPM, particularly when they disconnect the urban poor. Not being able to afford their bills leave many *desconectados* with culpability and shame even if they are able to reclaim their rights as illustrated (see Chapter 6), and therefore, they resort to illegality as the only option to secure accessibility. On the contrary, for unserved households, their exclusion from the urban development of the city has become an important terrain in the struggle to make visible their rights. In Bello Oriente, attitudes are constructed around the necessity of providing water to a community that has been historically excluded. For these inhabitants the term “public” is closely associated with inclusion, high quality and efficiency. In Pinares de Oriente, notions of “public” are inextricably linked to securing access to EPM water. However, if this water is “truly” public, it should be affordable, sufficient in quantity and legally accessed in their minds. These different meanings of public constitute a powerful tool not only to defend fundamental rights, but also to subvert notions of publicness that adjust to the commercialized ideology of EPM.

Table 10 Main variables to analyse informal practices in relation to different forms of disconnection

Forms of disconnection/ Variables	Disconnection for non-payment		Disconnection for illegitimate land tenure status	
	Suspended <i>(Solidarity responses to temporal interruption)</i>	Cut off <i>(Illegal responses to permanent disconnection)</i>	Unserviced <i>(Citizenship recognition through collective struggle)</i>	Temporary served <i>(Citizen recognition through individual struggle)</i>
Length of disconnection	2-7 months	+ 7 months	Never connected to EPM network	Temporarily connected to EPM network
Types of water	EPM water, legal and commodity	EPM water, illegal, fundamental right and commercial loss	Raw, abundant, unsafe, fundamental right, legal and physical loss	Potable, scarce, safe, illegal, fundamental right and commercial loss
Social arrangements	Family members, friends and neighbours solidarities (sharing bills and facilities such as toilet, kitchen, collecting money to pay back debts). Negotiating with contractors,	Negotiations with local plumbers, <i>los muchachos</i> (paramilitary groups)	Collective connections to EPM system. Community-based systems managed by a <i>fontanero</i>	Individual connections to EPM system
Technical arrangements	Reusing water, collecting rainwater, fetching water from streams using buckets	Removal of tricked valves, building new water pipe connections	Construction of a tank, cascade aerator and water pipes	Spaghetization of EPM network through individual pipes that differ in material, length and diameter
Water company intervention	Instalment of: prepaid meters, flow limiters and tricked valves	Removal of pipes and water meters. Implementation of economic sanctions	Does not intervene	Construction of temporary infrastructure: water pipes and communal meters
Perceptions towards the meanings of "public"	Confused term	Confused term	Inclusion, high quality and efficiency	Affordable, sufficient and legally accessed

CHAPTER 8

Conclusion: (De)commodifying Medellín's Urban Waterscape

8.1 Introduction

This research has illustrated how access to water in Medellín has become a crucial terrain over which market-driven logics are both consolidated and contested. I began this analysis by questioning a paradoxical situation: While the city's public multi-utility company "successfully" transforms into a *multilatina* and reports a steady increment in its annual revenues, thousands of households have been aggressively disconnected for not being able to pay their bills and many still remain largely excluded from the city's formal water supply system because of being located in the so-called "high-risk zones". Not being satisfied with the explanations provided by the municipality and the water company, which tend to interpret disconnection for non-payment as a poverty trap problem while the inability to provide water services in unserved areas is largely attributed to technical and land tenure arguments, my primary goal in this research has been to challenge these simplistic narratives by focusing attention on the commercialization of *Empresas Públicas de Medellín* (EPM) and its strategies of capital accumulation in a competitive transnational economy.

Although the successful expansion of EPM into the Latin American services market has been, for many inhabitants of Medellín, a source of pride and admiration, the implementation of market-oriented operating principles at the utility raise difficult questions about the public character of the company and its responsibility in the provision of basic services: Why does EPM, a public company that belongs to the municipality as well as the citizens of Medellín disconnects households for non-payment and excludes low-income households from the formal network despite that access to water has been endorsed by the Constitutional Court as a fundamental right? Why are *acciones de tutela* (tutelary actions) that forbid disconnection for non-payment not respected by EPM? Why are water tariffs becoming increasingly unaffordable for low-income households and prepaid water meters being promoted as the only solution to reduce disconnection, especially when they have been heavily criticized, and even been banned, elsewhere in the world (Barnes, 2009; Loftus, 2006a)? Why does EPM speak about competitiveness and sustainability but pay little attention to equity?

These questions go to the heart of emerging debates around the “public” character of commercialized companies (McDonald, 2014; 2016), where this research makes a valuable contribution.

I have structured this chapter in three parts. The first section provides a summary of the main findings of this research in relation to the framework developed to analyse contested urban waterscapes and the role of key actors taking part in these contestations. The second section examines the implications of this research for constructing alternatives to commercialization. The third section highlights important avenues for further research.

8.2 Main findings

This research was guided by two questions. First, to what extent have neoliberal reforms changed the management and ideological practices of Medellín’s water utility company, and with what economic, social, spatial and environmental implications? Second, how do disconnected households perceive, experience and resist those transformations and how do they employ particular practices to secure access to water on an everyday basis? Answers to these questions are structured around the contested urban waterscapes framework. Theoretically, I sought to demonstrate the application of an analytical framework for better understanding how contestations over control and access to water in urban waterscapes are shaped by, and embedded in two parallel processes: commodification and decommodification. Methodologically, I proposed that disputes over control and access to water could be productively addressed from a historical and multiscale perspective order to link the problem of disconnection of water to transnational capital structures and the state. Empirically, I have shown how these contestations can be analysed by following how various actors with different power relations (EPM, state, EPM, non-human nature) position themselves in these contestations, which discursive, material and institutional strategies they deploy and which alliances are built to secure control and access over water.

8.2.1 Contested urban waterscapes from the perspective of commodification and decommodification

In the last decades, studies about water inequalities in urban contexts remain largely dominated by debates that centre on the tension between public versus private utility companies. The case of EPM has shown that this perspective has become particularly unsuited for grappling with new hybrid models of water supply provision such as public companies operating under market-oriented principles. This model of water provision,

known as commercialization (Bakker, 2010a), tends to blur the distinction between public and private and the role of the market and the state. Additionally, it produces great confusion about what means "public" and who holds responsibility for the provision of public services

Acknowledging that the lack of access to water is connected to uneven power relations among different actors in the city rather than the ownership of the company (public or private), this research engaged with theoretical insights from urban political ecology (UPE) and neoliberalisation of nature to demonstrate how water inequalities in cities can be conceptualized through contestations that emerge over the control and access to water in the urban waterscapes. Viewing these contestations through the simultaneous processes of commodification and decommodification draws attention not just to the ways in which the commercialized logics of EPM have shaped the relationship between nature, society and urban infrastructure in uneven ways, but also how low-income households deploy particular practices to secure access to water when it is denied. Analysing these two simultaneous and different processes in the same case study becomes particularly useful for understanding water inequalities as both processes are infused by intense political contestations that reflect broader tensions and contradictions inherent in processes of capital accumulation.

UPE approaches are an important point of departure in exploring water inequalities in cities as they permit understanding of how the flows of water in any city in the world are largely embedded in wider political and economic processes associated to a neoliberal agenda. UPE work is particularly concerned with the urbanization of nature or for understanding urbanization as the transformation of nature through processes of capital accumulation. In this body of scholarship, urbanization of water is understood as the process through which flows of water are drawn into the city, are transformed into commodities and waste, and are ultimately disposed. From this perspective, urbanization is not longer perceived as an outcome of socio-technical processes, but rather a socio-natural ones as it fuses the circulation of water and the circulation of capital in inseparable manners. As I have demonstrated through a historical analysis (Chapter 3 and 4), metabolism, circulation and infrastructure networks are useful entry-points for analysing how the control and domination of nature (water) has become utterly instrumental for the consolidation of EPM and the functioning of the modern city. By drawing on urban political ecology to explore the process of urbanization of water in Medellín, I have argued that the separation of nature and city is viewed as a false dichotomy.

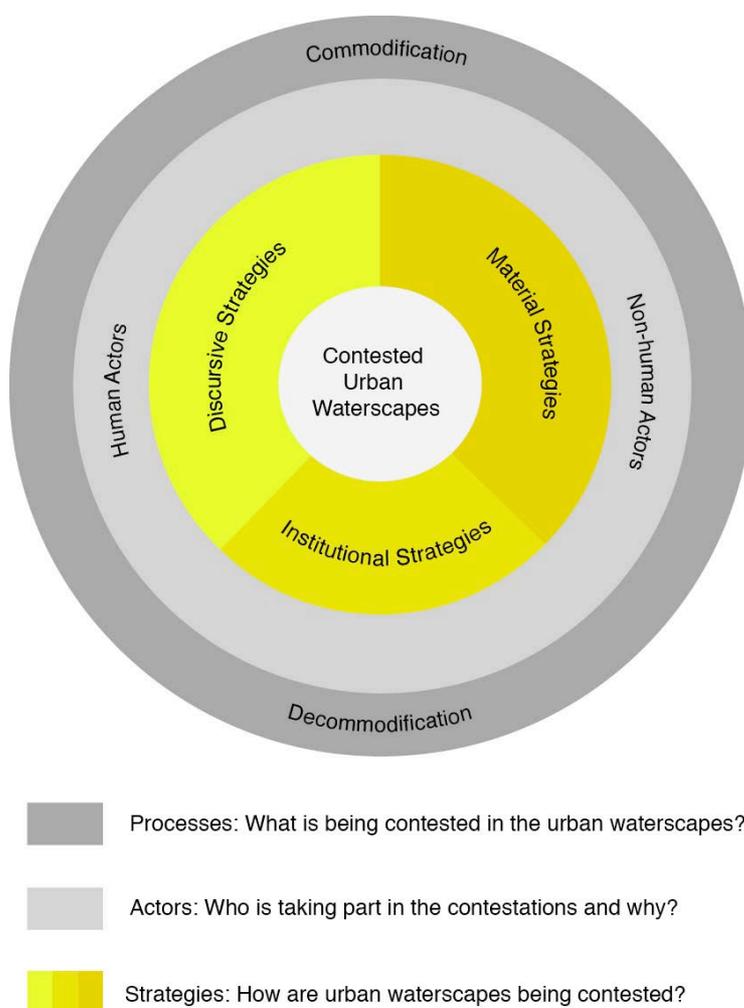
As UPE provides extensive insights into how urban natures become inserted into networks of capital accumulation, the literature on neoliberalisation of nature is found appropriate to complement and deepen work on water inequalities within UPE. In particular, I suggested that neoliberalisation of nature can expand UPE from three different perspectives: First, neoliberalisation is variegated. Rather than being homogenous and undifferentiated, neoliberalism is a heterogeneous project (privatization, commercialization and commodification). Second, the functioning of the market requires a strong state regulation. Rather than simply entailing deregulation, neoliberalism requires an active involvement of the state in regulatory actions. Third, nature is an important component to define the trajectories of neoliberalism. Rather than being a static or raw material lacking of agency, nature can be productively framed as an actor as it poses challenges and obstacles or provides opportunities to different types of neoliberalism.

However, results of this research suggested that a sole focus on processes of capital accumulation is insufficient for capturing the scope of water inequalities in urban contexts and the ways in which urban natures are being contested. In this research, I have demonstrated that another productive way to approach those contestations is through the daily practices deployed by low-income households to secure access to water. Here I focused on nature's materiality to illuminate how these practices are significantly shaped by water's biophysical, spatial and social characteristics. Therefore, bringing water as an active actor permits tracing not only how social power relations shape water flows, but also how water flows also shape social power relations.

Also, this research has demonstrated that the waterscape represents a suitable scale to situate these contestations as it permits capturing how power operates in wider political and economic processes that surpass the scale of the city to how diffuse forms of power operate at the household scale. Therefore, the contested urban waterscapes framework becomes suitable for unpacking power relations inherent of both processes of commodification and decommodification. I have argued that it is important to analyse these two processes in the same case study to be aware of the contested and contradictory aspects of commercialization itself. Excavating the social relations of power behind commodification and decommodification becomes imperative for understanding why water inequalities still persist in many cities in the world despite technical and managerial efforts.

I have proposed that one productive way for simultaneously approaching both commodification and decommodification is through the analysis of different actors (human and non-human) and their strategies (discursive, material and institutional) to secure control and access to water (see Figure 32). However, the actors selected for this research are not exclusive for the analysis of contestations in urban waterscapes. The analytical framework can be expanded to other actors that play a significant role in water provision in other geographical contexts such as water mafias (Ranganathan, 2014 in Bangalore), Coyotes (Reis, 2014 in Mexico), small-scale providers (Cheng, 2014 in Manila), trade unions (Spronk et al., 2012 in Uruguay) or the World Bank (McDonald and Ruiters, 2012 in Africa).

Figure 32 A framework to analyse contested urban waterscapes



8.2.2 Contested urban waterscapes from the perspective of Empresas Públicas de Medellín

Tracing back the water company since its origins in 1955 became a useful analytical tool to find enough evidences to prove how its recent transformation into a *multilatina* has deepened and reinforced water inequalities in Medellín's urban waterscape. The historical analysis developed for this research highlighted how the water company has constituted different urban waterscapes based on particular arrangements between nature, society and urban infrastructure in two distinct historical periods: Municipalization (1955-1990) and commercialization (1991-present). During the municipalisation period (Chapter 3), access to water in Medellín's urban waterscape strongly relied on moral values rather than economic interests. EPM since its inception undertook a municipal hydraulic paradigm model largely centred on the construction of large-scale and capital-intensive engineer projects (e.g. hydroelectric power plants, tanks, reservoirs) to secure universal water service provision and the modernization of the city. This model, which was largely supported by international loans and driven by a local elite composed by engineers educated in the *Escuela Nacional de Minas* (National School of Mines), relied not only on techno-managerial aspects but also on distinctive notions and ideals of publicness, citizenship and modernity. Having access to water at home, for example, was considered an emblem of citizenship, a precondition to enjoy a dignified and modern life. Additionally, water was perceived as a public good to be provided by the state through its public company at affordable prices.

However, the municipal hydraulic paradigm became undermined with the introduction of market-oriented principles implemented during the commercialization period. Water companies, either public or private, have to adjust their operations to principles such as competitiveness, efficiency and profitability in order to make water services more sustainable in the long-term. For EPM, this entailed providing water as an economic good available to those who are able to pay for it. This approach in water provision has resulted in better economic efficiency and improvement of environmental aspects, while failing to meet social needs. For example, the increasing implementation of cost-recovery policies (Chapter 5) for water supply provision has resulted in high water prices and reduction of cross-subsidization, which triggered disconnection for non-payment.

EPM legitimizes policies of disconnection for non-payment by claiming that if services are not suspended or cut off, in practices they will become a free good, thereby; it will threat the sustainability of the company. Additionally, they claim that when a person is provided with water it acquires citizenship recognition, and therefore, it has the

moral and economic “duty” to pay for the service. Besides the rigorous implementation of cost-recovery, EPM has deployed other mechanisms to facilitate that water flows as a commodity. This include discursive strategies such as the categorization of citizens as customers, the use of bill payment as a mechanism to differentiate between “good” and “bad” citizens, the representation of water as a “scarce” commodity as well as technical strategies such as the removal of water meters and installment of flow limiters, trickle valves and prepaid meters, which have resulted in a fragmented and splintered infrastructure. As such, I have argued in this research that this complex interplay between ideals of citizenship, water scarcity discourses and technological infrastructures have become utterly instrumental for the (re)production of water inequalities.

The most paradoxical situation is that many low-income households in the city continue being denied from affordable access to water, even though, EPM successfully transforms into a *multilatina*. The insertion of the company into the international market has become a significant source of revenue for the city, as by law 30 per cent of EPM’s annual profits need to be transferred to the municipality for the investment in social programs. This situation has given EPM a privilege position to intervene in the planning and modernization of the city, in which environmental and aesthetic projects are prioritized. For example, EPM has financially contributed to the protection of public fountains, lakes and parks, the implementation of reforestation programs and the construction of several water treatment plants to improve the water quality of Medellín River. Additionally, EPM has become an influential actor in shaping the cultural and recreational agenda of the city by becoming a key sponsor. There is not doubt that the transnationalization of the company has brought significant improvements to the city in term of infrastructure, conservation initiatives and cultural and recreational activities. However, little steps have been taken towards solving the problem of disconnection. The passive role of EPM can be understood as its unwillingness to deal with complex socio-political issues connected to providing access to water such as the right to citizenship and legalization of land. Therefore, I have argued that the problem of disconnection for non-payment and for ilegal land tenure status needs to be understood beyond technical and managerial discourses. Water disconnection is a fundamentally political issue and if water needs are to be met in a socially just manner, water requires to be approached in these holistic terms.

8.2.3 Contested urban waterscapes from the perspective of the state

The commodification of water, although deeply contradictory, requires a strong state intervention. Contrary to the often-repeated refrain that in a neoliberal economy the

state has lost all its power (“rolling back” of state regulation), this research has shown how markets could not operate without strong state influence at different scales: At the national scale, for instance, the state has repositioned itself primarily through the function of regulator rather than operator of the market. For this purpose, two new independent regulatory agencies were established: Superintendence for Public Utilities (SSPD), which controls the performance of the public services sector and protects consumers’ interests; and the Regulatory Commission for Water and Sanitation (CRA) which is responsible for setting water and sanitation tariffs.

Although these regulatory agencies have the duty to protect consumers’ interest and regulate prices, far from being “neutral” in relation to the market, they have focussed to a great extent on supply without much consideration of issues such as affordability and equity. As a result, the institutional framework governing access to water in Colombia reveals the tensions and contradictions inherent in processes of capital accumulation (Chapter 5). The paradoxical character of these policies can be reflected, on the one hand, in aggressive cost-recovery strategies, and, on the other hand, on a language of rights, inclusion and social equity. Ironically, while the national state has the constitutional obligation to satisfy unmet needs regarding potable water, it has been also highly supportive of these market-based regulatory arrangements, including disconnection for non-payment.

At the scale of the city, the Municipality of Medellín has repositioned itself as an “extra-economic” actor (Bridge, 2013) within the commercialization period. As a sole-owner of EPM, the municipality has become a main receptor of EPM’s annual transfers, thereby; the provision of basic public services is considered a significant source of revenue for fostering Medellín’s urbanization process. Unsurprisingly, the municipality’s role has been quite ambivalent in the cases disconnection for non-payment. Instead of mediating between company and citizens interests, it has opted to keep itself silent and complicit when EPM disconnects a household for non-payment. The only strategy that the municipality has implemented to prevent disconnection has been a free water allowance of 2,5 m³/person/month. Although, it has been recognized that this initiative represents a significant effort to move towards the progressive realization of the human right to water, it has been questioned for its paradoxical effects as this minimum amount of water provided free of charge can turn into the maximum to survive for many low-income households. The exclusion of thousand of household from the formal water network located in informal settlements has also received limited attention. While the municipality has failed to provide alternative solutions, EPM puts the blame on the municipality that does not authorize them to supply water services in the so-called “high-risks zones”.

8.2.4 Contested urban waterscapes from the perspective of *desconectados* for non-payment

Desconectados also occupy a relevant position through which the contested urban waterscape might be understood. Being aware that the rhetoric of poverty renders unaddressed the complex social power relations surrounding water inequalities in Medellín, I conducted research in low-income areas to show how institutional strategies fail to provide *desconectados* with affordable and adequate water services even though they are entitled to this fundamental right. The concept of governance failure (Bakker, 2010a) has proved to be highly useful for acknowledging the agency of *desconectados* by identifying how they perceive disconnection policies for non-payment and which difficulties they face to be reconnected legally.

Although extreme levels of poverty and unemployment were a prevalent condition in the households surveyed, results show that the reasons for non-payment are numerous and complex and go beyond the inability to pay. Complexity in bills formats, distrust in the government, little information about legal mechanisms to reclaim the right to water, inflexible payment programs, and low communication skills and participation constitute main barriers that preclude low-income households the full enjoyment of water access. Despite that *desconectados* can resort to legal mechanisms such as the *acciones de tutela* (tutelary actions) to protect the right of access to water, high levels of debts leave them with culpability and shame even to reclaim this right. The increasing levels of guiltiness of *desconectados* might be interpreted not only as a concern for losing the material access to EPM water, but also as a fear of being categorized as “bad” and “undesirable” citizens. Additionally, they expressed total confusion about the “public” character of EPM by not understanding why a public company disconnects households for non-payment, particularly the urban poor.

For EPM, debt payment is viewed as an obligatory pre-requisite to obtain legal access to the service. Although different strategies are being implemented to assist low-income households in debts payment, many of them fall again into a situation of disconnection, as they are unable to deal with their accumulated debts, while simultaneously paying their monthly bills. Due to the unsuccessful character of the programs to refinance the debts, EPM expects to implement in the short-term prepaid technologies for the provision of water services. Prepayment strategies establish suitable conditions that enable EPM to manage its financial debts and to avoid the political implications of disconnecting those households that are too poor to pay their bills by giving them the “freedom” to self-disconnect from the network when they run out of money. Thus, the company expects to reduce conflicts and restores its social corporate

responsibility image as customers silently and individually self-disconnect.

For *desconectados*, prepaid water is perceived as an immediate and viable alternative to regain legal access, avoid sanctions, reduce fear of being disconnected and progressively paid their debts to the water company. However, its implementation in the long-term might be quite problematic as the cases of South Africa and Namibia have proved, prepaid water systems have perpetuated the already existing inequalities created through apartheid laws (Harvey, 2005; LaRRI, 2005; Loftus, 2006a; McDonald, 2007; Ruiters, 2007). In the absence of appropriate solutions to deal with the problem of disconnection for-non-payment, many households find themselves obliged to deploy illegal strategies to re-connect regardless of the strict sanctions imposed by the water company. Many of them defend these strategies because they consider that disconnection for non-payment is an injustice and illegal connections constitute the only option to secure access to a basic right that is being denied by the water company and the municipality.

8.2.5 Contested urban waterscapes from the perspective of non-human nature

One of the main sources of contestations within Medellín's urban waterscape is derived from distinct, and even antagonistic meanings of water. While EPM has deployed diversified strategies to secure that water flows as a commodity (e.g. water as a "scarce" resource, citizens as costumers, instalment of prepaid meters and flow restrictors, etc.), there are other flows of water that challenge process of commodification process by rejecting being fully inserted into networks of capital accumulation.

By engaging non-human nature as an active actor in these contestations, we can have a better understanding how different types of water come to influence the ways in which low-income households deploy particular practices to secure access to water on a daily basis in an urban waterscape that is deeply neoliberalized. This research has examined how these informal practices articulate different institutional, material and discursive strategies in relation to two different forms of disconnection: for non-payment (suspended and cut off) and for illegal land tenure status (unserved and temporary served). While in the suspended phase (2-7 months of non-payment), *desconectados* built solidarity mechanisms with neighbours, family members and friends to secure access to water (e.g. collecting money to pay their debts, sharing water bills), in the cut off phase (more than 7 months of non-payment) they are forced to connect illegally to the formal system despite the punitive measures adopted by EPM. In many cases, local plumbers or paramilitary groups facilitate illegal connections through fee charges. Likewise, *desconectados* located in "high risks-zones" deploy diversified institutional strategies that range from paying a small fee to a *fontanero* for the management of an

alternative service delivery system (unserved) to establishing individual and illegal connections without paying for it (temporary served).

Material strategies are also very diverse and largely depend on the type of water used. Whether water was raw/potable, safe/unsafe, scarce/abundant, legal/illegal or technically differentiated as a physical /commercial loss come to influence the shape and form of informal practices. Informal practices range from systems of rainwater collection, fetching water from the streets using buckets, removal of tricked valves, construction of community based-systems to instalment of individual pipes that differ in material, length and diameter producing the spaghetization of EPM's water network. The water company intervenes many of these strategies, especially those that pose serious commercial obstacles as they contribute to increase the levels of UFW (unaccounted for water) through commercial losses.

However, informal practices should be understood beyond their material and institutional character. These practices also embody discursive strategies such as citizenship claims and new meanings of "public", which have become powerful mechanisms not only to defend fundamental rights, but also to subvert notions of "publicness" that adjust to the commercialized ideology of the water company. Following the flows of water through the process of decommodification has provided useful insights into how informal practices are simultaneously discursive, material and institutional.

Instead of criminalizing these strategies, this research has argued that policy interventions can derive from these everyday practices in order to be more responsive to the necessities of *desconectados*, thereby, possibilities to provide universal and affordable access to water can be guaranteed and maintained. Thus, the water's materiality concept (Bakker and Bridge, 2006; Castree, 2005; Sultana, 2013) has been useful for contributing to the current debates on alternatives to privatization and commercialization (López, 2016; McDonald and Ruiters, 2012) by bringing valuable insights into how everyday practices to secure access to water are constructed and mobilized outside neoliberal frameworks implemented by the water company as discussed below.

8.3 Constructing alternatives

In Colombia, there have been several attempts to influence national politics to improve access to water and reduce the impacts of market-oriented logics. Many of them have failed, but some have proved notable successes. A national referendum to defend water as a human right, for instance, was rejected by the National Congress in 2010; however, local NGOs from Medellín took the referendum's proposal further and pressed the municipality to implement a free water allowance program of 2,5 m³/person/month,

which operates since 2009. Beside this program, Medellín has shown a number of interesting alternatives to provide water supply services on a non-commercial basis. Many of these alternatives are located in the periphery of the city where communities excluded from the formal water network have been active in the construction of their own water supply systems managed by a *fontanero* (a person who is paid by the community) on a non-commercial basis as shown in Chapter 6.

Surprisingly, EPM has been another active actor in the construction of alternatives to commercialization. The commercial approach towards water provision has pressed the company to cooperate with the local community. For example, the *Brigadas Comunitarias* program (Community Brigades for Risk Mitigation) implemented since 2008, has facilitated the temporal connection of low-income households to the formal network, while the company recovers commercial losses by reducing the number of illegal connections (see Chapter 5). Additionally, the company provides training in *fontanería* to assist communities in the management of their own community-based water systems.

However, despite the positive alternatives highlighted above, it is necessary to further discuss new possible ways to redress the problem of disconnection beyond the refinanciation programs provided by EPM or the recent implementation of “innovative” technologies such as prepaid water meters. In this part, I suggest that a productive way to identify alternatives to commercialization is by tracing the flows of water through the decommodification process. By interrogating how informal practices emerge as a complex interplay between material, discursive and institutional strategies, this research seeks to highlight possible avenues for creating alternatives to commercialised service delivery models. Thus, informal practices can represent an important point to construct more just and equal water supply systems. By focussing on everyday practices, I suggest that progressive alternatives can be enacted and envisioned according to the following criteria: (a) Recognize *desconectados* as a heterogeneous group, (b) Learn from everyday practices and local knowledge, (c) Create multiple and affordable mechanisms to secure access to water, (d) Redefine communication strategies towards *desconectados* and promote participation, and (e) Strengthen organizations that protect the human right to water

Recognize desconectados as a heterogeneous group

The company and the municipality often invoke *desconectados* as a unity, as an undifferentiated entity in their goals and interests, thereby, overlooking complex realities behind everyday struggles to secure access to water. In the course of this dissertation, I

have shown that *desconectados* rather than being homogenous, they are a heterogeneous group. I demonstrated that they articulate diversified strategies to secure access to water according to the types of water used, the nature and length of disconnection, and the different perceptions of what water is and what “public” means (see Chapter 7). Therefore, a nuanced approach to *desconectados* is necessary to create diversified policies and strategies that are more responsive to their everyday realities. Interventions to solve the problem of disconnection can hardly succeed if difference is not taken into account, and rather they can reproduce and deepen existing inequalities.

I suggest that it is necessary that the company and the municipality understand the multiple and everyday geographies of water disconnection and the critical role that nature (water) plays in shaping social power relations. Programs could usefully be more driven around the different forms of disconnection identified in this study: suspended, cut off, unserved and temporary served. While suspended and cut off households can resort to subsidised programs to prevent the increment of more debts, unserved households should receive the support from EPM and the municipality to improve the already existing community-based systems, or to be included in the network (e.g. *Brigadas Comunitarias* program) with an affordable water tariff that prevents them from being disconnected for non-payment. These alternatives could lead to better results over the medium and long-term as the company eliminates excessive day-to-day operating costs by reducing illegal connections and levels of unaccountable for water (UFW), while limiting the interference of other for-profit actors (e.g. local plumbers, paramilitary groups) in water supply provision.

Learn from everyday practices and local knowledge

Understanding everyday practices to secure access to water is particularly important to create policies and programs that are more responsive to the realities of low-income population. Policy interventions can derive from how low-income households perceive and experience disconnection on a day-to-day basis and how they develop particular strategies to cope with the lack of water access (e.g. socio-technical arrangements, discursive representations of water, demand of citizenship rights, etc.). Some community initiatives have demonstrated capacities to design, implement and monitor small-scale infrastructure projects that require low investment over time as the case of Bello Oriente has proved (see Chapter 7).

To reduce water inequalities, programs and projects need to be more tentative to the material, discursive and institutional strategies deployed by *desconectados* to secure access to water on a daily basis. This perspective might encourage engineers and the

technical staff of the company to approach water supply systems beyond pipes, valves and conventional meters, and draw attention on the ways in which *desconectados* struggle to establish themselves in the city. Technical interventions and training programs should promote mutual learning and exchange between staff members of EPM and local communities. The *Brigadas Comunitarias* program provides a remarkable example, in which staff members of EPM and local communities join efforts to improve water supply provision (see Chapter 5). The program is composed by technical, educational and recreational activities. EPM provides better quality pipes free of charge to reduce leakages and encourages the establishment of a *Mesa Comunitaria del Agua* (self-organized water committee), whose members receive training on leadership, conflict resolution and civil culture in order to stimulate better cooperation, preserve the water infrastructure, organize collection of fees, control water expending and report irregularities to the company. Everyday practices to secure access to water are built on extensive individual and collective knowledge about how to redress inequalities and how to deal with deficiencies in water supply provision. It is important to acknowledge these dynamic forms of securing access to water, especially those based on new forms of solidarity if water is to be delivered in a just and equitable manner.

Create multiple and affordable mechanisms to secure access to water

According to the conducted survey, low-income households are unable to pay their bills simply because they are very expensive. Chapter 7 has shown that the lowest socio-economic strata in the city (Strata 1, 2 and 3) not only are the most affected by the increment of water prices, but also they have to pay a relative high proportion of their monthly income for water bills (around 30 per cent). There is an urgent need to implement strategies to ensure the affordability of water services in low-income areas in order to minimize the impacts of high tariffs. Solutions should be more preventive and not come too late when a household is already disconnected. Until now, the company has relied on multiple programs to refinance the debts, but all of them have proved to have limited effects (see Chapter 6).

One alternative to prevent disconnection for non-payment is the already existing free water allowance program (*Litros de Amor* program). However, the current restrictive criteria of the program (e.g. not having debts with EPM, having connection to the formal network) should be avoided as it excludes a significant part of the population from the enjoyment of a minimum amount of water free of charge as shown in Chapter 6. The *Litros de Amor* ("litres of love") program needs to be expanded to all low-income households regardless of their debts with EPM and it should be complemented with

“social tariffs” and subsidise programs to avoid households to be disconnected when they consume more than the amount they were assigned for free. The city of Porto Alegre in Brazil, for instance, has established a “social tariff” for low-income households who have the right to use 10 m³/month but pay for only four (Maltz, 2005). In Medellín, this alternative can be financed with EPM’s annual transfers while involving the municipality in taking an active role in securing the right to water and protecting low-income households from being disconnected for non-payment.

Redefine communication strategies towards desconectados and promote participation

It is hard to foresee that the problem of disconnection will be solved with draconian measures and oppressive laws, as *desconectados* continue to deploy diversified strategies to decommodify the flows of water despite of the strict sanctions imposed by EPM (see Chapter 7). As I have shown in this study, public awareness campaigns launched by EPM place a strong emphasis on presenting water a “scarce” ecological resource in order to demonize *desconectados* and their informal practices. This manufactured scarcity has served to reinforce strategies of commodification, including the criminalization for accessing to water without paying for it. Such measures, in turn, have perpetrated profound injustices in the city by contributing to high levels of anger, fear, anxiety and culpability among *desconectados*, as they perceive themselves as “bad” and “undisciplined” citizens. Such a situation has prevented them to reclaim the right to water, even though they are entitled to this fundamental right.

Instead of criminalizing *desconectados*, spaces for participation and cooperation should be promoted where they can raise their concerns. The municipality can create a platform to promote dialog between customers and EPM. One notable example is the *Mesas Técnicas de Agua* (MTA, communal water councils) in Caracas, Venezuela that promotes exchange between representatives of civil society, local government and the water company (Spronk et al., 2012). Other example is the establishment of water forums in South Africa where issues about payment of bills are raised (Smith, 2005). Additionally, the municipality and EPM can organize door-to-door campaigns or awareness initiatives spread through radio broadcasts, local newspapers, theatre performances and community meetings to inform low-income households about available mechanisms to prevent disconnection for non-payment. These activities are imperative to avoid condemning *desconectados*, and instead, encourage them to make the company and the municipality more accountable and transparent, a task that remains urgently needed if the city expects to reduce the levels of social inequality.

Strengthen organizations that protect the human right to water

I have shown in this research that tutelary actions are the most efficient and simplify legal mechanism to adjudicate on the obligation to fulfil the human right to water when it is denied (see Chapter 5). *Desconectados* have resorted to this mechanism to hold EPM accountable through the Colombian Court System. According to an interview conducted at EPM's customer service office, the company in the majority of the cases has been obliged in less than 48 hours to reconnect the water service and establish a payment program that adjust to the economic capacity of the customer. Despite that tutelary actions are accessible to all; they are not widely used and promoted because *desconectados* have high levels culpability to reclaim their rights and they are not empowered to understand the legal procedure to enforce this regulatory mechanism. In the meantime, the company continues sending contractors to disconnect households inhabited by individuals under special constitutional protection, even though they are not allowed to do so. It is imperative that EPM provide training to contractors not only on consumer's rights, but also on citizen's rights. Disconnected households have the right to be previously informed when the house is going to be suspended or cut off for non-payment and about the legal mechanisms available to prevent disconnection.

It is also imperative to strengthen the role of organizations that work to protect the human right to water such as *Personería de Medellín* and local NGOs (e.g. Corporación Ecológica y Cultural Penca de Sábila and Corporación Jurídica Libertad). This means that more staff, financial resources, international cooperation and political participation might facilitate these organizations to place water issues high on the political agenda. This can increase pressure on the municipality and EPM to halt disconnection and provide a space where *desconectados* can receive legal assistance, particularly regarding tutelary actions. This legal mechanism can represent a significant challenge for the company because the problem of disconnection might reach uncontrollable levels in case that the number of tutelary actions escalates.

8.4 Future research directions

In this concluding section, I highlight important avenues for further research. Although some of them I briefly touched throughout the study, I hope that further research along these lines will enable scholars, policy makers, practitioners and activists not only to deepen their theoretical concepts on water inequalities, but also to explore alternatives to construct more equal and just water supply systems.

Gender and water

The fact that water for many disconnected households becomes accessible through constant processes of improvisation has created gender inequalities as well as serious public health problems and safety risks. By conducting household surveys and direct observations, I realized that women are disproportionately affected by disconnection as they spend more time looking for new sources of water under the expenses of employment and free time. Children usually are not sent to school because of hygienic conditions or because they have to work alongside their mothers to collect water (see Figure 33), while men are rarely involved in domestic water collection jobs. In order to make a work more sensitive to the gendered relationships with water, Sultana et al., 2013 call for the necessity to open the “black box” of household and community. Households are commonly considered as a congruent unit of interests, while communities are conceptualized as homogenous in their interests (Mohanty and Miraglia, 2012).

Figure 33 Children and women collecting water in barrels in the peripheries of Medellín



Source: Photograph by Marcela López, 2013.

One way to dissect intra-household differences and intra-community dynamics is to pay a more adequate attention to intersectionalities with respect to multiple dimensions of difference. A more nuance understanding of women's live realities can provide a fruitful ground to evaluate how gender and intersectional inequalities are reflected in the way water is perceived, represented, managed and controlled after disconnection. Conducting research that captures how factors such as caste, race, ethnicity, class, age and geographical location all intervene to position women in different and similar relationships to inequality (Lahiri-Dutt, 2006; Mohanty and Miraglia,

2012; Sultana and Loftus, 2012; Sultana et al., 2013) remains urgently needed in the literature of UPE and neoliberalisation of nature. Neglecting this intersection evades any critical analysis of intra-household and intra-community injustices (Boelens, 2008) and weakens any efforts of women groups to make their voices heard.

Prepaid technology and water

EPM has been a pioneer company in the implementation of prepaid technologies not only in Colombia, but also in Latin America. A staff member of the company in one of the interviews conducted in 2013 commented that there are 12 national and Latin American water companies following carefully the implementation of prepaid technologies in Medellín as they foresee offering prepay systems in the long-term. Results of a pilot program conducted by EPM have shown that low-income population have widely accepted prepaid water meters, however, little is known about their effects. Chapter 6 has shown that because of fear of debts and high level of anxiety and culpability for being categorized as “bad” or “undesirable” citizens, *desconectados* for non-payment have been supportive of prepaid water meters without questioning the implications in water consumption and citizenship rights.

Although prepaid meters have been presented as an “innovative” solution to reduce social inequalities (see Chapter 5), still many questions remain unanswered. How do users appropriate and contest prepaid systems? What are the differential impacts on men and women, and the implication on their water consumption habits and ordering of domestic space? How do prepaid systems re-shape people's daily practices and to what extent this technology undermines the commitments to provide universal and affordable access? How does this new differentiated technology reinforce different levels of citizenship among city inhabitants? Ruiters (2007), for example, illustrates in great detail how prepaid systems in South Africa are linked to negative outcomes such as intermittent services and increased household stresses. He further adds that for women, prepaid meters are mostly perceived as a form of punishment rather than empowerment. Other authors such as Bond and Dugard (2008) have pressed in South Africa to consider pre-paid meters nationally outlawed as a health hazard, as they are in Britain, because they are associated with the rapid spread of a cholera outbreak in poor neighbourhoods. A rigorous analysis of prepayment technology is urgently needed in order to have a critical view of the impacts of prepaid systems on disconnected households and how this “progressive” and “innovative” technology is perceived and experienced among its users.

Social movements and water

By conducting this research, I found out that access to water for *desconectados* matters beyond its biophysical functionality, it is also regarded as a powerful tool for citizenship recognition. One way how *desconectados* put forward their claims is by being active members in the *Mesa Interbarrial de Desconectados* (Roundtable of Disconnection), a social movement that struggles to find alternative modes of water supply provision based on principles of justice and equality (see Chapter 6). This organization represents a valuable source for deepening research on water inequalities as their members are active in transforming and extending the content of citizenship rights and demanding concrete solutions to the problem of disconnection, alongside issues such as housing and land tenure. There is a pressing need to do more work on social movements. Particular attention should be paid to how they construct strategies and paradigms that can fundamentally transform social inequalities, how they connect the right to water with other rights (e.g. to electricity, sanitation, education, health care, housing), and what political and legal actions are deployed and which effects they have.

Commercialization and water

Existing research has primarily shown how privatization initiatives have failed to provide affordable and accessible water services to the urban poor (Bakker, 2010a; McDonald and Ruiters, 2005; Swyngedouw, 2004). However, insufficient scholarly attention has been paid to the effects generated by state-owned companies running on commercial principles (for an exception, see McDonald, 2014). Additionally, comparatively little critical research has been developed in Asia, Africa and Latina America where state-owned companies are increasingly operating under market logic principles (*ibid.*). It is necessary to undertake studies on water commercialization across different regions, particularly where EPM has subsidiaries, in order to understand how the neoliberal strategies adopted by the company unfold in particular local places and which multiple and contradictory effects are generated depending on the political, historical, ecological and socio-economic contexts.

Studies in this field remain urgently needed in order to draw lessons on how other countries prevent disconnection for non-payment and how to construct public service models more responsive to the necessities of the low-income population. Besides comparison across regions, it is also suggested a critical comparison across sectors such as sanitation, electricity, gas, waste collection and health care in order to explore in a systematic way commonalities and differences as well as to stimulate dialog among sectors.

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APPENDIX 1. Household survey

Note: The survey was conducted in Spanish language

INVESTIGATION OF THE SOCIAL AND SPATIAL INEQUALITIES OF DISCONNECTED HOUSEHOLDS FROM WATER SERVICES

Date		Household survey No.	
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1. SOCIO-SPATIAL CHARACTERIZATION

Your house:

1.1 Is located in the <i>barrio</i>		1.2 And in the <i>comuna</i>	
1.3 Which one is your socio-economic strata (according to the bills you receive)		1.4 And which one is your SISBÉN level	

2. SOCIO-ECONOMIC CHARACTERIZATION

How is the composition of your house?

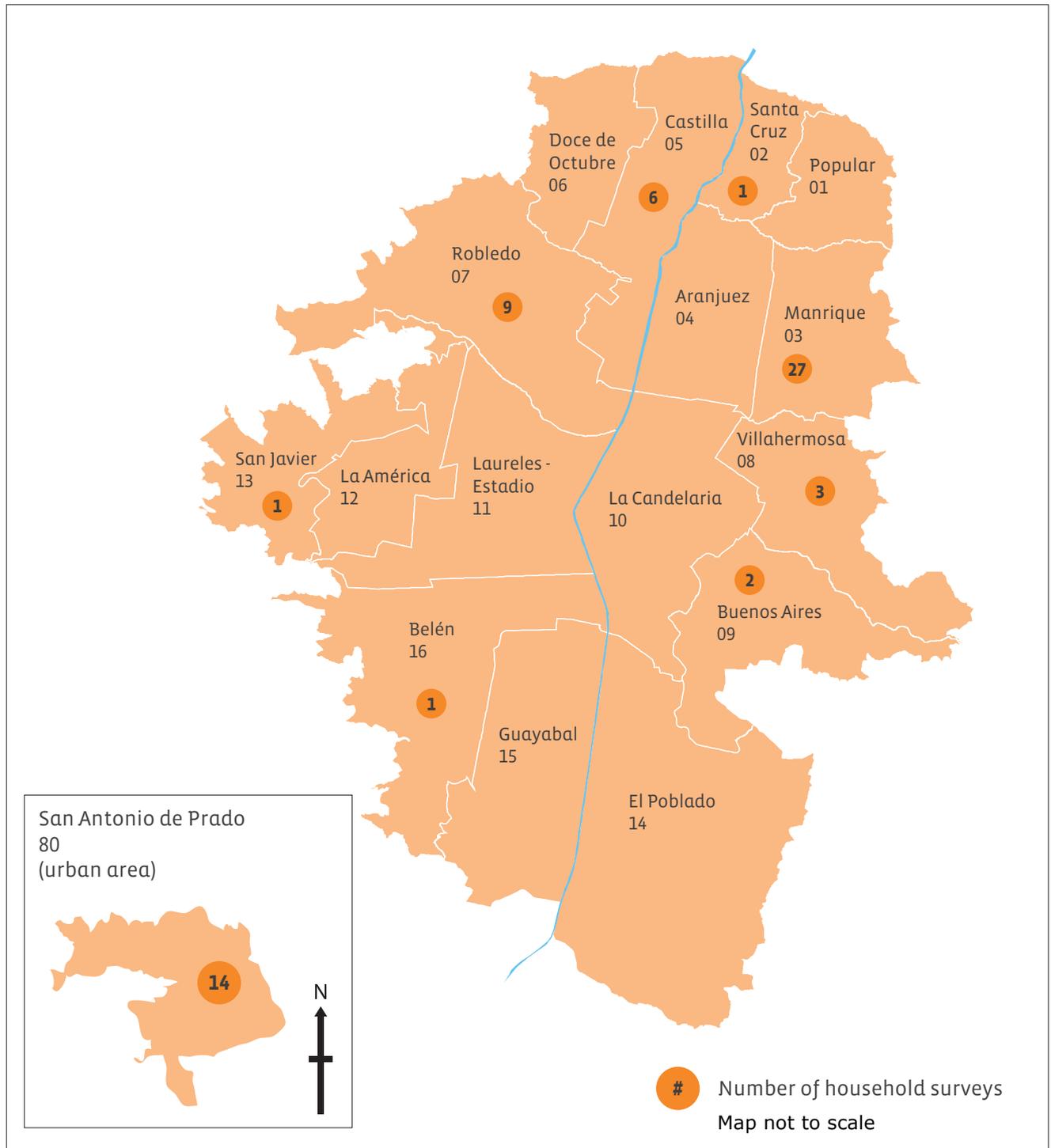
No	2.1 Gender	2.2. Age	2.3 Educational Level	2.4 Occupation	2.5 Type of Job	2.6 Montly Income

2.7 Are there people with physical disabilities?		How many?	
2.8 Have you been displaced by violence?		2.9 How long have you been living in Medellín?	

3. DISCONNECTION STATUS

3.1. How long have you been disconnected from the water services?
3.2. What are the main reasons of disconnection?
3.3 How do you obtain water after being disconnected and where do you storage it?
3.4 How much are your debts to EPM for non-payment of water?
3.5 Have you been disconnected from other public service? <input type="checkbox"/> No <input type="checkbox"/> Yes Which one? <input type="checkbox"/> Electricity <input type="checkbox"/> Gas <input type="checkbox"/> Telephone Do you have access to electricity through a prepaid meter? <input type="checkbox"/> No <input type="checkbox"/> Yes, are you satisfied with this service?
3.6 Have you contacted EPM to solve the problem of disconnection? <input type="checkbox"/> No, why? <input type="checkbox"/> Yes, what kind of solutions has EPM offered?
3.7 Are you part of a social group or network? <input type="checkbox"/> No, Why? <input type="checkbox"/> Yes, Which one?
3.8 Do you know the program <i>Litros de Amor</i> or free water allowance program offered by the Municipality of Medellín (Accord 06 of 2011)? <input type="checkbox"/> No <input type="checkbox"/> Yes, how did you obtain this information?
3.9 Have you implemented a legal action to secure the right to water and avoid being disconnected (e.g. tutelary action, right to petition)? <input type="checkbox"/> No, why? <input type="checkbox"/> Yes, which have been the results?

APPENDIX 2. Fieldwork areas where household surveys were conducted



Source: Based map supplied by Medellín Department of Administrative Planning. Prepared by Juan Esteban Naranjo, 2014.

APPENDIX 3. List of activities

Phase I (September 1-November 30, 2011)

Nr.	Date	Activity
1	08.09.2011	Participation in an educational program organized by Empresas Públicas de Medellín (EPM) at the Botanical Garden
2	15. 09.2011	<i>Observatorio Derechos Colectivos y Medio Ambiente</i> (observatory of collective rights and the environment), meeting with <i>Personería de Medellín - Corporación Ecológica y Cultural Penca de Sábila</i>
3	16.09.2011	Meeting with the environmental and human rights group of <i>Personería de Medellín</i>
4	27.09.2011	Meeting roundtable of disconnection at Corporación Jurídica Libertad (CJL)
5	27.09.2011	Guided tour through the building of EPM
6	01.10. 2011	<i>Diplomado Servicios Públicos Domiciliarios</i> (Course Domiciliary Public Services). Modulo I: History and main concepts of the domiciliary public services. University of Antioquia, Institute of Political Studies
7	04.10. 2011	<i>Observatorio Derechos Colectivos y Medio Ambiente</i> (observatory of collective rights and the environment), meeting with <i>Personería de Medellín - Corporación Ecológica y Cultural Penca de Sábila</i>
8	05.10.2011	Forum Antioquia " <i>Visión y grandes iniciativas: Hacia una nueva geografía cultural, social y económica del territorio</i> " at EAFIT University Presentation of the Ituango hydroelectrical dam by Federico Restrepo (Director of Empresas Públicas de Medellín)
9	06.10.2011	Meeting Public Health Faculty at Universidad de Antioquia with the Epidemiological group. Introduction of a project that investigates the nutritional situation of <i>desconectados</i>
10	10.10.2011	
11	15.10.2011	Meeting roundtable of housing and domiciliary public services Comuna 8, <i>Barrio Sol de Oriente</i>
12	25.10.2011	Meeting roundtable of disconnection at Corporación Jurídica Libertad (CJL)
13	25.10.2011	Conversatorio: Water as a Human Right and the problem of water disconnection in Medellín. Café Calle 9.
14	26.10.2011	<i>Observatorio Derechos Colectivos y Medio Ambiente</i> (observatory of collective rights and the environment), meeting with <i>Personería de Medellín - Corporación Ecológica y Cultural Penca de Sábila</i>
15	27.10.2011	Meeting roundtable of housing and domiciliary public services Comuna 8, <i>Barrio Villatina</i>

16	09.11.2011	Forum " <i>Desarrollo urbano, Megaproyectos y Derechos</i> " (Urban Development, Mega-projects and Rights) organized by the <i>Observatorio de Derechos Colectivos y del Ambiente</i> (Observatory of collective rights and the environment)
17	13-19.11.2011	Participation in the Seventh-Inter-American Dialogue on Water Management (D7)
18	15.11.2011	Meeting roundtable of disconnection at Corporación Jurídica Libertad (CJL)
19	27.11.2011	Meeting roundtable of housing and domiciliary public services Comuna 70, <i>Barrio Altavista</i>
20	29.11.2011	Presentation of preliminary results in the international Seminar " <i>Derechos Colectivos y del Ambiente: Derecho humano al agua y al habitat sostenible</i> " (Collective rights: The human right to water and sustainable habitat). Organized by the <i>Observatorio de Derechos Colectivos y del Ambiente</i> (Observatory of collective rights and the environment).

List of activities

Phase II (February 22 –March 28, 2013)

Nr.	Date	Activity
1	27.02.2013	Meeting Roundtable of Disconnection. Presentation of preliminary results at Corporación Jurídica Libertad (CJL)
2	28.02.2013	Presentation of a "draft" version of a to the <i>Comité Departamental del Agua</i>
3	04.03.2013	Meeting roundtable of disconnection at Corporación Jurídica Libertad (CJL)
4	07.03.2013	Debate at the Concejo de Medellín: Fusión of Empresas Públicas de Medellín (EPM) and Empresas Varias de Medellín (EMVARIAS)
5	12.03.2013	Guided tour to the <i>Museo del Agua</i> (Water Museum)
6	15.03.2013	Visit to the <i>barrio</i> Pinares de Oriente (Comuna 3) with a EPM team as a part of the program <i>Brigadas Comunitarias de Mitigación al Riesgo</i> (Community Brigades for Risk Mitigation)
7	17.03.2013	Participation in a mobilization organized by the Roundtable of Disconnection. Starting point <i>Barrio Sol de Oriente</i> (Comuna 3)
8	19.03.2013	Presentation of my PhD results at CORPADEZ (<i>Corporación para la Paz y el Desarrollo Social</i>)
9	21.03.2013	Participation in the debate about the "Fusión Une-Tigo", Foro el Colombiano

List of activities

Phase III (February 04 – April 07, 2014)

Nr.	Date	Activity
1	10.03-4.04.2014	Research in the <i>Sala de Patrimonio Documental</i> at EAFIT University
2	06.03.2014	Presentation at the Andes University (Bogotá) in the Master Program Public Management and Development
3	14.03.2014	Fieldwork in the <i>Barrios</i> Santo Domingo Savio and Bello (Hatoviejo sector)
4	31.03.2014	Preparatory meeting to participate in the program " <i>Brigadas comunitarias de mitigación al riesgo</i> "
5	02.04.2014	Participation in a technical and educational training program to participate in the " <i>Brigadas comunitarias de mitigación al riesgo</i> ".
6	05.04.2014	Field trip in the <i>Barrio</i> Santo Domingo Savio
7	07.04.2014	Opening of the exhibition <i>Waterscapes: forms, meanings and transformations</i> at the Gallery of Contemporary Art Paul Bardwell of the Colombo Americano, Medellín

APPENDIX 4. List of interviews

Phase I (September 1-November 30, 2011)

Nr.	Date	Institution	Type
1	16.09.2011	Personería de Medellín	Municipal's Human Rights Office
2	21.09.2011		
3	19.09.2011	Corporación Ecológica y Cultural Penca de Sábila	NGO
4	27.09.2011	Corporación Ecológica y Cultural Penca de Sábila	NGO
5	28.09.2011	Corporación Jurídica Libertad (CJL)	NGO
6	05.10.2011	Corporación Ecológica y Cultural Penca de Sabila	NGO
7	17.11.2011		
8	11.10.2011	Municipality of Medellín	Municipal Body
9	14.11.2011		
10	21.10.2011	Red Juvenil de Medellín	NGO
11	26.10.2011	University of Antioquia	Academia
12	15.11.2011	Inter-American Water Resource Network	International Network
13	15.11.2011	Corporación Para la Paz y el Desarrollo Social (CORPADES)	NGO
14	16. 11.2011	Municipio de Medellín	Municipal Body
15	16.11.2011	Ecofondo, Antioquia-Viejo Caldas	Network
16	17.11.2011	Coalición de organizaciones mexicanas por el derecho al agua	Network
17	18.11.2011	Fundación Social Palomar - Barrio Bello Horizonte	Foundation
18	18.11.2011	Red Interbarrial de Desconexión	Social Movement
19	20.11.2011	Empresas Públicas de Medellín (EPM)	Management
20	28.11.2011	League of Public Service Users of Antioquia	Union

List of interviews

Phase II (February 22 – March 28, 2013)

Nr.	Date	Interviews	Type
1	22.02.2013	National University Medellín	Academia
2	27.02.2013	Corporación Ecológica and Cultural Penca de Sábila	NGO
3	01.03.2013	Municipio de Medellín	Municipal Body
4	06.03.2013	EAFIT University	Academia
5	07.03.2013	Empresas Públicas de Medellín (EPM)	Management
6	07.03.2013	Empresas Públicas de Medellín (EPM)	Management
7	08.03.2013	Secretaria de Bienestar social (Department for Social Well-being)	Municipal Body
8	13.03.2013	Empresas Públicas de Medellín (EPM)	Management
9	14.03.2013	Empresas Públicas de Medellín (EPM)	Management
10	20.03.2013		
11	20.03.2013	SINPRO Union	EPM Professionals' Union
12	20.03.2013	Empresas Públicas de Medellín (EPM)	Management
13	21.03.2013	Empresas Públicas de Medellín (EPM)	Management
14	21.03.2013	Empresas Públicas de Medellín (EPM)	Management

List of interviews

Phase III (February 04 – April 07, 2014)

Nr.	Date	Interviews	Type
1	13.02.2013	Acueducto Comunitario in the <i>barrio</i> Bello Oriente	Community organization
2	10.03.2014	Empresas Públicas de Medellín (EPM)	Management
3	25.03.2014	Radian Colombia S.A.S	Contracting agency
4	25.03.2014	Radian Colombia S.A.S	Contracting agency
5	01.04.2014	Museo de Antioquia	Cultural institution
6	04.04.2014	Municipio de Medellín	Municipal Body
7	05.04.2014	Radian Colombia S.A.S	Contracting agency

“For reasons of data protection, the Curriculum vitae is not published in the online versión”

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