Right to the water, right to the city. The universalization of sanitation in precarious urban settlements of Medellin, Colombia

Direito à água e ao lugar em Medellín, Colômbia. Universalização do saneamento em assentamentos precários urbanos

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Abstract

This article analyzes a sanitation universalization program in precarious urban settlements, implemented by the municipal government of Medellin, Colombia. Based on the theory of Political Ecology, it discusses aspects that enable or restrict the expansion of sanitation services to the poor population, and analyzes the experience of Bello Oriente, a settlement not served by the program, where the population, with the support of a local NGO, has managed to improve water supply conditions and mitigate geotechnical risks. The article shows that the solution developed by the community is much closer to a concept of socioenvironmental unit than the municipal urban policy, which proposes a development based on ecological urbanism, but is subject to the neoliberal model of commodification of the city.

Keywords: 2030 Agenda for Sustainable Development; urban water management; Unidos por el Agua Program; ecological urbanism; slum upgrading.

Resumo

Este artigo analisa um programa de universalização do saneamento em assentamentos precários urbanos adotado pela prefeitura de Medellín, Colômbia. Com base na Teoria da Ecologia Política, discute sobre os aspectos que possibilitam ou restringem a expansão do saneamento para a população pobre e analisa a experiência de Bello Oriente, um assentamento não atendido pelo programa, no qual a população, contando com o apoio de uma ONG local, conseguiu melhorar as condições do abastecimento de água e mitigar os riscos geotécnicos. O artigo mostra que a solução desenvolvida pela comunidade está muito mais próxima de um modelo de unidade socioambiental do que a política urbana municipal, que propõe um desenvolvimento baseado em urbanismo ecológico, mas está sujeito ao modelo neoliberal de mercantilização da cidade.

Palavras-chave: *Agenda 2030; gestão das águas urbanas; Programa Unidos por el Agua; urbanismo ecológico; urbanização de favelas.*

Introduction

This paper discusses the limitations and the possibilities of strategies aimed at universalizing sanitation in precarious urban settlements, based on a case study carried out in Medellín, Colombia. The prefecture of Medellín has implemented a public policy of right to water in association with the 2030 Agenda with a focus on the "Objectives of Sustainable Development". However, at the same time, the local municipal government also enforces urban development policies that are based on financial and mercantile approaches to develop the city (Britto & Rezende, 2017; Vargas Lopez, 2018; Zuluaga, 2014). The program named *Unidos por el Agua* was adopted by the municipal government and by the publicly-owned enterprises of Medellín (EPM), which is responsible for the sanitation services in the city, was subjected to an analysis of its objective to universalize the water supply and sewage collection. That analysis aimed at identifying the advances accomplished with the use of such program, as well as its limitations. The municipal land zoning policy was then found to be a limitation to the objectives of the program. On the other hand, the organized community presented was able to present alternatives that could contribute to the necessary universalization of sanitation in precarious urban settlements.

The text presents a history of the measures that have been put in practice along the time by the prefecture of Medellín to expand the access to water by the poorer population until the Program *Unidos por el Agua* is finally put in practice. The text then presents the Land Zoning Plan (POT) currently in force, along with the public infrastructure of water and sewerage services, so as to clarify the relationship between the community needs and the limitations imposed by said plan. After that, the text presents the case of the settlement named *Bello Oriente*, located on the northeast portion of the town, beyond the urban perimeter and its sanitation limits, as defined in the POT and not included in the scope of the EPM program. Nevertheless, the community has found ways to remediate the lack of basic services and many other limitations imposed by the urban zoning standards of the city in order to accomplish their right to housing, water, and permanence in that area.

The theme is discussed from the perspective of the theory of political ecology proposed by Swyngedouw (2004), which considers that water flows in urban areas are not determined exclusively by a physically water cycle, but also by influences and correlations that are also cultural, symbolic, social, and political. From this perspective, the land zoning policy in Medellín, which determine the sanitation and housing policies, defines the destination of public investments and the fates of people, while it also faces collective reactions that challenge the technocratic planning that segregates the land and impose changes in the way the city is planned.

The water issue is only one of those that stir a territorial conflict over a settlement built by the poorer population and the technocratic territory, but sufficient to lead the community to question their own urban condition. The communitarian project named *Escuela territorial de barrios de ladera* (Convivamos... 2019?) presents a counterproposal to the use of that portion of the city and to the

strategic project named *Cinturón Verde Metropolitano* (Medellín, 2014a); as described in the POT. Such counterproposal is based on principles and methodologies focused on the use of the land and suggests that such new form of production and reproduction of the land might be an alternative to pacify the society. Therefore, such contra proposal might represent a participatory project of the city aimed at ensuring the right to one's permanence in the area, the right to access water utilities, and the right to the city.

Sanitation: human right and merchandise

The universalization of sanitation is a theme that is simultaneously related to urban development, management of water resources, and environmental management. The ways to access sources of clean water, recover river and water streams, and treat domestic wastewater are all involved in the scope of sanitation and have multiple interfaces: health, housing, urban planning, environment, etc., and have been approached basically in the scope of that restricted water market. Other examples include the discussions led by the World Water Council, which are amplified in the World Water Forums and guided by the concept that the universalization will only be possible in a context where the market plays the main role in the mediation between demand, society, and the natural availability (Espinoza, 2016).

In this sense, the governments of countries that have not yet managed to provide nationwide sanitation, particularly in the Southern Hemisphere, have prepared public policies that make use of services renders by means of corporate structures, which have shown to be inefficient in their capacity to expand the service and recover the quality of superficial and underground water. Castro (2013) suggests that these deficiencies are not technical and not even related to water shortage. Instead, he suggests they may result from neoliberal privatization policies and social inequalities. The "market efficiency" ideology that has been emphatically promoted in World Water Forums (Furigo and Samora, 2019) praises the technical and scientific knowledge, reduces the social importance of sanitation, and forces governments and state-owned companies to seek profits, which leads them to transform citizens into clients. At the same time, this process silences critics, ignores cultural and historical aspects related to water, and ignores the failure or those policies when it comes to social and environmental development along the years (Castro, 2013).

For Swyngedouw (2004), the inequality of access to sanitation has to do with a complex socionatural process closely connected with urbanization, as it metabolizes nature and produces social and physical-environmental conditions that render new forms to the environment in which they occur. The social relationships of power take place in a "kingdom of forces" in which social players strive to defend and create their own environments in a context of conflicts and struggles. In the capitalist regime, market relationships strongly provoke and interfere with other socioecological processes of domination and subordination, exploration and repression, which mutually feed each other and transform

the city, thereby establishing some balance as they negatively impact some social groups and positively others.

Water is one of the elements in this socionatural, biochemical, and physically defined environment, and not a "natural thing" that differs from "social things". Another element is precarious housing: Oliveira (1974 apud Maricato, 2014) affirms that the production of the latter is the result of a socioeconomic inequality combined with the so-called "formal city", as it would be produced by the working class in a type of domestic or pre-capitalist production, which would have been fundamental for the process of capital accumulation. Precarious housing is associated with precarious sanitation, which then leads to precarious urban settlements, the source of the sanitation deficit.

While poorer workers build their own houses in inadequate locations deprived of infrastructure and subject to several unsafe situations, the water that flows through the city are directed to different directions, as they follow the capital speculation of land and centers of power. The State incurs expensive infrastructures (water treatment stations, reservoirs, pipelines, trunk sewers, outflow sewers, and effluent treatment stations) that, on their turn, are driven by private interests to highly prized regions of the city. On the other hand, poor workers need to find alternatives to solve their own housing in the city and only through collective efforts they may obtain some adequate infrastructure from the State, even if minimum and deficient. There will be no adequate technology that could serve all of those who depend on these services, and it is unlikely that public investments on sanitation will guide in proceed to meet such needs.

Therefore, the "informal" sanitation and water supply systems arrive after the settlement takes place, in a backwards process when compared to that in the formal city (Furigo, Ferrara, Samora & Moretti, 2018), leading to a continuous struggle for the right to water. In the formal city, services like sanitation and water supply are supposed to be profitable, favoring urban renovations and large size ventures (Britto & Rezende, 2017) in which water is a commodity.

The right to water and sanitation in Medellín

Medellín is the administrative city of the Department of Antioquia, in the northwest of Colombia, and also the Metropolitan Region of the Aburrá Valley, located in the central region of the Andes. The metropolitan region has a population of 3,866,165 people, with 65% living in Medellín. The city is crossed by the Medellín river from south to north, engulfed by high mountains, in a panoramic scenario of large amplitude. With 380 km2, its territory covers an urban area with 110 km2 that concentrates 2,479,987 inhabitants distributed in 16 districts, or *comunas*, while the rural area total 28,465 people in 5 *corregimientos* (Figure 1) (Antioquia, 2017)

Medellín was one of the pioneer cities in adopting the Program for Minimum Free Vital Water Volume – PMVAP (Vargas Lopez, 2018) in a social context marked by the fight for water services all over the country. In 2007, as the result of popular demands, a nationwide campaign that demanded water to be recognized as a public resource took place

Figure 1 – *Comunas* and *corregimientos* in Medellín

Source: Wikimedia, 2019.

and, in 2008, a constitutional referendum was convoked to declare potable water a fundamental right, and to ensure a free, minimum volume of water to people. The campaign also demanded special protection and priority use of essential ecosystems to support the water cycle and the public and communitarian management of water and sanitation utilities (Motta Vargas, 2001, apud ibid.). Although not approved by the Colombian Congress, this campaign led municipalities like Medellín and Bogotá to enforce specific policies related to the access to potable water (Vargas Lopez, 2018).

The Program for the Minimum Vital Potable Water Volume was implemented between 2008 and 2011 and named *Litros de Amor* (Liters of Love), and was intended to reach 45,000 families in extreme poverty and ensure, monthly, 2,500 liters of water *per capita* to provide for the basic hygiene and cooking needs (Zuluaga, 2014).

According to Zuluaga (ibid.), this program, which reached 24,694 low-income households in 2012, was based on the records of EPM itself to establish its goals. However, the author identified more than 30,000 households not connected to the services and, therefore, not served by the program. Those households were the home immigrant families and other families settled in risk areas considered to be "non-mitigable". In addition to this groups, there were also people that had utility services suspended for delayed payments. In 2006, the "disconnected" totaled 60,000 people (*Medellín cómo vamos*, 2007)

In order to solve the problem of default, the EPM adopted a pre-paid system in the water service system. Even though such measure allowed lower income families to gain access to minimum utilities, Zuluaga (2014) considers it to be an offence against human dignity, as it limits the consumption of water to basic hygiene and cooking needs. In the context of this program, the author estimated a number above 27,000 households still in debt with the water and sanitation companies, and other 14,000 families left out of the system.

Moreover, the PMVAP became a right of the poor population and those subjected to forced displacement after the signature of Agreement n. 6, 2011 (Medellín, 2011), sanctioned by the Municipal Council of Medellín.[1] The arguments that supported the institution of that agreement included, in addition to the Political Constitution of Colombia, the UN Resolution A/RES/64/292/2010 and legal decisions of the Colombian Constitutional Court, which then started to ban the interruption of water supply to poor people for default. Some rulings established the fundamental right to water as a basic condition for the human health and dignity (Rulings T-410/2003, T-270/2007, T-381/2009, T-418/2010, T-717/2010 apud Medellín, 2014b).

Between 2016 and 2019, the municipal government of Medellín implemented the Program *Unidos por El Agua*, coordinated by the EPM, with the objective to provide 40,200 families with potable water supply and sewerage services, both in the urban and rural areas. It also included actions aimed at the community development and the mitigation of geological risks. According to *Medellín cómo vamos* (2018b), the program divides the target population into three interest groups, according to the possible solutions to each specific group:

• Group 1: solution to the water supply issue to the community through the interim provision of potable water and sewerage structures managed by non-conventional systems in informal settlements and other areas not fully developed. The plan for these groups was set to include 11,500 households in the outskirts of Medellín and extreme low-income families for three years.

• Group 2: this group includes constructions previously recognized by the municipality in terms of land property regulation, which allows for the connection of those lots to the water and sewerage infrastructure. The goal was to include 21,800 families to water and sewer utilities.

• Group 3: this group is comprised of households found in settlements that had already been considered in the municipal plans for improvement and inclusion, in which 6,900 households would be formally connected

to utilities in *Comunas* 1 (Popular), 8 (Villa Hermosa), and 13 (San Javier).

The inclusion of Group 1 in the Program required the approval of national decree n. 1272 (Colombia, 2017), which established and regulated the provision of water and sewer services to households in the regions categorized as zones of difficult access, difficult management, and territorial conditions that prevented the implementation of proper standards of efficiency, coverage, and quality for household water and sewer services. This change was fundamental to the expansion of the areas served by water and sewerage services, because law n. 142 (Colombia, 1994), which regulates domestic water and sewerage services, and law n. 388 (Colombia, 1997), which regulates the use of urban land, did not allow the extension of these utilities in these specific cases.

According to the EPM, Program *Unidos por el Agua* was very close to reach its goal, as it reached 82% of the total scope of the plan, including 32,811 families. Moreover, the program accomplished much more than the technical requirements for the operation of water and sewerage systems, as it also included alternative connection methods in order to adjust to specific geographic features of each settlement. Since the initial date of the program to July 2019, the number of connected households in Group 1, which includes the most precarious settlements, totaled 8,467 homes. In Group 2, 19,526 homes were connected to the system, and, in Group 3, which includes areas of full urban improvement, the Program reached 4,818 homes.[2]

That political and institutional movement had an unquestionable importance to the accomplishment of the goals defined in the Agenda 2030, as it also granted legitimacy to UN Resolution A/RES/64/292, from 2010. However, Vargas Lopez (2018) points out that popular initiatives played an extremely important role in the implementation of mechanisms that enforced the right to water utilities, such as those mentioned in the referendum proposed in 2007. The legal recognition of the minimum and essential amount of water was also paramount for the improvement of policies, as it raised the interest of governments and municipal councils on actions to consolidate these rights.

Also, even with a consolidated public policy, the universalization of water and sewerage services in Medellín is hindered by institutional and economic factors that must be discussed. The institutional aspects involve limitations imposed by laws that regulate the use and occupation of land, the right to decent housing, and political projects for the development of the city, as discussed later herein.

The plan for land use, housing, and water and sewerage utilities in Medellín

The Municipal Land Use Plan – POT provides general and specific directives to the urban and rural development of Colombian cities. It is equivalent to the Urban Master Plans in Brazil and is legally in force for 12 years. The POT of Medellín is in force from 2015 to 2027, and its urban development principles are based of the paradigm of ecological urbanism, guided by the adaptation of the city to climate change, risk management, equality in the

use of land, collective construction of the areas, and the improvement of institutional capacities (Medellín, 2014a).

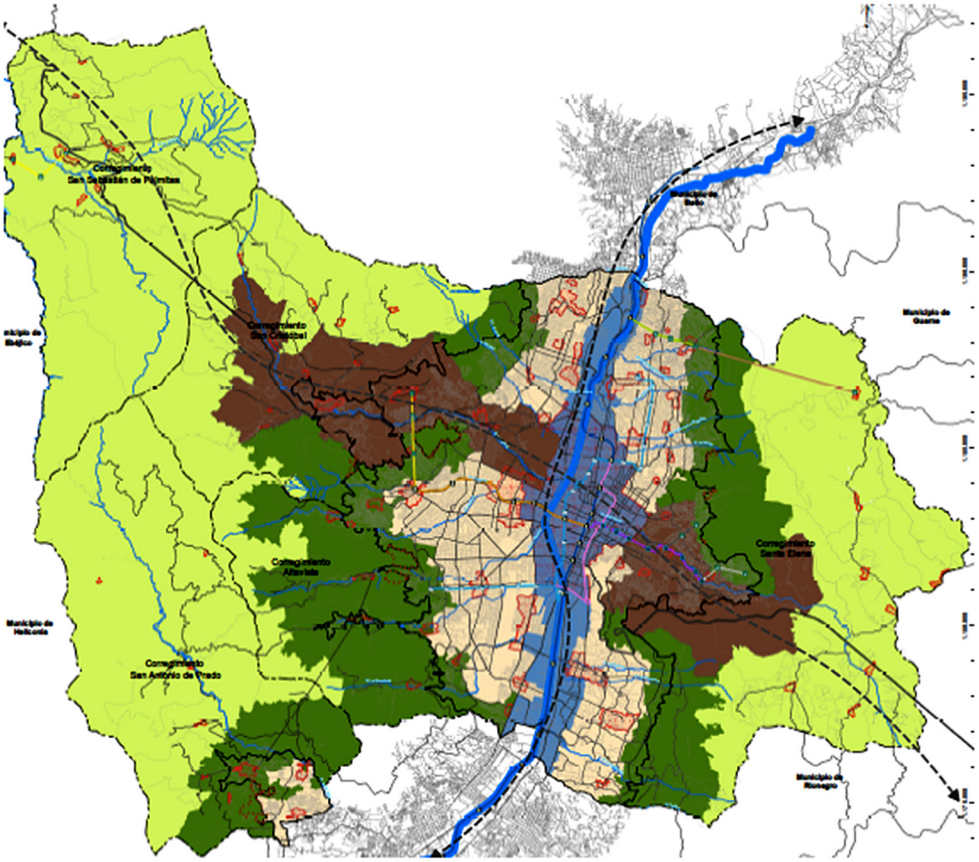
The model of land use and occupation adopted in the POT proposes a Main Ecological Structure (EEP) focused on reducing environmental unbalances and enabling regional ecological integration. In this model, rural areas play the role of protecting natural assets and producing environmental services, in which the boundaries between urban and rural zones act as barriers to the urban expansion, so as to protect natural assets and landscapes, but also to enable a certain occupation level. As they are connected to the EEP, areas that are sensitive to erosion or subject to mass movements are categorized according to the risk they pose to any potential occupation. Depending on the vulnerability of the population, areas considered to pose high risk are then categorized as "unmitigable risk zones," and must be vacated and recovered for environmental purposes (ibid.).

The POT also defines three strategic macroprojects: "AIE MED Río – Corredor del Río Medellín", defends a urban renovation and a maximum occupation of flatlands along the Medellín river; "AIE MED – Transversalidades" (West-East Transversal Project) proposes the integration of the regions of the city; and the "AIE MED Borde Urbano Rural", or "Cinturón Verde Metropolitano" (Metropolitan Green Belt Project) aims at requalifying and consolidating neighborhoods located at high topographic elevations (*laderas*), but also limiting their expansion by means of a system of ecoparks around the urban area, so as to protect areas of environmental and landscape importance (Figure 2) (ibid.).

According to Ruales (2015), the neighborhoods located on the higher areas of the northeast part of the city (*Comunas* 1, 3, and 8), which subject to the influences of the Metropolitan Green Belt macroproject, represent urban and housing areas that are extremely precarious, formed as the result of forced displacements of rural and urban populations occurred during the intense and armed social conflict that occurred in Colombia in the 20th century. According to this author, these neighborhoods came to be as a result of the effort and solidarity of the people that found shelter at that place, which led to the construction of housing, pathways, handmade water distribution systems, etc. Although many urban interventions have been made in these areas, they are still bound to conditions of obvious inequality and extreme poverty. According to Veeduría... (2018), in 2017, *Comunas* 1, 3, and 8 presented the highest percentage of people in extreme poverty, with 7.3%, 5.8%, and 4.9% of the population, respectively. This fact is aggravated by forced displacements that still play a role in the reality of Colombia as a whole and the city of Medellín, as they lead to significant rural-to-urban and intra-urban migration flows that corroborate to the constant expansion of those territories. Moreover, and still according to Veeduría... (2018), Medellín received 7,816 people due to forced displacement. Other 3,517 people were subject to displacements, although still within the municipal boundaries, as the result of problems related to increased violence in the original regions.

According to Miguel Tamayo, Community Management technologist, and member of *Corporación Convivamos*, Medellín attracts

Figure 2 – Occupation model proposed by the POT of Medellín, to be in force until 2027



Caption: Project Rio: in blue; West-East Transversal Project shown in brown, Metropolitan Green Belt Project shown in dark green. Highlights in red show Comunas 1, 3, and 8.
Source: adapted from Medellín (2014a).

many people from other places to the city as the result of the urban marketing promoted by public and private institutions willing to attract new businesses to the city. Although it is an attractive city, violence is still part of the everyday life. However, the sense of solidarity is cultivated between those already settled in popular neighborhoods (the steep hills) and newcomers, strengthening community bonds and allowing for the expansion of those communities.[3]

The POT aims at meeting the housing needs in that municipality in the long run, according to the 2030 Agenda, which plans the construction of 185,463 households. On its turn, the Municipal Development Plan for 2016-2019[4] (Medellín, 2016) has its focus on reducing the quantitative deficit by providing opportunities for new housing and funds for families subjected to risky or forced displacement conditions. This modality includes urban requalification programs like

the Full Neighborhood Improvement Program and other programs aimed at refitting existing buildings to improve housing conditions, supported by technical supervision, with the support of Program *Unidos por el Agua*.

The investments dedicated to housing policies in the last two years were concentrated by the priority set on the Integral Neighborhood Improvement Program, along with housing subsidies. Also, when it comes to investments in housing plans carried out in a timeline, on average, they stand for 2.6% of total urban investments, with an increase in 2009, with 3.2% and 4.9% of the total amount in 2013 (*Medellín cómo vamos*, 2019 p. 145).

The fast pace in the creation of housing opportunities has not been sufficient to revert the increasing trend in the housing deficit. In 2015, when the POT had plans to assist 10,477 families, that deficit totaled 24,199 houses and quickly rose to 32,733 houses in 2017, 88% of which was related to lower income families (*Medellín cómo vamos*, 2018a). Therefore, in spite of the efforts dedicated to improve precarious settlements with urban and housing improvements, the actual production of new housing areas planned in the strategies set by macroprojects is undermined by the lack of sufficient public investments, as they end up not being considered in the municipal budget plans.

As for the water supply and sewerage systems, the POT establishes restrictions to the occupation of severe high-risk zones and preservation areas from water springs and streams (Medellín, 2014a). The POT establishes the urban limits in accordance with the sanitation limits defined at the altitude of 2,100 meters above sea level, beyond which no occupation or utilities like water and sewerage services are allowed to be installed. Thus, even though the municipal and national laws have attempted to provide some flexibility to allow for the provision of water and sewerage services that would serve a larger number of people, the limits imposed by sanitary regulations exclude all and any precarious settlements located out of the urban area beyond that altitude (ibid.).

Bello Oriente: where there are no rights and the 2030 agenda has no effect

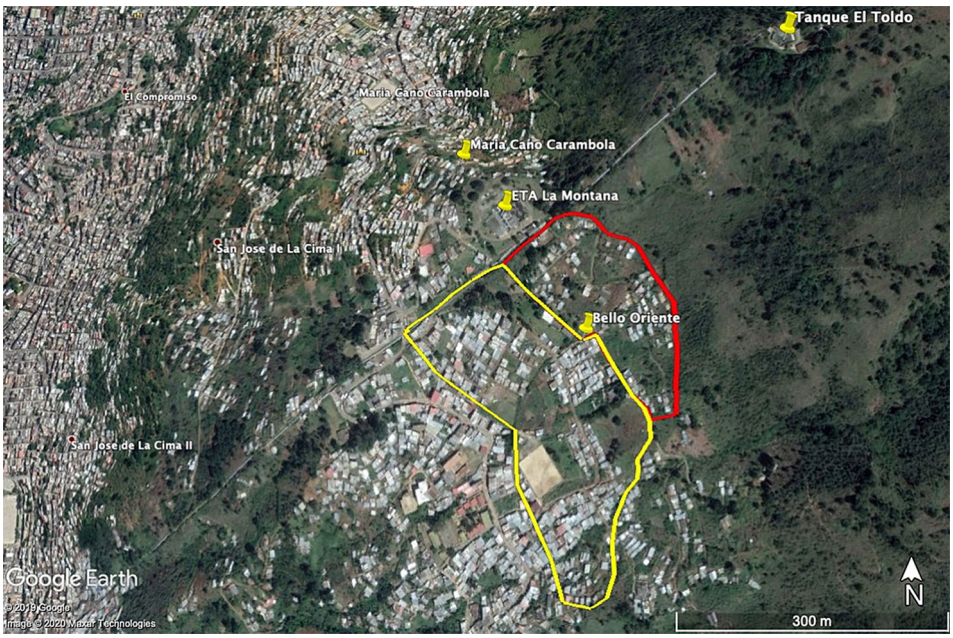
Bello Oriente is a precarious settlement located in *Comuna* 3, partially below the sanitary limit of the city, and partially above it. According to the POT, it is under the influence of the Metropolitan Green Belt Macroproject, meaning that the population that resides beyond the sanitary limit must be relocated to another region of the city, yet to be defined. The lower part of that settlement is recognized by the Municipal authority and has been the object of actions of Program *Unidos por el Agua*. The higher areas hold a sparse occupation that is very close to the base of the hillside and has already been subject to a landslide. According to information provided by local leaders, the accident was due to the infiltration or leaks from the water supply system that was built by the residents themselves.

This and other neighboring settlements are not recognized by the Municipal Government and have managed to divert water from a water reservoir named *Tanque el Toldo*, built by the EPM. That reservoir collects

water from the dam of *Piedras Blancas* and supplies the Treatment Station of La Montana, located within less than 500 meters from *Bello Oriente* (Figure 3). The surplus volume of water that reaches the tank of *El Toldo* is spilled down onto a stepped spillway that leads the water to a buffer tank, from which it is "returned" to nature halfway down the hill. This buffer tank is the point from which residents collect the water and divert it to their houses by means of communitarian pipelines (Figure 4).

In spite of the fact that the water collection infrastructure from *El Toldo* is old (Zapata Hoyos, 2009), and in view of the accident occurred on the hillside, *Corporación Convivamos*, a non-governmental organization created by residents in *Comuna* 1, invited the residents settled on the irregular area of *Bello Oriente* to organize themselves and improve the water piping from the main pipeline by providing technical and social assistance. The original pipeline was replaced by a PEAD pipeline with 75 mm in diameter (the standard diameter and material used by water companies in their pipelines), so as to prevent leakage along the system. The residents managed to organize themselves to perform periodic inspections along the entire length of the pipeline, including its connections with households equipped with individual

Figure 3 – Location of Bello Oriente showing its distance from the EPM Water Treatment Station of La Montana



Source: adapted from Google Earth, 2019.

Figure 4 – EPM spillway and water collection pipes made by residents halfway down the hill

Source: research records.

intake valves to allow for any maintenance required in the pipeline (Figure 5). All of these solutions aimed at preventing leakage and waste of water and were also aimed at mitigating geotechnical risks that could affect the community.

Despite these precautions, the water capture from this overflow pipeline is not potable. Residents are instructed to boil the water, as they cannot afford domestic filters and are constantly subject to the interruption of that pipeline by the EPM. Some residents prefer to buy bottled water or pay a neighbor for the supply of the regular part of the area supplied by water treated by the EPM. However, these solutions are very expensive for the population that reside in *Bello Oriente*.

As for the sewerage system, residents are instructed to avoid direct discharges to the soil and, therefore, they discharge their effluents into natural thalwegs (*quebradas*) or even into the EPM sewerage network when they manage to connect their pipes to the regular part of the local system.

Figure 5 – Water distribution and outlet collar to "irregular" households in Bello Oriente from the communitarian pipeline

Source: research records.

It is important to point out that EPM is a company that provides domestic utilities and, in addition to potable water and sewerage systems, it also provides power and gas utilities to the entire city. Despite the absence of any water and sewerage systems in that irregular portion of *Bello Oriente*, power and street lighting are provided. The limits between the two portions of the territory can barely be noticed, and one street is sufficient for people to know which area is covered by the Program *Unidos por el Agua* and which area is not.

Therefore, the contradictions in the urban policies of Medellín that limit the reach of state actions and the human right to water become obvious. First, because it is difficult to comprehend the technical unfeasibility of the water and sewerage system beyond the sanitary limit, as the physical limits between covered and uncovered areas is so faint. Second, the proximity to the water treatment station would astonish any observer, since such a basic public health facility is so closely located and, nevertheless, restricts the

supply to that population. Third, according to the map of risks and vulnerabilities of the POT (Medellín, 2014a), the irregular portion of *Bello Oriente* does not configure a non-mitigable risk zone. Finally, the POT admits that the universalization of domestic utilities demonstrates a clear conflict with the urban regulations when it comes to the rules that govern the provision of power utilities, as these are less restrictive than water and sewerage regulations, thereby "leading to confusion between the universal access to utilities and the principles of safe occupation of the land" (ibid., p. 393).

Considering the experience of the communitarian risk management carried out by *Corporación Convivamos* with the residents of *Bello Oriente*, it is possible to affirm that, as people are instructed to deal with their own risks after the last geotechnical accident, these people started to manage the water pipelines and understand the importance of an appropriate destination of domestic sewers. As these people were led to analyze their own problems, they also started to question the limitations imposed by the municipal government, as they now feel and demonstrate to be capable of dealing with the environment in which they live.

The tank of *El Toldo* overspills part of the water that comes from *Piedras Blancas*, providing that population with access to an abundant amount of water. That availability of water would enable that population to live with the certainty of water supply, but also to learn how to manage their consumption to ensure a permanent supply. However, whenever they find themselves prevented from making use of artisanal water treatment techniques, or when they are led to believe that they are "stealing" water from EPM, they are forced to make use of non-potable water, which affects their health unnecessarily. Moreover, that water does not belong to EPM, as it is discarded back to nature, which therefore grants it with the status of a resource that is free and available to anyone who needs it.

The urban development project proposed by the POT aims at limiting the urban expansion by limiting the implementation of a region of ecoparks, and did not consider the existence of people living in such areas, nor even that such fact is due to the absence of feasible housing options. These are poor families that became victims of violence and urban segregation. The POT does not allow them to remain where they are settled because it intends to segregate urban activities from ecological needs, without any consideration to what to be done with those people. According to Ruales (2015), the participation of the local people in the territorial planning process should be expanded to give those people the right to participate in the planning of the territory, identify areas of mutual assistance and proximity as adequate to housing, thereby respecting the right of those people to strive for better conditions of life.

Water, territory, and the struggle for continued residence in Medellín

People in *Bello Oriente* cannot remain where they are now. This is the mindset of the Territorial Land Use Plan of Medellín. But this is not due to the fact that this population is located on a non-correctable zone, and not

even to the inexistence of sufficient technology to provide them with water and sewerage systems. Even though the housing plans of Medellín provides for the resettlement of those families in some other area of the city, the date for such replacement is still uncertain and the municipal government has not indicated any areas planned for such resettlement.

Communitarian organizations, such as *Corporación Con-Vivamos*, *Montano-A*, and *Mesa de Vivienda y Servicios Publicos Domiciliarios de La Comuna 8* have proposed an alternative project to the Metropolitan Green Belt. Its core principles include the popular identity, the right to the city, the defense of the territory, and the communitarian risk management (Convivamos..., 2019?).

According to that project, the concept of risk that has been used by the municipal government of Medellín provides a justification for not doing what has to be done and restricts the right of people to a safe territory, while it also fails to provide proper instructions to deal with the urban growth. According to these organizations, the attention dedicated by the state to the natural disaster is triggered only after the event, revealing a passive behavior when it comes to the development of the city (ibid.).

These organizations propose changing the roles of the potential victims of disasters into agents that could minimize their effects, as they have deeper knowledge of their own risks and do not deny those issues. They approach risk management as the basic task and follow the principle that "the land is a construction in different scales, a political action" (ibid.).

The project is named *Escuela Territorial de Barrios de Ladera* (Local Hillside Neighborhood School) and relies on the idea that the territorial development of neighborhoods occurs in three spheres: 1) the family sphere, based on the household as a moving force in the construction of neighborhoods, which should therefore take place in accordance with the principles of safety, cooperation, solidarity, progressivity, and productivity; 2) the surrounding sphere, that is, neighborhoods where the community interacts with the land zoning rules and where popular participation takes place. This sphere includes domestic utilities, mobility and transportation, public spaces, and urban equipment; and 3) the socioeconomical sphere, which must consider the scales of the city, region, and country, so as to define an economic and social development model aimed at overcoming poverty and inequity to accomplish more than the simple employment of the "local workforce" in urban and housing improvement projects (ibid).

The purpose of the *Escuela Territorial de Barrios de Ladera* is to ensure the population of those precarious urban settlements with the right of permanence, to remain where they are, and the respect to all that has been built by the population, so as to give the population the chance for a new beginning after all of the violence they endured. The aim of overcoming the current conditions of risk, poverty, and urban segregation should be accomplished without any new victims in order to lead to the so-called "popular territory," in which the communitarian identity would allow for the formation of a new landscape associated with natural elements and strategic factors for the municipal development (ibid.).

In short, that project proposes a different socioenvironmental paradigm from the conventional organization of the territory

that imposes limitations to areas dedicated to housing, working, and protecting the environment in a segregated manner, as if it were possible to reestablish nature to make it seem untouched. This is what Swyngedouw (2004) debates: the metabolization of nature has already been triggered and should follow a continuous process of production of spaces.

The analysis of the history of *Bello Oriente*, where residents demonstrated the capacity to rethink their land and safety, demonstrates the actual possibility of an autonomy capable of accomplishing the peace they have sought for so long. The lack of arguments to justify the failure to provide water to that settlement undermines the very purpose of the POT, as other territories are gradually included to the urban area. An example of that process is the settlement of *Maria Cano Carambola*, in close proximity to *Bello Oriente*, and included in the POT as an expansion area. That settlement raises the hopes of those living in *Belo Oriente* and other illegal land dealers that keep selling land lots in precarious settlements and in noble areas in the hills of Medellín.

Therefore, it is possible to say that, despite the existence of such an intense policy dedicated to the full coverage of water and sewerage utilities, its results have been held hostage to the land zoning policy. While the full coverage policy excludes people and fails to meet its own objectives, as described in the proposals of Agenda 2030, the land zoning policy ignores the housing policies in the short run and also fails to solve the issues that led the population to such vulnerable condition. The POT imposes land occupation rules that ignore the actual land zoning reality, and it also underestimates the capabilities of the local people and their individual history. In response to that, people dodge and subvert the unjust rules set by urban policies to reinforce constant expansion fronts as they struggle for their right to the city.

Final considerations

The objective of this article is to discuss the challenges and possibilities of the universalization of the water and sewerage utilities in precarious urban settlements, according to the analysis provided by Program *Unidos por el Agua*, as implemented by the Municipal Government of Medellín, Colombia. The purpose of that program was to expand the access by the population in precarious urban settlements to water and sewerage facilities, so as to meet the goals defined in the Agenda 2030 for Sustainable Development. This study has shown that the actions proposed by the municipal government of Medellín are particularly restricted by the system used for the collection of fees related to water and sewerage utilities, and also by the policies applicable to the use and occupation of urban land.

The Land Zoning Plan limits the right to land and housing in a way that excludes poorer people from exercising such right by proposing an ecological urban model that fails to consider preexisting social and urban realities that abound in the area referred to as *Laderas*. In the context described here, the Metropolitan Green Belt proposes a pact to halt the expansion of the city and establish a regional boundary to the city and define geographic limits to it, ignoring

any consensus or consultation with those who live in that territory and have no other housing alternatives that could offer them better chances of living in a place that is safe, equipped with regular urban facilities, where they could exercise their rights as citizens.

According to the Theory of Political Ecology proposed by Swyngedouw (ibid.), which states that nature is constantly metabolized by urbanization, thereby producing new socionatural conditions and new forms of nature, we must ponder if a previously urbanized space could possibly be transformed into a space capable of containing its own urbanization process.

The policy used in the collection of fees for water and sewerage utilities limits its universal coverage and has shown to be inefficient to this date, even after the enforcement of the free Minimum Vital Water Program designed to ensure low-income populations with 2,500 liters per person every month to provide for basic hygiene and cooking. A significant part of the population in precarious settlements has not been able to exercise such right because they are not included in the EPM's records. In order to overcome such limitation, that company implemented a pre-paid water purchase system, which has also failed to expand the reach to poorer populations, therefore maintaining those restrictions to the minimum consumption of water for vital purposes.

From a technological perspective for both physical and operational solutions for water and sewerage utilities in the scope of Program *Unidos por el Agua*, the EPM demonstrated that it is possible to equip precarious settlements with means to provide water and sewerage utilities, provided that alternative management models are accepted. The expansion of water and sewerage utilities to serve some of the settlements was only made possible after the passing of decree n. 1272/2017, which alleviated the requirements of quality and efficiency applicable to domestic water and sewerage utilities. This demonstrates that technical issues do not impose limitations to the full coverage of water and sewerage utilities.

The study carried out on the settlement of *Bello Oriente* demonstrated that the population, even when subjected to limitations that forced it to consume non-potable water, was able to manage the water supply and mitigate potential geotechnical risks after they were provided with instructions. Those actions enabled those populations to approach their own limitations, both territorial and socioeconomic, in a more pacific and empowered perspective.

The experience of the *Escuela Territorial de Barrios de Ladera* proves that urban planning can make the access to land and the city more democratic, and also contribute to ensure the environmental preservation, provided that other forms of occupation of the soil be accepted. The paradigm of segregation of uses and functions of the land must be replaced by a new model that would enable people to live along with nature, as both people and nature are parts of the same socionatural process. However, for this paradigm to be effective, governments must create opportunities to discuss, prepare, and go beyond traditional regulations on the use and occupation of the land that separate urban purposes from environmental functions of the land.

The concept of low-income communities regarding spaces of use of the city suggests deeper adhesion to the concept of socioenvironmental unity, as proposed by Swyngedouw (ibid.) than the conventional, technical models used by the EPM and the municipal government of Medellín. Until the current models are readjusted, the water supply will continue to follow circuits determined by governmental and economic rules, since urban plans have been subject to such rules and failed to play a role as the main drive.

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Translate: the article was translated by Henrique Mariotto.

Notes

(1) The Municipal Council is equivalent to the Council Chamber in Brazil.

(2) The information mentioned herein were provided by Engineer Edgardo Martinez Echeverri, Director of Market Relations in the EPM, July 2019, in an interview to the researchers.

(3) Interview given to the researchers in a meeting held on July 23, 2019, at the headquarters of *Corporación Convivamos*, in Medellín, to discuss Program *Unidos por el Agua*.

(4) Equivalent to the Multi-Annual plan of Brazilian municipalities.

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