

MEDELLIN ENVIRONMENT URBANISM SOCIETY

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MEDELLIN ENVIRONMENT, URBANISM AND SOCIETY

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NOTE ON THE TRANSLATION

- 1) The names of Colombian and other Spanish speaking countries' institutions were left in Spanish, in Italics (With the exception of the "*Centro de Estudios Urbanos y Ambientales*", translated as the "Center for Urban and Environmental Studies"). When it was considered helpful, an English translation was given in a translator's note (TN), only for the first time the names appear in the article. (e.g.: "*Area Metropolitana del Vallé de Aburrá*" with the footnote "Metropolitan Area of the Aburrá Valley (TN)", "*Empresa de Desarrollo Urbano*" with the foot note "Urban Development Enterprise (TN)", etc.). In the List of Acronyms, at the end of the book, the reader will find these names in Spanish and in English, with their corresponding acronyms or initials.

Projects, public places, urban interventions and geographic places were translated into English (e.g.: "*Plan de Ordenamiento Territorial*" appears as "Land Use Plan", "*Proyecto Urbano Integral*" as "Urban Integral Project", "*Parque Explora*" as "Explora Park", "*Parque Arví*" as "Arví Park", "*Parque lineal de la quebrada La Presidenta*" as "La Presidenta Creek's Lineal Park", "*Paseo Carabobo*" as "Carabobo urban passage way", "*Triada de la 33*" as "33rd Avenue interchange", "*Unidad Deportiva Granizal*" as "Granizal Sport Center", "*Valle de Aburrá*" as "Aburrá Valley", "*Río Medellín*" as "Medellín River", "*Quebrada Juan Bobo*" as "Juan Bobo Creek", "*Estación Metro Universidad*" as "Universidad Metro Station", "*Parque Biblioteca Belén*" as "Belén's Library-Park", "*Librería España*" as "España Library", "*Centro Cultural de Moravia*" as "Moravia Cultural Center"). Occasionally, other translator's notes (TN) were used to give helpful explanations, which can be found in the Glossary (e.g. *Metrocable*: "Cable-car, public- transport system integrated into the Metro system"; *Corregimiento*: "The *corregimientos* (townships or localities) are the rural areas of the municipalities. Medellín has

five *corregimientos*"; *Comuna*: "The *comunas* (districts) are administrative subdivisions. The municipality of Medellín is divided into 16 *comunas*. The *barrios* (neighborhoods) make up the *comunas*").

All quotes from Spanish articles, books, web sites, etc. have been translated into English and are of the entire responsibility of the translators.

- II) I would like to thank all the people who participated in the translation of this book: Daniel Hawkins for his final edition of the whole text and for his contribution in the translation of "Informality and Social Urbanism", "Changes in Interpretation, Behavior and Public Policies Regarding Homicidal Violence in Medellín" and "Socio-Demographical Changes in Medellín: Intercensal Period, 1993-2005"; Nicolás Loaiza for his contribution in the translation of "The Natural Environment"; Juan Sebastián Herrera in "Hazards and Risks in the Aburrá Valley", Sergio Salazar in "The Potential of Satellite Remote Sensing as a Tool for Urban and Environmental Planning in the Aburra Valley", Pedro Sanín in "Mobility-transforming Events, Aburra Valley, 1995-2010" and "Disaster and Population in the Aburrá Valley", Marcos Zapata in "Dignified Housing" and Ricardo Gómez in "Cities and the Poverty Trap". I would also like to thank Maya-Ward Karet for her revision of "The Publicity of Public Space" and José Antonio Fortou for his revision of "Changes in Interpretation, Behavior and Public Policies Regarding Homicidal Violence in Medellín".

E.C.

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⁵ Exaedro Architecture and Urbanism (TN)

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⁶ Medellín's Botanic Garden (TN)

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⁷ On the way to a global crisis? (TN)

⁸ Entrepreneurialism in Antioquia. (TN)

⁹ National Trade Union School (TN)

¹⁰ Antioquia’s Family Benefit Fund (*Caja de Compensación Familiar de Antioquia*) (TN)

¹¹ Cain’s trace (TN)

¹² Postmodern civil war (TN)

¹³ Citizenship and social human rights (TN)

¹⁴ Carl Schmitt: politics, law and big spaces. (TN)

published in different national and international specialized journals, and he has contributed chapters in several books. His most important academic studies of the last ten years deal with civil wars, Colombian armed conflict and urban security, and with contemporary political philosophy problems. He works as Dean and professor at the School of Sciences and Humanities of the *Universidad EAFIT*.

Juanita López Peláez

Geologist from the *Universidad EAFIT*, M.Sc. in Development and PhD in Geography from the School for Advanced Studies in the Social Sciences (EHESS), Paris. Her research has been focused on urban development and problems related with urban administration and social representations of risk, themes in which she has published several articles in specialized journals. She is an expert in disaster risk management and has worked as a consultant for Medellín's public policies, coordinating the integration of disaster risk management with land use policies. She has also worked in the integral improvement of neighborhoods projects, and as consultant of the World Bank and of the National Planning Department of Colombia.

Edgar Sardi Perea

Mathematician from the *Universidad de Antioquia*, Masters in Demography from the *Centro Latinoamericano de Demografía (CELADE)*,¹⁵ Santiago de Chile. Professor of Demography in the School of Statistics of the *Universidad Santo Tomás*, professor of the Specialization in Demographic Analysis Methods and of the Masters in Population Studies at the *Universidad Externado de Colombia*. He is a professor in themes of population and demography at the *Centro de Altos Estudios*. He was the Subdirector of the *Departamento Administrativo Nacional de Estadística (DANE)*¹⁶ in the period 1999-2000. He was a consultant for the Organization of American States (OAS) in the design of the Project Banks for Public Investment for the National Planning Department. He was also a consultant for the European Union in the implementation of the Local Public Policies Observatories in the context of the strengthening of the *Escuela Superior de Administración Pública (ESAP)* and the *Federación Colombiana de Municipios*.¹⁷ He was also a consultant for the United Nations Population Fund (UNFPA) in the methodological design of the 2005 Colombian General Census. He currently works as Consultant for the *DANE* in population, vital statistics and demography issues.

¹⁵ Latin American Demography Center (TN)

¹⁶ National Administrative Department of Statistics of Colombia (TN)

¹⁷ Colombian Federation of Municipalities (TN)

PRESENTATION

JUAN LUIS MEJÍA ARANGO
PRINCIPAL

The city, in all its diversity, represents an object of study in which interdisciplinarity becomes fundamental for the study of issues such as its territory, memory, history, culture, rituals and displacements, among others. As a dynamic living organism, the city and its boundaries undergo permanent change and transformation. Due to this, there is a dire need for a new contribution; an account that talks about the urban issues and their always relevant topics, becomes a referent for the study and discussion of public issues that touch private ones, as well as academic interests that transcend purely investigative purposes.

A city such as Medellín has been studied and analyzed from viewpoints as diverse as photography, politics, the contribution of private enterprise in the construction of the public sphere, citizenship and its history. The *Universidad EAFIT* is now presenting a contribution that talks about the recent and still beating past of our urban environment. Once, people spoke of only an ill-fated city. Today, they think about an environment that, to some degree, has managed to transform the architectonic, educative and cultural project, in contexts where a plan like the one here analyzed had never been thought of before.

This editorial effort is intended to be the analytical radiography of a project that oscillates between: the public and the aesthetic, art and its use, and signs and monuments. The Center for Urban and Environmental Studies, *Urbam*, presents this work as a response to the local, national and international interests generated by the city in different contexts with regard to its urban projects, which have created impacts from the moment of their conception all the way to their current use and significance. We therefore present a compiled vision, also intended as a starting point for further analysis, revisions and developments.

urbam MEDELLÍN

Alejandro Echeverri Restrepo

The creation this year of the Center for Urban and Environmental Studies of the *Universidad EAFIT, Urbam Medellín*, has been an exciting journey for us; the book you have: *Medellín, Environment, Urbanism, Society*, is the first written step in this path. The institutional determination and support, and the work of a team that possesses high human qualities, have made possible the construction of this academic space of thought, critical reflection and action. *Urbam* was created as a space to understand and search for innovative answers; a space where the university, public policies and the private sector can meet. *Urbam* is a space that tries to understand the problems from a transversal viewpoint, rupturing the traditional ways in which boundaries separating the different disciplines have been established.

This journey will involve, without any doubt, confronting the complex problem of erasing boundaries and promoting interchanges. Our meeting space will be the different projects that we will carry out for the city and the territory. Working in projects we will be able to incorporate the different disciplines of the university departments and their subject specialities, and we will also invite other institutions and external people to help us in leading these projects. Working with the precise goals and schedules of the projects we will be able to periodically address a great variety of themes and special scales that will enrich our objective via the adoption of multidisciplinary visions.

The sustainable city and territory will be the physical framework for the development of the different projects of *Urbam Medellín*, with the natural environment, urbanism, society and culture all being the central problems grounding the institute's work. Sustainability, nowadays the major contemporary concern on a global scale, will be situated as the transversal axis in the search for integral solutions. We will address the fields of architecture and social urbanism as strategic tools in the pursuit of solutions for our cities and regions, concerning problems such as social inequality, exclusion and segregation. We will work to ensure that culture becomes, in the

construction of identity, an essential instrument in advancing towards the recovery from violence and reconciliation. Managing to meet these viewpoints in order to look for complex solutions without losing the expertise of each field will be a difficult objective, but it will be our challenge.

Our traditional education is not designed to understand complex thought: each discipline jealously strives to protect its boundaries when, paradoxically, the problems we face demand a structural change in the way we tackle them. There is a beautiful story in the book *One River*, written by the botanist-explorer Wade Davis, in which he tells us about his journeys in the Amazon jungle, in the company of a Waorani native, where he discovered the most precise way of classifying and naming a plant, as well as understanding its biological relationships. The native could not tell him the name of a plant, since all its parts, the roots, the fruits, the leaves, the bark, had their own name; they could not name a fruit tree without enumerating all the animals and birds that depended on it. To understand and define each plant required that not only its identity was taken into account, but also its history and its universe of relationships. This book: *Medellín, Environment, Urbanism, Society* is the first step in *Urbam*'s path as an urban and environmental studies center; we want to take this example from the complex universe of the Waorani to try to set the tone for our work.

FORM AND POLITICS THE CASE OF MEDELLÍN

Francisco Sanin

In recent times what has become known as “the case of Medellín” has generated a growing interest in the international community. The transformations of the city, particularly under Sergio Fajardo’s administration, and continuing with the administration of the current Mayor, Alonso Salazar, have become a focus of attention and a reference for experts in many fields, around the world. This book that is now being published by the Center for Urban and Environmental Studies of the *Universidad EAFIT, Urbam*, is a testimony of the value given by our culture to the accomplishments of the city, the idea of the public sphere and the growing relationship between the technical sphere, understood in the broad sense as a form of disciplinary knowledge, and the political sphere, understood in the broad sense as the construction of civil society.

This book brings together a knowledge of the city from multiple perspectives; knowledge that is, without any doubt, impressive for its extension and profundity, as well as for its capacity to combine objective data with conceptual reflections about the scope and impact of the different perspectives concerning the theme of urban transformation and the different actors that have participated in such processes. The complexity of the themes is a testimony of the value of what has been accomplished in and on the urban sphere and its potential as a conditioning factor of civic life. The articles in this book deal with themes that range from the very conception of the State and its mechanisms, to the analysis of the city’s geological conditions and their impact over its settlement and risk factors, all the way to studies of how these conditions reflect or articulate ways of life and social differences, just to mention some of them. The book weaves a broad net over the city, its history and development, adopting a multidisciplinary vision. I think that this will be the first step in creating a speech that might finally liberate itself from the strict disciplinary boundaries, building a trans-disciplinary perspective that can amplify the urban dimension of the city. We refer to

urban in the broad sense of negotiation systems of life conditions and intellectual perspectives, and even ideological ones.

Some aspects must be mentioned within the general framework of the book, of its content and ambitions: the lessons or reflections that can be learned from the transformation of Medellín of the last years, and the need of building a critical reflection in order to contextualize and evaluate this experience within a broader conceptual framework, both technical and political.

An element that could go astray between the open spaces of the boundaries of the different disciplinary perspectives proposed in the book is the simple, but at the same time complex, fact of the nature and conditions of the urban as an architectonic project: the role of the *formal* element of the architecture of the project. This question opens a very broad overview of the relationship between form and politics, which should be developed in a broader context. What is clear is that, in the context of the transformations of Medellín, the formal dimension cannot be reduced to a simple effect or a mere representation. On the contrary, it must be understood as an active and central agent of the processes and transformations. In the hope of being controversial and within a broader context, it could be argued that, without the *formal* dimension of the project, the political and social process would not be possible. In another text, I proposed the following equation: “Without form there is no presence, without presence there are no politics”.* In this context, one could refer to Thomas Hobbes’s *Leviathan* or to the Marxist concept of *praxis*, just to use two examples. In the context of the architectonic and urban discourses of the last two centuries, the dialectic between form and politics has also been the subject of continuous debate, which can be captured by reference to Le Corbusier’s famous question: “Architecture or revolution?”, as a means of beginning to define a whole discursive space that hovers over this relationship between form and politics.

In the case of Medellín, although it does not resolve the controversy, it certainly opens up an important space for reflection, for both the process and the strategies used, and most importantly, for the effects that have been produced. This is not the moment to propose an extensive evaluation of the process or a description of its strategies, but to open up space for some initial reflections about the possible lessons, points of reflection and future discussions.

In terms of the strategies, it is worth mentioning the specific interventions, for example, the Library-Parks, schools, entrepreneurial centers,

* “Architecture, vision and Power”. Francisco Sanin. Article presented in the Symposium Visions, Florence, Italy.

etc., interventions that had a profound effect from the social and urban perspective. This strategy is proposed as an alternative to traditional planning instruments such as the master plan, or urban plan as totalizing instruments of control. On the contrary, the notion of precise intervention behaves as a catalyst, an agent that hastens or accelerates multiple reactions over multiple actors. These precise interventions are the result of a meticulous analysis of the existing conditions found. Instead of being self-sufficient strategies, they are valued in their simple but predetermined connection with existing or expected urban systems, such as, for example, the public transport system, the *Metrocable*, public spaces, urban fabric, etc. The combination of these systems weaves a network of relations with the potential of generating dynamics on a much larger scale than the energy invested in their creation process. Finally, these precise interventions establish a network of relations among themselves that interact on a metropolitan scale, such as, for example, the node of the *Parque Explora*, the *Universidad de Antioquia*, the *Jardín Botánico*, the *Parque Norte*, or the *Metroplús* system, etc.

To a greater degree, at least for some time, these interventions, although small in terms of their scale, and not always visible on an urban scale, have had the effect of creating conditions so that entire neighborhoods, which had been marginalized and excluded for decades, are now able to define their own spaces in which urban and cultural dynamics can take place. In this process, the city has not only advanced in terms of security; also, in a very special manner, spaces have been opened up for a citizen and popular culture to express itself and prosper. It is not an exaggeration to say that the accumulative effect of these precise interventions have almost doubled the scale of the city in terms of the public sphere, of access, culture and, more importantly, civic identity.

It would be naïve to expect that these, or any other interventions, are capable of eliminating or resolving the problems of the city; it would be utopic (literally: out of space) to think so. Certainly, the problems of security, injustice and poverty will continue existing. However, it would be just as naïve not to recognize that this process has experienced and permitted the emergence of practical, technical and conceptual instruments that have a huge potential for the future, not only for Medellín, but for the culture of the contemporary city. This is, in my opinion, the task that we intend to begin with this book, the beginning of a profound and complex reflection that is, at the same time, a project of knowledge and an instrument of action and participation.

August 2010

ENVIRO

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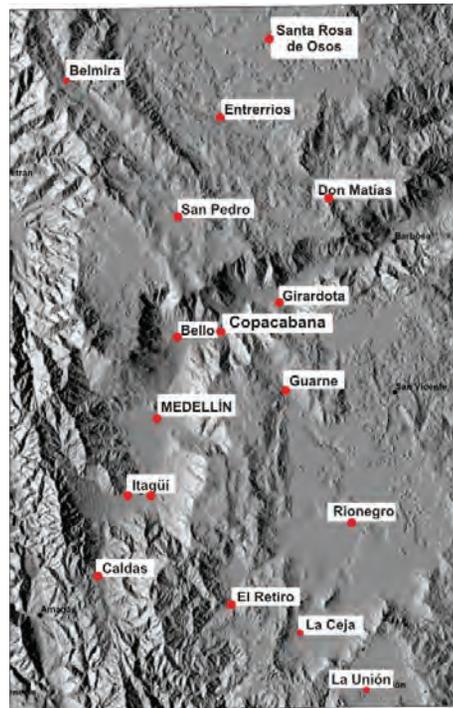
N M E N T

THE NATURAL ENVIRONMENT

Michel Hermelin

Department of Geology. Universidad EAFIT

Figure 1.1.
Digital Terrain
Model of
the Aburrá Valley.
Source: G. Toro



Anyone observing for the first time the Aburrá Valley from an airplane at high altitude, or from one of the hills surrounding it, will be amazed by its breadth. In satellite images and even more so in Digital Terrain Models (DTM), its anomalous shape will be confirmed: it is a corridor measuring up to 7 km wide and extending for 30 km from south to north, from Caldas to Bello, where it abruptly takes a northeast direction for 30 km until Barbosa (Figure 1.1).

To have a better understanding of its origins, let us take an imaginary journey through time to appreciate the evolution of this part of Colombia, home to 3.3 million people. For readers unfamiliar with geologic time, the age of rocks and geological events will be expressed in time periods totaling one single day: when the planet Earth originates, about 4500 million years ago (from now on Ma) the stopwatch is set to zero: it is midnight in our geological time clock and the day trip starts (Figure 1.2). If you want to select the origin of the Universe as the starting date, you should start

the tour at an age about three times older (The Big Bang).

Initially, the Earth is a sphere of solid particles that are melted by heat and over that burning mass a crust gradually forms. The igneous manifestations on the hardened surface are equivalent to numerous volcanic eruptions which, besides producing lava flows that solidify, also yield large quantities of gases. At this point in time, the Earth is not a hospitable environment: its scarce atmosphere is composed mainly of carbon dioxide and water vapor and is constantly hit by meteorites and comets. Some 600 million years later (it is three in the morning on our clock) the Earth's crust has fully consolidated and the precipitation of atmospheric gases has led to the formation of oceans. The erosive action on the

emerged areas has produced the first sedimentary rocks, now found in Greenland already transformed into metamorphic rocks by high pressures and temperatures after being deposited in the seabed. It is possible that geologists will find even older rocks elsewhere on Earth.

Shortly afterwards, the first life appears as primitive microorganisms, cells without nuclei that can survive in environments with extreme conditions: high temperatures, low sunlight, etc. They will evolve and their descendants, by the effect of photosynthesis, will accumulate oxygen in ocean waters (2200 Ma) and then in the atmosphere (it is 12:00 on our clock). The first multicellular organisms appear at about 18:00, and then the first animals arrive

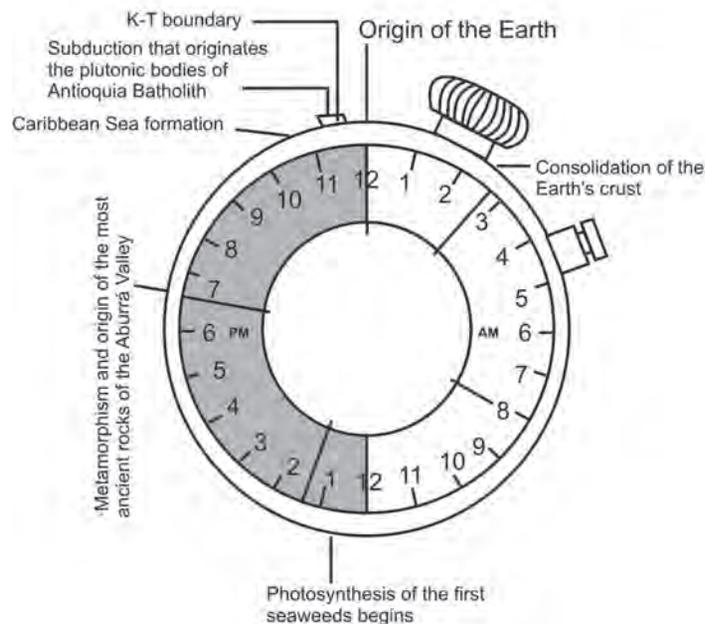


Figure 1.2
Geological
time clock.
Source: M. Hermelin

on the scene, but only at 22:00 will the first plants start growing on the continents. The first hominids appear at 23:58 and the Last Glaciation occurs at 23:59:59:6/10.

This summary, as an incomplete and arbitrary history of the Earth, is the result of the investigative work of many scientists for over two centuries. However, the rocks, as the Earth's archive, have the disadvantages of being similar to poorly preserved old books which have been unbounded and whose pages have been lost. In other words, the record is incomplete, since many of its components are gone forever due to erosion or sinking to depths of the globe where they have melted. Therefore, the reconstruction of the Earth's History is a hard-work exercise that is incomplete by nature.

One of the pioneers of this knowledge concerning Antioquia was Tulio Ospina (1911), who founded, in 1887, the *Escuela de Minas de Medellin*.¹ Then in 1919, the newly established National Science Commission sent the German geologist, H. Scheibe (1919), its first director, to make a series of geological studies in southern Antioquia and left comments on the Aburrá Valley. Juan de la Cruz Posada, a Berkeley alumnus, who was also director of the *Escuela de Minas*,

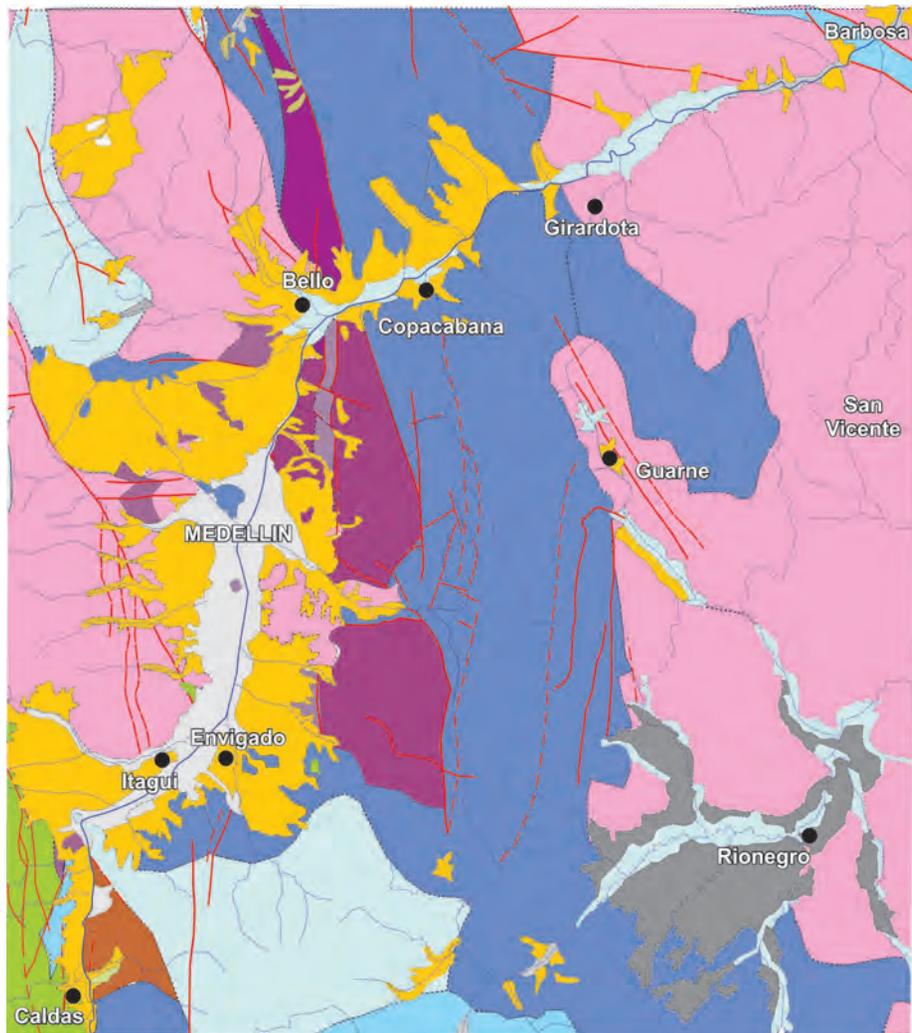
published a paper on the geology of the region in 1936. The first systematic geological survey of the Aburrá Valley and its surroundings was made by G. Botero (1963), professor at the *Escuela de Minas* was Colombian Institute, whose work was complemented after 1965 by the Mining Inventory (IMN, 1965) and *Ingeominas*² (Ingeominas, 2001), as well as by contributions from teachers and students from the geology schools of Medellín (a more complete bibliography on the subject is found in Castro and Hermelin, 2003).

If we try to establish the evolution of rocks from the Aburrá Valley, the difficulties that occur worldwide will become even more noticeable: in this corner of the Earth, the reconstruction must be based on what is found there and complemented by the observations made in the areas surrounding the valley. The result will be hypothetical scenarios that put together all the available scientific knowledge. The tool that enables us to assess the spatial and chronological relationship of the rocks is a *geological map*, the memory of which contains an interpretation about the origin, age and evolution of each one of the rock types of a particular region.

¹ The *Escuela de Minas de Medellín* (School of Mines of Medellín) is an institution devoted to the teaching of engineering that was very influential in the industrial development of Antioquia in the beginning of the 20th century. Today it is part of the *Universidad Nacional de Colombia* (TN).

² *Instituto Colombiano de Geología y Minería* (Colombian Institute of Geology and Mining) (TN)

The oldest rocks of the region of Medellín are metamorphic rocks, which means that, after being sedimentary or igneous rocks, they were transformed at high pressures and temperatures inside the Earth. (Figure 1.3).



Tectonic features

- Fault
- - - Lineaments
- Contacts

Geology

- Alluvial deposits
- Terraces
- Slope deposit

Cretaceous plutonic bodies

Ophiolite complex

- Metagabbros
- Ultramafic rocks
- Quebradagrande Complex

Cordillera Central polymetamorphic complex

- Migmatites, granulites and amphibolic gneisses
- Amphibolites
- Quartz – sericite and chlorite schists
- Syntectonic gneisses

Figure 1.3 Geological map of the Aburrá Valley.

Source: Recopilación Rendón, 2003, modified after: Ingeominas, 1983;1997; Rendón, 1999; Correa & Martens, 2000; Integral S.A., 1982; 1994; 1997; 2000; Seismological Group of Medellín, 1999; 2002; Restrepo & Tousaint, 1984; Botero, 1963.

It is a traditional belief amongst the scientific community that the oldest rocks, located on the south and northwest of the Aburrá Valley, date from the Precambrian Period, but this assumption is currently under review. The amphibolites – massive dark rocks lay in the north-south strip that crosses the valley between Copacabana and Girardota and show a wide range of ages that evoke three different episodes of metamorphism between the Precambrian and Cretaceous periods. Geologists have collected these ancient rocks under the name of Metamorphic Complex of the Central Cordillera³ and found that it is likely that some of them originated in distant sources, and were thereafter transported by the movement of tectonic plates that displace both the continents and the seabed. The serpentinized dunites, silicon-poor dark-green rocks that outcrop at the east of Medellín, are located above the amphibolites.

During the early Mesozoic Period (22:40 on our clock), North and South America are separated. In the Cretaceous (beginning at 23:12), to the west of today's *Romeral Fault* (a long fracture in the Earth's crust that runs from north-south and was named after the hill of the same name located southwest of La Estrella), a subduction zone starts to work: i.e. the crust of the old Pacific Ocean plunges eastward beneath the continental rocks.

The igneous rocks found in the Aburrá Valley and Antioquia's eastern region (Oriente Antioqueño) were formed from magmas that solidified during their ascent to the surface. In turn large masses of igneous origin arose, whose main exponent is the Antioquia Batholith as well as other less extensive masses on both sides of the Aburrá Valley: the Ovejas' Pluton near Bello, the Altavista Batholith on Medellín's western side, amongst others. As mentioned above, the origin of these magmas is related to the subduction process of the Pacific Ocean crust beneath old continental rocks.

At 23:38 on our clock, at the place now occupied by the Yucatán Peninsula, the impact of a meteorite occurs, leaving a crater about 200 km in diameter (Chicxulub), resulting in a series of cataclysmic developments that included a giant explosion, widespread fires, earthquakes, tsunamis, the poisoning of oceanic waters, a nuclear-type winter caused by the amount of ash and smoke inflicted into the atmosphere, and therefore the mass extinction of many species. This massive event is called by geologists the K/T episode (the boundary between the Cretaceous and Tertiary periods). No direct evidence for its existence has been found so far in the Aburrá Valley, but its effects must have been felt by the fauna and flora inhabiting the region at the time.

³ The *Cordillera Central* is one of the three ranges of the Andes mountains that split western Colombia in a north-south direction. (TN)

The oceanic basalts (greenstones) and marine deposits, found west of the Romeral Fault in the southwest of the Aburrá Valley, are the result of the process of accretion (literally shuck) of the ocean floor to the continent, with the fault zone as the limit at that time.

The Central Cordillera begins to rise: to the west of the Romeral Fault sediments are deposited in continental beds, which also receive large quantities of plant remnants that make up what are today the coal deposits in the Amagá region. In this neighboring area at the southwest of the Aburrá Valley volcanic processes have left the characteristic landscapes marked by hills such as the Cerro Tusa, the

Farallones de La Pintada and the Cerro El Corcovado, among others. The ages of solidification of these bodies are from about 12 to 8 Ma (ending at 23:57:30 on our clock).

On several occasions (three or more), the lifting of the eastern part of the Central Cordillera is going to be overtaken by the erosion forming plains close to the sea level. Once the lifting resumes it will generate in turn the surrounding highlands of different heights that enclose Medellín (Llanos de Cuivá, Llanos de Ovejas, Santa Elena- Las Palmas, Rionegro, San Vicente), produced by both successive pulses and tectonic tilting (Hermelin and Rendón, 2007) (Figure 1.4).



Figure 1.4
Western edge of the
highlands of Santa
Elena.
Source: M. Hermelin

At about 4.5 Ma (23:58:30 on our clock) the recent volcanism in the Central Cordillera, about 150 km south of the Aburrá Valley commences. The craters at the Ruiz-Tolima massif start sending fine materials (volcanic ash), covering in successive eruptions (the most recent ones are about 20 000 years old), much of the highlands of the east and north and obviously the Aburrá Valley. However, the soils derived from those ashes are preserved only in the wet and cold areas (Caldas Municipality to the south of the valley, and on several roads such as Santa Elena, Las Palmas and others) (Toro and Hermelin, 1991).

A few hundred miles northwest of Medellín another phenomenon will have a drastic impact on the climate of the entire globe: the closure of the Isthmus of Panama, which ended 3.5 Ma (23:58:07 in our clock), having effects on the distribution of tectonic stress in Colombia's northwestern territory. This closure has resulted in changes in the circulation of ocean currents deeply affecting global climate. On the other hand, this event also opened a corridor for migrating animals and plant species between the two continents that had been separated for several hundred million years. Part of Colombia's enormous biodiversity is due to this phenomenon.

The Aburrá Valley, at least in its southern part, seems to have originated due to the interaction of tectonic faults about 2.5 Ma (23:59:08 on our clock). This date was determined from intercalated

volcanic ash deposits in alluvial deposits on the Envigado-La Fé road (Toro, 1999). This origin is confirmed by large irregularities in the thickness of the valley sediments (Rendón, 2003). In addition to this, the lower parts of the slopes of the valley are mostly covered with deposits transported by mass movements from the higher lands. Recent studies suggest that the age of these deposits can reach 2.5 Ma (Rendón et al., 2006) (Figure 1.5).

From a geomorphological point of view, our current knowledge suggests that the Aburrá Valley is the result of the superimposition of erosive events on a landscape with strong tectonic control: it is the product of the efforts generated by the movement of continental and oceanic blocks along tectonic faults (Hermelin y Rendón, 2007). Within its lithological variety, its slope types can be summed up from top to bottom as follows (Figure 1.6):

- Abrupt slopes that limit high plateaus and mountains.
- Strong to moderate slopes on various types of rock with varying degrees of decomposition.
- Slope deposits formed by materials transported from the upper zones, sometimes with intercalations of volcanic material.
- Torrential fans in many of the tributaries of the Medellín River.
- Alluvial deposits in the center of the valley, with highly irregular thickness.



Figure 1.5
Slope deposit in
the northeast of
Medellin.
Source: M. Hermelin

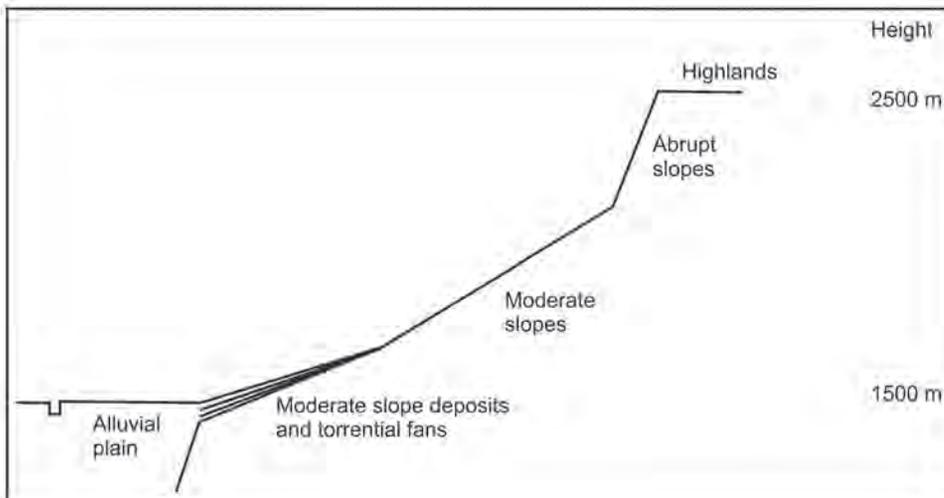


Figure 1.6
General outline of
the slope types in
the Aburrá Valley.
Source: Department
of Geology,
University EAFIT

The Natural Biophysical Environment

20 000 years ago (at 23:59:59:6/10 on our clock) the world went through the Last Glacial Maximum, in other words, the most recent cool period after the climatic fluctuations that have hit the Earth during the Quaternary (the last 2.3 Ma, or from 23:59:12 on our clock).

The shape of the Aburrá Valley has little differences with its present configuration. What is the main difference? The temperature was 5°C to 8°C lower than the current one. Rainfall may have been different in terms of distribution and likely there would have been less annual precipitation. Vegetation may have been affected by this in some parts of the valley but we are still uncertain

as to how. One hypothesis is that forest coverage was a little more sparse and there may be some places where surface erosion occurred with a certain intensity, as suggested by evidences intercalated between several volcanic Ruiz-Tolima massif ashes brought to the valley and the adjacent highlands (Figure 1.7).

However, it seems that none of the eruptions of ash released a sufficient amount to bury the ground and force the ecosystem to “start over”, as the materials provided were literally absorbed by the upward growth of the organic layer of soil, which took advantage of an external and rich supply of nutrients, mainly phosphorus and potassium. It is likely that a phenomenon similar to that observed in Villapinzón (limits of Boyacá

Figure 1.7
Volcanic ash Profile,
Arví Park
Source: M. Hermelin



Cundinamarca) in 1985 took place, when the deadly eruption of the Ruiz Volcano that buried Armero brought to farmers in that area of the Eastern Cordillera a magnificent crop thanks to a moderate deposition of ashes (Toro and Hermelin, 1993).

If the changes in rainfall were in fact described by a smaller amount of total precipitation and more intense rains, it resulted in more violent floods, with sediment deposits in the fans that the tributaries to the Medellin River left when they hit the flattest floor in the valley. These changes could have resulted in catastrophic accumulations at some places (De Greiff and Hermelin, 2004), as observed in the upper basin of the Medellín River. The influence of ENSO (El Niño Southern Oscillation) at the time is still to be determined, since the data available do not allow for a more detailed interpretation, but the systematic field samplings being conducted in the Cauca Valley (José Ignacio Martínez, personal communication) and in the Guarne Lake will probably yield more accurate information about the changes that made the Aburrá Valley evolve to its current situation. It is generally thought that the main temperature increase occurred since the last glacial maximum stabilized around 11 000 years ago, although there are minor variations during the period known as the Holocene (current geological epoch).⁴

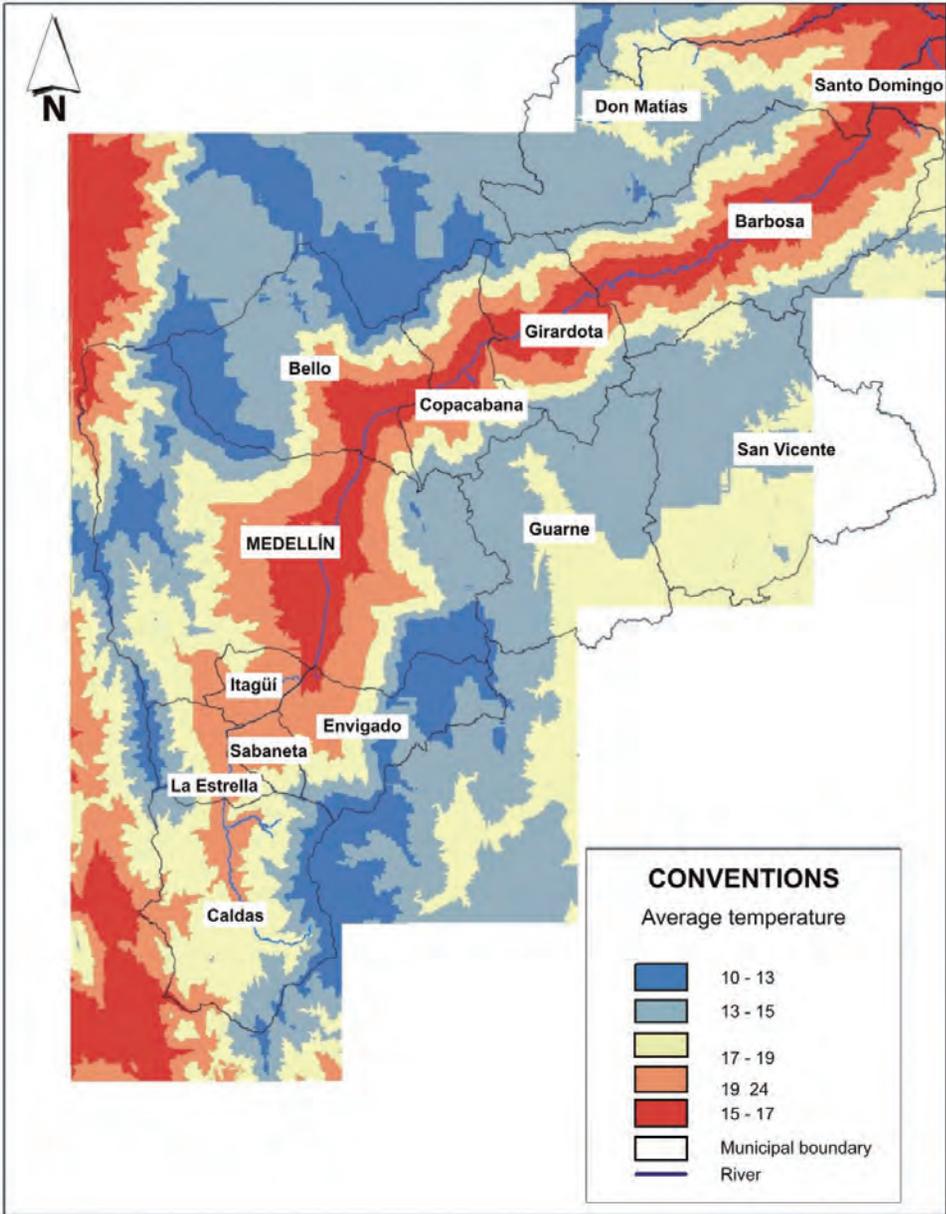
What were then the natural conditions of the Aburrá Valley when the first paleo-indians arrived?

The current average temperature varies with height (Figure 1.8), but the extent of change over time is very small between June and December (Figure 1.9), 22°C for Medellín's downtown. The names of "winter" and "summer" are used in Medellín, as in the other countries in tropical America, to designate the wet and dry seasons respectively, but lack any meaning in terms of temperature change in a city that is located at 6° 30' North latitude.

The current rainfall in the Aburrá Valley depends on the local topography: the Trade Winds blowing towards the southwest push the masses of humid air between the mountains that force them southward in the region of Bello. The result is an accumulation of moisture towards Caldas (south of the valley), which receives 2300 mm of annual rainfall (3000 mm at the top of San Miguel Hill) (Figure 1.10). Furthermore, the shape of the valley causes major irregularities in the distribution of rainfall because of the updrafts of warm air generated at several sites. The fluctuation of the inter-tropical convergence zone results in two wet seasons, corresponding to its passage over the area (April-May and October-November), alternating with two dry seasons.

⁴ Translator's Note (TN).

Figure 1.8.
 Average
 temperature in the
 Aburrá Valley.
 Source: POMCA
 (2007)



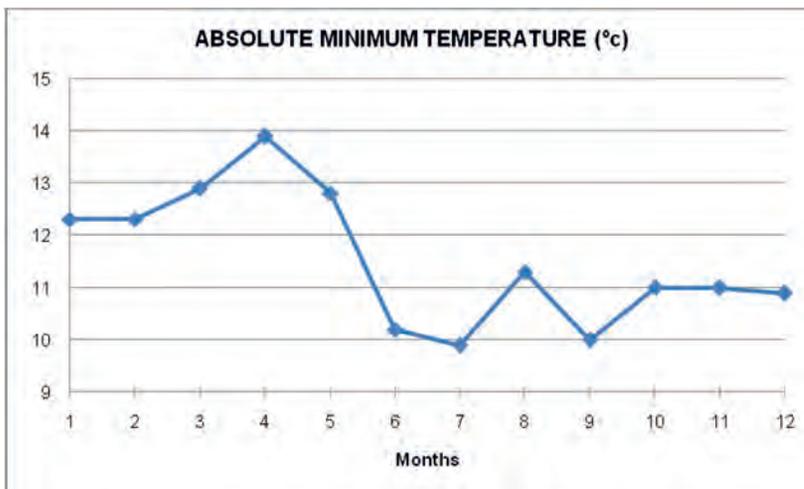
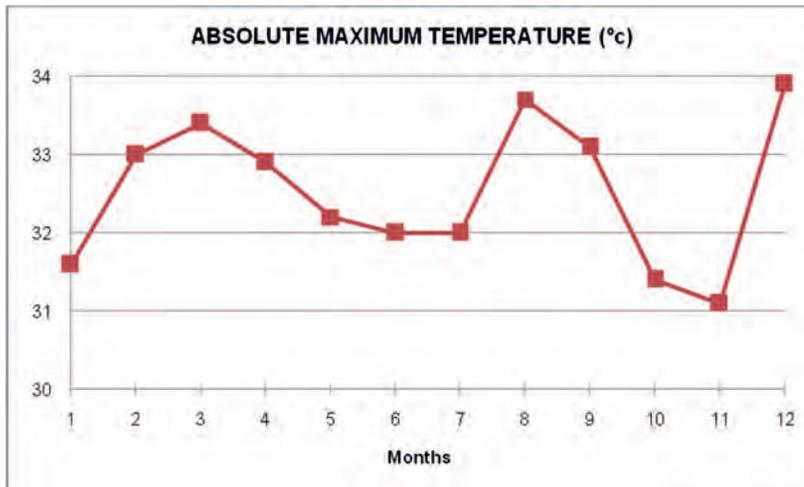
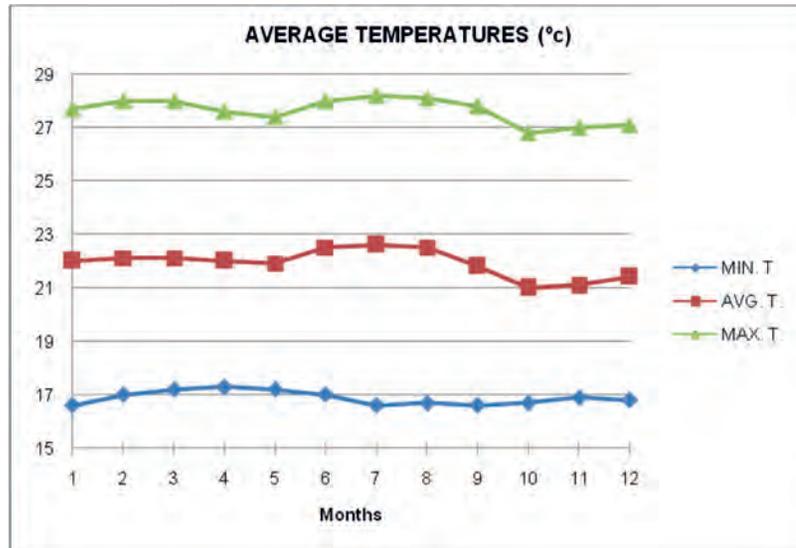
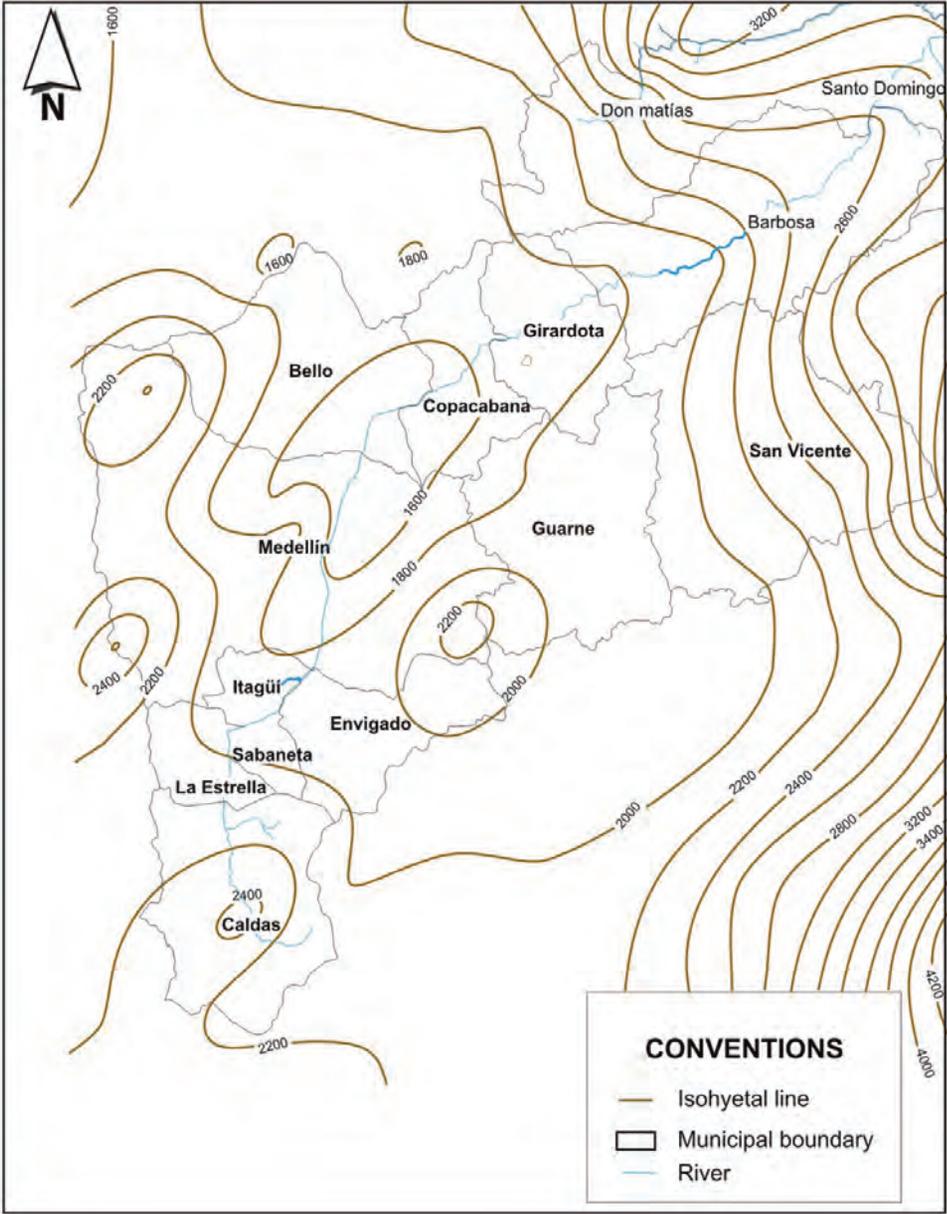


Figure 1.9
Monthly temperatures at the Olaya Herrera Weather Station, municipality of Medellín.
Source: IDEAM

Figure 1.10
Spatial distribution
of multi-year
average rainfall.
Source: modified
from POMCA (2007)



To the above considerations we must add that the influence of ENSO can cause large changes in precipitation, such as the drought in the first quarter of 2010. According to the IGAC⁵ (2007), the prevailing climate in the Aburrá Valley is temperate, humid and very humid, with no water deficit. A more detailed discussion of the climate of the valley can be found in Pérez (1996).

The soils at the Aburrá Valley's are typically temperate, humid to wet and cold weather mountain soils, with some volcanic ash and low fertility (IGAC, 2007).

The vegetation of the Aburrá Valley belongs to the following life zone formations (Espinal, 1977; Pérez, 1993):

- Premontane Moist Forest
- Premontane Rain Forest
- Lower Montane Moist Forest
- Montane Rain Forest

These life zones or ecosystems are widely discussed by Perez (1996) who also examines human actions on them.

Conclusions

In short, when the first human settlers arrived to the Aburrá Valley they found a wooded area except perhaps for the wetlands at the

bottom of the valley and very steep slopes. On the axis of the valley there was a river with a sinuous watercourse running along swampy areas in the alluvial plain we have today, which was recovered with the canalization. On rare occasions, the river has been pushed towards the mountain slopes by the landslides, forming the south and north narrows.⁶

The tributaries –and the Medellín River itself on its upper basin to the south of Caldas– were torrential creeks which, despite their watershed forest cover, were subject to flash floods that left fan deposits at the entrance to the alluvial plain.

The valley was usually affected by natural disasters such as floods, flash floods, earthquakes and the spread of volcanic ash that apparently failed to destroy the local vegetation. The valley was covered by forests and its soils recycled most of the nutrients. This explains why the first settlers found a “fertile” land that quickly withered as soon as intensive agriculture and livestock raising were implemented.

Ongoing studies may allow us to investigate changes that occurred in the climate and the frequency of volcanic ash fall and major seismic activity. For now, human occupation continues to cause havoc on what little remains of the natural environment.

⁵ Instituto Geográfico Agustín Codazzi (Geographic Insitute Agustín Codazzi) (TN)

⁶ In Spanish: “Ancones” sur y norte. (TN)

There are several aspects of the Aburrá Valley that still deserve to be studied and monitored:

- The thickness of the alluvium. This is a critical point, particularly in terms of seismic behavior and groundwater movement. It is necessary to complete the geoelectric study performed by Rendón (2003) and map the detailed gravimetric and seismic surveys.
- The distribution, circulation and origin of groundwater in the valley should be considered, taking into special account the presence of salt water at a certain depth. The origin of these waters must also be investigated.
- A detailed study of surface formations and soils of the entire Aburrá Valley must be done. The presence of volcanic ash, as well as their age, is important in order to establish the relative stability of slopes in natural conditions, but it is also important to know the behavior of soils in terms of their capacity for infiltration, resistance to runoff, and their evolution to changes in use. Without that

knowledge, it will be impossible to establish a comprehensive hydrological assessment and proper environmental planning in the valley.

- We need to improve our knowledge of the meteorology and hydrology of the valley. The *IDEAM*⁷ *Empresas Públicas de Medellín*⁸ and the *SIATA*⁹ networks must be integrated and expanded by both the *SIMPAD*¹⁰ and the *Area Metropolitana del Valle de Aburrá*.¹¹ Local weather variations in the valley are so large that they justify a dense and permanent network that will allow in the future more effective warning systems.

Finally, the constant outcry of the scholars of the physical aspects of the valley has been the retrieval of scattered information and the lack of communication and coordination among the entities that are in charge of the physical environment. It is expected that in the near future initiatives such as the Tripartite Commission will take effect, and at least allow for easier access to the existing information and a greater collaboration between the different organizations.

⁷ *Instituto de Hidrología, Meteorología y Estudios Ambientales de Colombia* (Colombian Institute of Hydrology, Meteorology and Environmental Studies) (TN)

⁸ Medellín's Public Utilities Enterprises (TN)

⁹ *Sistema de Alerta Temprana de Medellín* (Medellín Early Warning System) (TN)

¹⁰ *Sistema Municipal para la Atención de Desastres* (Municipal Disaster Prevention and Relief System) (TN)

¹¹ The *Area Metropolitana del Valle del Aburrá* (AMVA) is the institution in charge of the urban planning and environmental and transportation issues in the Metropolitan Area. (The Metropolitan Area of the Aburrá Valley or Metropolitan Area of Medellín is a region made up of the following 10 municipalities: Barbosa, Bello, Caldas, Copacabana, Envigado, Girardota, Itagüí, La Estrella, Medellín and Sabaneta). (TN)

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HUMAN IMPACT

Michel Hermelin

Introduction

Human occupation of the Aburrá Valley is a long story that will certainly never be told satisfactorily. Even to this day, the natural sciences do not permit a complete knowledge of the functioning of the current ecosystems and, in order to understand what happened in the past, it is still necessary to turn to geology (archaeology helps in deciphering what happened since the arrival of the first settlers, and history as to what happened after 1541, the arrival date of the first Spaniards, although even for these four and a half centuries, we will continue to face important information gaps).

The Metropolitan Area of the Aburrá Valley¹ can be seen today as a great urban agglomeration located in a geographical space where, originally, nature was generous: a wide plain surrounded by slopes

generating an ideal climate and offering abundant water and biodiversity. Medellín emerged in this valley as a food production center for the neighboring mining zones. The city and the nearby towns were growing amid the favorable natural offer. Capital accumulation fostered the establishment of industry, which brought a greater urban expansion, fed by rural violence and displaced people, who started coming to the city more than 60 years ago.

The search for space on which to grow led to the canalization of the river, drying the moist soils and occupying the slopes. Water streams stopped offering this resource to the population and became receptors of sewage water. With the restriction imposed by the steep and unstable slopes, the architectonic patrimony had to be destroyed to make way for new buildings. At the same time, the slopes have been sources of

¹ The Metropolitan Area of the Aburrá Valley or Metropolitan Area of Medellín is a region made up of the following 10 municipalities: Barbosa, Bello, Caldas, Copacabana, Girardota, Itagüí, La Estrella, Medellín and Sabaneta. (TN)

building materials, used as rubble dumps, foundations for houses and buildings, and a permanent source of natural hazards: in the last 100 years, more than 1000 victims of landslides and flash floods have been documented (Aristizábal y Gómez, 2007). Due to the emission of atmospheric pollutants and to the steep topography of the valley, air pollution rates are some of the highest in Latin America. The city continues growing and, in spite of the multiple planning and environmental management efforts, it is quite obvious that there is an urgent need for drastic changes in terms of the settlement of the territory.

The knowledge of the history of the settlement process is an important step towards understanding the system and the formulation of land use strategies. The succinct history that will be told next explains the importance of the favorability of the climate, soil fertility and the water supply in attracting human activity. It is also evident that the settlement process has been prominently informal and fed by rural migration. Only from the second half of 20th century, when the city already had about 360 000 inhabitants, were there any important planning efforts put in place.

Historical overview

Pre-Hispanic period

Evidence found by archaeologists for the Aburrá Valley indicate that a population devoted to agriculture

existed roughly 10 000 years ago. Chroniclers say that they also bred rabbits, guinea pigs and “dumb dogs”; animals that apparently amazed the conquerors (Castillo, 1988). Castillo also mentions that, based on the findings of the burials, there must have been settlements in today’s localities of El Poblado, Manrique, Envigado, La Estrella, Itagüí, Bello, Copacabana and El Volador Hill. He also refers to the control of the *Aburraes*, the name given by the Spaniards to the settlers, and of the salt sources of Heliconia and Mazo, which were very important means of commercial exchange at that time.

From an ecological point of view, Pérez (1993) describes the original natives as hunter-gatherers who gradually became farmers with the aid of fire (“slash and burn”). It is not yet defined whether their agricultural pattern followed the gradual recovery of the ecological balance using soil management and enrichment techniques, as described by Cavalier de Ferrero *et al.* (1990). The chronicler Sardela says that Spaniards found wide stone paths and ruins of big destroyed buildings (Álvarez, 1996). He mentions that the settlement locations were the alluvial dykes in stream banks, floodplains and relatively flat foothill areas. He also mentions gold as a probable local mining product, in addition to salt.

Conquest and Colony

Melo (1998) estimates the population of the department of Antioquia before the arrival of the

Spaniards at 500 000 inhabitants. According to him, by 1580, some 40 years after the discovery of the valley by Jerónimo Luis Tejelo, deputy of Marshal Robledo, there were only a few thousand indigenous people left because of the killings, diseases and displacements of the population. The Spanish occupation brought the destruction of many woods that were replaced with pastures and some crops, including sugar cane (Pérez, 1993). The inappropriate use of steep areas might have produced erosion at that time.

According to Álvarez (1996), in the 17th century there was an increase in the presence of cattle and crop farms in the Aburrá Valley. The first census, on the occasion of the founding of Villa de la Candelaria (1675), gave a total of 288 families for the valley (21,5% white, 67,7% *mestizos*² and *mulatos*:³ and the remaining, indigenous). The opening of gold mines in Santa Rosa de Osos, Rionegro and Piedras Blancas (Guarne), increased the demand of food produced in the Aburrá Valley during the 17th and 18th centuries, so much so that, in the second half of the 18th century, there was no more land available (Patiño, 1988). Medellín and Rionegro were distribution

centers of goods and provisions. The former grew thanks to immigration. According to the census carried out by Mon y Velarde (1996), by the end of the 18th century the population of the Aburrá Valley came to 14 507 inhabitants.

Even in the 18th century, life in Medellín took place in an environment that was more rural than urban. The city squares were used to enclose cattle and the courtyards of houses were used as orchards. However, some streets were opened and paved, and in 1787 part of the waters of Santa Elena Creek were taken through a channel to the main square (today's Berrío's Park) and, from there, to the *aguardiente*⁴ factory. The census of 1786 points out that 87 of the mud-walled houses⁵ had thatched roofs (which does not imply the production of building materials) and 15 had tiled roofs. This means that there was at least one tile-kiln in the surroundings (Patiño, 1996).

Álvarez (1996) outlines the fact that Medellín and the department of Antioquia had a much higher population growth than the rest of the country. Additionally, Medellín was named capital of the province of Antioquia in 1826.

² Mixed race of Indian and white parentage (TN)

³ Mixed black and white ancestry (TN)

⁴ *Aguardiente* is a very popular anise-flavored liqueur, derived from sugar cane (TN)

⁵ *Casas de tapia* in Spanish. (TN)

Table 2.1 Population growth for Medellín, the Aburrá Valley and Antioquia

YEAR	POPULATION	ANNUAL GROWTH	% OF ABURRÁ VALLEY
1905	59 815		56.8
1912	65 547	1.3	52.3
1918	79 146	3.2	55.8
1928	120 044	4.3	61.1
1938	168 266	3.4	66.7
1951	358 189	6.0	71.7
1964	772 887	6.1	71.3
1973	1 100 082	4.2	73.9
1985	1 468 089	2.0	68.3
1993	1 834 881	3.1	68.2
2005	2 214 494	3.1	82.3

ABURRÁ VALLEY			
YEAR	POPULATION	ANNUAL GROWTH	% OF ANTIOQUIA
1905	105 305		15.9
1912	125 407	2.5	16.9
1918	141 797	2.1	17.2
1928	196 612	3.3	19.4
1938	252 124	2.5	21.2
1951	499 756	5.4	31.8
1964	499 756	6.1	43.8
1973	499 756	3.8	51.2
1985	499 756	2.7	53.9
1993	499 756	3.5	53.9
2005	3 213 000	1.6	56.6

DEPARTMENT OF ANTIOQUIA		
YEAR	POPULATION	ANNUAL GROWTH
1905	661 389	
1912	740 937	1.6
1918	823 226	1.8
1928	1 011 324	1.8
1938	1 188 587	1.6
1951	1 570 197	2.2
1964	2 477 299	3.6
1973	2 965 116	2.0
1985	3 888 067	2.3
1993	4 919 619	3.3
2005	5 682 276	1.2

Source: DANE⁶

⁶ Departamento Administrativo Nacional de Estadística (National Administrative Department of Statistics of Colombia) (TN)

19th Century

Foreign travelers such as Gosselmann (1981), who visited Medellín in 1826, were impressed by the beauty of the valley, the cleanliness of the villages and the good use of the land for agriculture and livestock.

Later, in the last decades of the 19th century, visitors highlighted the great amount of capital that was circulating in the Aburrá Valley. In addition to houses, streets and churches, Medellín already had a university, an arts and crafts school, a school of mines, a museum, two market places, a cathedral and several parks (Álvarez, 1996). It was leaving behind the town it had been some decades before. In spite of the civil wars, which were very abundant in the 19th century, Medellín was able to increase its wealth, mainly due to its gold-centered commerce: traders bought gold from the miners, sold them provisions and tools in return, and invested the surplus in imported goods, coffee plantations and livestock. (Parsons, 1997).

During this period the city grew towards the north of the Santa Elena Creek. Tyrell Moore created Villanueva, where the cathedral and today's Bolivar Park were built. Berrío's Park was no longer the city's main square. The industrialization of the Aburrá Valley began: machinery for coffee, sugar cane, pita fiber and light machinery for mining. In

the early 20th century the textile industries that would become the bases of Antioquia's industry were established.

The Aburrá Valley also had some gold mining activity. Parsons (1997) mentions the cut made to the rock near the south narrow cove in order to alter the course of the Medellín River and exploit the river deposits, whose mining gave rise to the founding of Pueblo Viejo, now in the municipality of La Estrella.

20th Century

The 20th century in Medellín brought with it not only massive population growth, resulting in the current conurbation from Bello to La Estrella, but also dramatic changes in the landscape. In the beginning of the century the *corregimientos*⁷ included El Poblado, by that time isolated on the east bank of the River, and Guayabal, Belén, La América and Robledo, which were isolated on the west bank. Robledo was founded due to the destruction of the village of Aná, caused by the flooding of the Iguaná Creek in 1875 (Avendaño, 1998). The communication between Medellín and the different urban nuclei was difficult, since they were separated by a wide swampy stripe along the bank of the Medellín River.

The street lighting of the city dates from 1898 and its management was undertaken by a com-

⁷ The *corregimientos* (townships or localities) are the rural areas of the municipalities. Nowadays Medellín has five *corregimientos*. (TN)

pany in which the municipality was a minority stakeholder (most of the stocks were in private hands). This company had an interesting influence over the growth of the city. According to Toro (1996), the increase of the local demand due to the First World War led factories to set up where hydroelectric energy could be generated:

- *Rosellón*,⁸ close to La Ayurá Creek, in Envigado.
- The breweries in Doña María Creek, in Itagüí.
- *Fabrica de Tejidos*⁹ in La García Creek, in Bello.
- *Coltejer*¹⁰ on the banks of Santa Elena Creek.

In the last decade of the 19th century the municipality acquired the aqueducts of Piedras Blancas and Santa Elena (Toro, 1996). The hydroelectric plant of Piedras Blancas was inaugurated in 1921, as was the streetcar; while the hydroelectric plant of Guadalupe, of 10 000 kw, was inaugurated in 1932, starting the era of hydroelectric development in Antioquia, which

is still ongoing. In Piedras Blancas, where the vegetation and soils had been destroyed by gold mining, the process of recuperating the basin via reforestation with pine trees also began.

In 1914 the 80 km road that connects Caldas and Barbosa along the Medellín River was completed. In 1926 the covering of the Santa Elena Creek began; a task that was not completed until the 1940s, the decade in which the Nutibara Square and Hotel were also built. The straightening and canalization of Medellín River began in 1912 and, after several stages it was finished with the construction of the metropolitan train in 1985. This canalization not only helped the construction of bridges that connected the *corregimientos* of the rest of the valley, but it also allowed for the recovery of vast areas of land that were previously occupied with abandoned meanders and swamps (Botero, 1996). A summary of the covering and canalization of the creeks of the Aburrá Valley is given in table 2.2.

Table 2.2 Creek canalization and covering

NAME OF THE CREEK	CANALIZED LENGTH (km)	COVERED LENGTH (km)
Medellín River	15	
Santa Elena Creek	0.5	0.4
La Gómez Creek	2.8	
La Poblada Creek	1.8	1

⁸ Textile industry “*Compañía de Tejidos Rosellón*” (TN)

⁹ Textile industry bought in 1939 by the “*Fábrica de Hilados y Tejidos del Hato, Fabricato*”. (TN)

¹⁰ Textile industry “*Compañía Colombiana de Tejidos, Coltejer*” (TN)

NAME OF THE CREEK	CANALIZED LENGTH (km)	COVERED LENGTH (km)
La Presidenta Creek	1.7	0.8
La Volcana Creek	1.6	0.7
La Aguacatala Creek	1.8	0.8
La Ayurá Creek	4	
La Sebastiana Creek	0.5	
Zúñiga Creek	1.8	
Doña María Creek	5	
Guayabala Creek	3	1.4
Ana Díaz Creek	3	
Leonarda Creek	5.6	
La Iguaná Creek	4.2	
La García Creek	0.5	
Malpaso Creek	~2.3	
Chumbimba Creek	1.6	
La Quintana Creek	1.8	
Other creeks towards the south-east	1.9	~ 4.3
Other creeks along the 30 th Street	2.8	2.4
Other creeks along the 33 rd Street	5	
Total	68.2	9.8

Source: M. Hermelin

The city continued growing northwards (neighborhoods of Berlín, Boston). In the 1940s the housing development designed by Pedro Nel Gómez, with a semi-concentric shape around the *Universidad Pontificia Bolivariana*, was the starting point for the neighborhood of Laureles (Perfetti, 1998). In the 1940s the process of the overflow of the urban area from Medellín to Bello, Itaguí and Envigado began, and this process accelerated in the period 1948-1963, leading to the beginning of the transformation of a group of satellite municipalities into a metropolis (AMVA, 1985). From the 1960s the city grew in all directions and important reforms that profoundly modified its physiognomy took place: the administrative centre of La Alpujarra, the bus terminals, Olaya Herrera Airport which was later transformed into an aero-park, etc. (Botero, 1996). One of the best documents about the evolution of Medellín during the 20th century is the one by Botero G. (1994).

21st Century

Nowadays, conurbation is practically complete, from Copacabana to La Estrella and Sabaneta. A metropolitan region with more than 3.5 million inhabitants has been formed, with most of these inhabitants subject to unacceptable living conditions: 10 % of the population lives in absolute poverty and 26% in poverty.

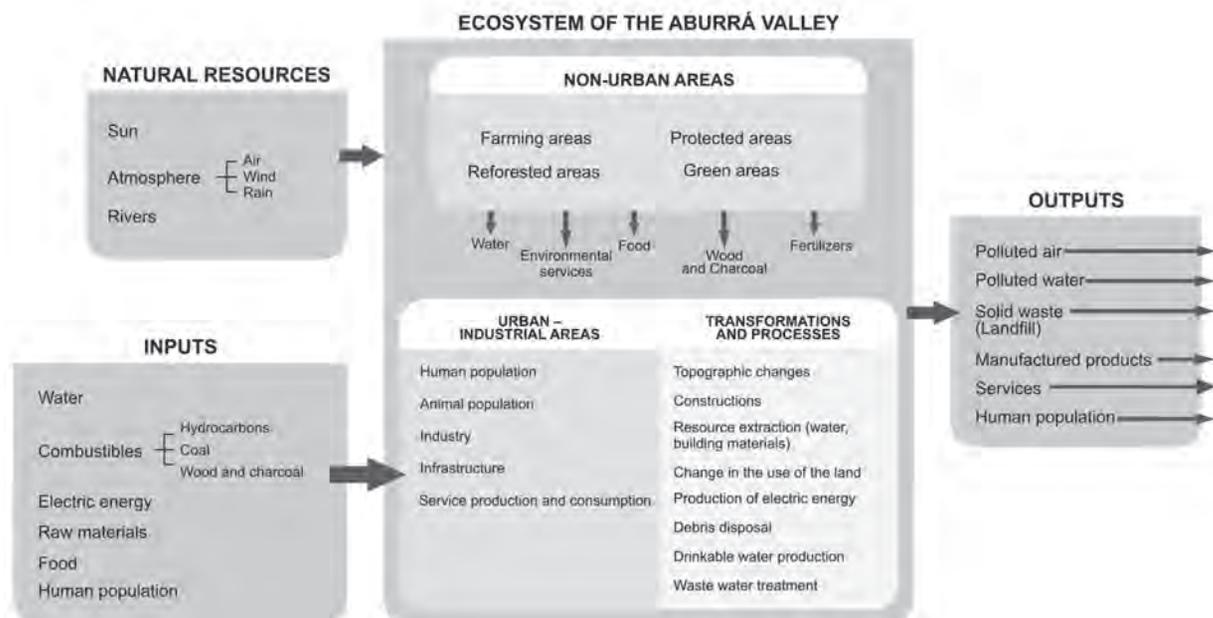
The annual consumption rates are the ones of a metropolis: 143 Mm³ of water, 2190 Gwh of energy for domestic life and industry (SUI, 2007), 2 800 000 m³ of building materials (Ramírez y Caballero, 2008). 2250 tons of solid waste are produced daily, 12 000 annual tons of organic load are dumped into the river (Agudelo, 2006) and 9000

tons of particulate matter (PM10) are emitted into the atmosphere. The system that has been formed consumes resources, generates waste and cannot be regulated, since the technology and the market makes it possible for the cities to import resources and carrying capacity.

The Aburrá Valley as an ecosystem

The exercise of considering the Aburrá Valle as an ecosystem (Camargo, 2008) has the advantage of increasing reflection upon all the aspects that have to be taken into account for its characterization. However, it has not been possible to quantify many of these aspects.

Chart 2.1 The Aburrá Valley as an ecosystem



Source: adapted from Camargo (2008)

Water

Water imported by the Metropolitan Area represents 83% of the water consumed in the basin. According to the POMCA¹¹(2006), the installed capacity of EPM¹² is of 17.25 m³s⁻¹ for a current demand of 9 m³ s⁻¹ (table 2.3).

Table 2.3 Water supplies for Empresas Públicas de Medellín's aqueduct

TREATMENT PLANT	SOURCE	HYDROLOGIC CHANGE (m3/s)	CONCESSION DISCHARGE (m3/s)	COLLECTED DISCHARGE (m3/s)
Manantiales Riogrande (Riogrande Reservoir), out of the basin	Riogrande	15.05	19.5	3.55
	Chico River	4.75		
La Ayurá (La Fé Reservoir) out of the basin	Las Palmas and Espíritu Santo Potreros	2.74	4	
	Pantanillo River	3.50		
	Buey River	8.34	2	
	Piedras River	7.06	2	
Villa Hermosa and La Montaña (Piedras Blancas Reservoir)	Piedras Blancas and La Honda	0.80+0.72	0.11+0.68	0.33+0.22
Caldas	La Valeria	0.90	0.22	0.13
	La Reventona	0.02		
San Antonio de Prado	La Manguala	0.02		
	Doña María	0.13		
	Las Despensas	0.01	0.02	
	La Chata	0.06	0.06	
	La Larga	0.08		
San Cristóbal	La Iguaná	0.08		
	La Puerta	0.03		
	La Tenche	No information	0.24	0.11
Barbosa	La López	0.04		0.06
	El Viento	0.04		No information
La Cascada	Santa Elena		0.12	0.09
Aguas Frías	La Picacha		0.02	0.02

Source: F. Piedrahita (2006)

¹¹ Plan de Ordenación y Manejo de la Cuenca del Río Aburrá (Plan for Land Use and Management of the Aburrá River Basin) (TN)

¹² Empresas Públicas de Medellín (Medellín's Public Utilities Enterprises) (TN)

The communitarian aqueducts, operating with local sources, supply $0.76 \text{ m}^3\text{s}^{-1}$. Only a minimum amount of rainwater is used. Data of underground waters is uncertain. Annual water consumption is 143 Mm^3 . 12 000 annual tons of organic load are dumped into the Medellín River, an amount which corresponds to 15% of the residual waters. (Alcaldía de Medellín, 2009). The discharge of the Medellín River in the north cove is $37.75 \text{ m}^3\text{s}^{-1}$ and it is estimated that the recovery of the oxygen concentration in the river only takes place some 100 km-below water from the urban zone.

The air

The topographic configuration of the Aburrá Valley is that of a basin enclosed by mountains closing in the south, where pollutants carried by the wind are hard to disperse. In this type of valley, day and night thermal cycles cause an

additional phenomenon, worsening the problem even more: at dawn, a warm layer of hot air settles over the city, hindering the dispersion of colder air and increasing the concentration of pollutants to which the population is exposed. As the day wears on, the sun manages to heat up the lower layer, permitting its convection. By that time, winds play a fundamental role; depending on their direction, pollutants migrate and disperse over the territory. In the Aburrá Valley, the circulation pattern has a generalized north to south tendency, concentrating the pollution in the southeastern sector of the valley.

The vehicle fleet accounts for 70% of the emissions, industry for 27% and the biogenic sources for 3%. It is estimated that 9 mTon a^{-1} of particulate material (PM10) is emitted into the atmosphere. The Aburrá Valley's emissions are indicated in table 2.4 (AMVA-UPB, 2007).

Table 2.4 Total atmospheric emissions in the Aburrá Valley

COMPONENT	INDUSTRIAL (T/YEAR)	MOBILE (T/YEAR)	BIOGENIC (T/YEAR)	TOTAL BY ELEMENT (T/YEAR)	% BY ELEMENT
CO	13 054.7	109 266.8		122 321.5	54
NO _x	5496.1	15 987.4	319	21 802.5	10
COT	8097.1	28 755.8		42 873.9	19
MP	4386.3			4386.3	2
PM ₁₀	2986.0	2011.2		4997.2	2
SO _x	25 528.1	1037.7		26 568.8	12
Inorganic C.	1946.1			1946.1	1
Total by source	61 494	157 059	6340	224 893	100
% by source	27	70	3		
CO ₂	3 414 679.80				

Source: AMVA-UPB (2007)

Solid waste

According to the PGIRS¹³(2010), 2400 tons of solid waste are produced daily in the Aburrá Valley, of which 58.9% are organic and could be used. However, only 8% is currently being used. 25% of the total solid waste production is being used by 4500 recyclers.

Table 2.5 shows the distribution of solid waste in the Aburrá Valley. After having built a dump hill almost downtown, waste was taken to Curva de Rodas landfill, which was in operation for less than 30 years. Waste is currently being taken to Pradera landfill in the municipality of Don Matías, at an average distance of more than 50 km, but close to the administrative center of Barbosa and to the Medellín River.

Table 2.5 Total flow of solid waste in the Aburrá Valley

WASTE FLOW	ABURRÁ VALLEY	PERCENTAGE
Disposal in Pradera landfill (t/month)	55 522.00	76.2%
Waste use (t/month)	9121.00	12.5%
Collected by the cleaning service companies and taken to the rubble dumps (t/month), including 45.5 t of vegetal waste that go mixed with the rubble	4664.05	6.4%
Collected for treatment (t/month)	135.50	0.2%
Biomass used for combustion in brickyards (t/month)	1402.43	1.9%
Losses (t/month)	2059.99	2.8%
Generated (t/month)	72 904.96	100.0%

Source: AMVA-UPB (2007)

Building materials

Human history and its behavior as a geomorphologic agent, i.e., as a transformer of Earth's surface formations, have been exposed in detail by Nir (1983) and Hooke (1994). These authors explain how, from more than four million years ago, primates have carried out movements of land in a systematic way. The industrial revolution and the use of combustion engines were the maximum multiplying agents. Hooke estimates that the sum of all the Earth's material removed by men in the last 5000 years would generate a mountain 4000 m high, 40 km wide and 100 km long. He also

¹³ Plan de Gestión Integral de Residuos Sólidos (Plan for the Integral Management of Solid Waste) (TN)

sustains that, if the current trend continues, it will double its size in a hundred years.

Building activity in itself has a geomorphic impact whose growth rates exceed any natural rhythm. No geological phenomenon can produce the material flow generated by urban growth. The erosion rates in the Alto de San Miguel, where the Medellín River originates, fluctuate between $0.61 \text{ t km}^{-2} \text{ a}^{-1}$ under grass and $0.59 \text{ t km}^{-2} \text{ a}^{-1}$ under forests (De Greiff, Rendón y Hermelin, 2002). The basin of the Magdalena River presents one of the highest sediment generation focuses of the planet; according to Restrepo (2005), a load equivalent to a rate of $689 \pm 527 \text{ t km}^{-2} \text{ a}^{-1}$. Within its tributary basins, the highest rate is $2200 \text{ t km}^{-2} \text{ a}^{-1}$, whereas the lowest is $10 \text{ t km}^{-2} \text{ a}^{-1}$. The material carried by the lahar (mudflow originated by the Nevado del Ruiz volcanic eruption) which destroyed the town of Armero in 1985, was estimated at 90 Mm^3 (Pierce *et al.*, 1990).

The type of construction used a century ago depended, to a great extent, on the available materials in the surrounding environment. In spite of the progress achieved in this field, there are still two predominant building materials in Medellín: brick and block. Both have been produced locally from abundantly available raw materials. Bricks, as well as tiles, come from chemically advanced meteorization

products of local rocks. Blocks are produced by mixing cement with rock decomposed in a lower degree than with bricks, locally called *arenilla*.¹⁴

Other stony materials are also used for fillings and more specialized uses: different rock types for façades and interiors, usually coming from other regions. It is worth mentioning the exception of the laterite, used in facades, exploited in Niquía (Bello). The total volume of building materials moved in the Aburrá Valley has been estimated at 2.8 Mm^3 .

Based on the amounts of materials used per square meter of construction projects during the 1997-2008 period, Ramírez and Caballero (2008) estimate the consumption of sand and stony aggregates at 15.4 Mm^3 , extracted in the Aburrá Valley for house building (roads or other types of construction are not included). Brick production from clay comes to $553\,125 \text{ t km}^{-2} \text{ a}^{-1}$ (Ott, 2007). Given the total area of the Aburrá Valley (1152 km^2), the average density of sand and aggregates of 2.0 g cm^{-3} , and considering the clay extraction for brick production and the excavation lands, the result is a net material flow rate of $4762.4 \text{ t km}^{-2} \text{ a}^{-1}$. In terms of the annual rate of removed tons per capita, the number reaches approximately 2.0 tons per inhabitant. According to Hooke (1994), the estimated

¹⁴ Fine sand (TN)

number for the United States is 30 annual t per capita, while the world average is 6 t. Taking into account that the calculations are based on the material actually used in construction projects, not considering in situ erosion caused by the mining activities

or the material residues for each construction project, the number could increase by at least 50%. In spite of the low average in relation to the world standard, man is the main geomorphologic agent in the Aburrá Valley. Table 2.6 shows the magnitude of his impact.

Table 2.6 Flow of materials for building activity in the Aburrá Valley. Comparison with natural erosion rates in different environments

PROCESS	FLOW RATES	INFORMATION SOURCES
Use of sand and stony aggregates	3600 t km ² a ⁻¹	Data from Camacol, presented by Ramírez and Caballero (2008).
Brick production	475.2 t km ² a ⁻¹	Annual brick production reported by Ott (2006).
Materials excavation	687.2 t km ² a ⁻¹	Total of excavated lands taking into account that, according to Bedoya (2007), 40% of the building and demolition residues in the Aburrá Valley corresponds to this type of materials.
Total extraction of materials for building activity	4762.4 t km ² a ⁻¹	Sum of previous data.
Erosion rates in the Alto de San Miguel, source of the Medellín River	0.59 a 0.61 t km ² a ⁻¹	Monitoring of geological and geomorphological processes in the Alto de San Miguel. Direct measurements in fieldwork (De Greiff, Rendón and Hermelin, 2004).
Average erosion rates in the Magdalena River's basin	689 +/- 527 t km ² a ⁻¹	Estimate of erosion rates in the Magdalena River's basin, based on the river's total solids (Restrepo, 2005).
Average erosion rates in the Carare River's basin, tributary of the Magdalena River	2200 t km ² a ⁻¹ Higher erosion rate for the Magdalena River's basin.	Estimate of erosion rates in the Magdalena River's basin, based on the river's total solids (Restrepo, 2005).
Average erosion rates in the Cesar River's basin, tributary of the Magdalena River	10 t km ² a ⁻¹ Lower erosion rate for the Magdalena River's basin.	Estimate of erosion rates in the Magdalena River's basin, based on the river's total solids (Restrepo, 2005).
* This number could be lower, taking into account that the brick industry presents a growing increase in the use of lands for excavation as raw material.		

Source: M. Hermelin

Changes on the landscape caused by material extraction

The landscape of the city of Medellín shows this phenomenon. The hill located in the area of Robledo San Germán disappeared because of the extraction of materials in the 80s, giving rise to a territory for building development with an adequate location.

In the western slope there are abundant landforms shaped by mining activity. Large excavations have been carried out in the banks of the Medellín River. Their depth can exceed 40 m and their length ranges between 50 m and 100 m (figure 2.1)



Figure 2.1
Excavations for the
extraction of building
materials, Girardota
Source: M. Hermelin



Figure 2.2
Ciudadela del Valle
in Itagüí, which is
being built in what
used to be the
Ladrillera del Valle
Source: N. Cadavid.

Some of these excavations are converted into lakes, and others into rubble dumps. Due to the deficit of flat building lands in the valley, the recovery of these lands, once their exploitation has finished, becomes a priority. On the contrary, in the case of exploitations on slopes, the change of the landforms is an opportunity from the urban point of view. The lands exploited by the Ladrillera del Valle,¹⁵ the municipality of Itagüí, became a flat zone next to the urban area with a

high potential. It is an area of more than 30 ha, where the construction of Ciudadela del Valle began.

Similarly, the neighborhood Nuevo Amanecer was built on lands abandoned by Las Mercedes brickyard in the *corregimiento* of Altavista, in the western sector of the municipality of Medellín. 470 families coming from La Mano de Dios neighborhood were relocated here, after losing their houses in a fire that took place in March, 2003.

¹⁵ Del Valle Brickyard (TN)

The availability of nearby sources of clay, sand and aggregates has been an opportunity for the development of building activities in the Aburrá Valley. As far as building materials are concerned, the costs for the final consumer depend directly on the proximity to the source. These materials have a very low value per volume unit, and therefore the transport variable is fundamental in the cost structure for the final consumer. Consequently, for urban growth material sources need to be in close reach. However, this generates an important dilemma: while the city grows it needs to extract building materials but, at the same time, the closeness between the mining locations and the urban zone generates situations of insecurity and insalubrity for the population.

Mining activity in the urban periphery and its contribution to sustainable development

The western sector of the city is considered, in the Land Use Plan, as a zone for building material extraction. The city wins due to its closeness to the material sources because of the energetic savings in transport. However, the road infrastructure required for materials evacuation has not been built. While builders can have easy access to the materials, the community suffers the impacts

of an activity whose benefits they do not receive. The environmental authorities have not carried out an adequate process of accompaniment and, as a consequence, there is an abundance of abandoned projects with insufficient recovery works in place. The removal of vegetation cover, in addition to the steepness of the land and the high rainfall, make the mining activity a significant source of sediments for nearby streams.

Creeks such as La Picacha, that go across the mining area, present an average concentration of suspended solids of 1760 mg/l, which far exceeds the reference values established by the environmental authority: 30-40 mg/l⁻¹ (water quality data given by EPM, 2010).

The associated environmental outlook was recently described by Ramirez and Caballero (2008). The authors evaluated the sustainability of the building material exploitation in the Aburrá Valley, based on the environmental management quality of the exploitation areas. They found that only 16% of the quarries carry out adequate management practices concerning their environmental impacts. The material exploitation they are in charge of amounts to 32% of the total production (table 2.7). These authors also point out the phenomena of material importation such as mortar sand from Bolombolo, a town 70 km from the Aburrá Valley.

Table 2.7 Building materials' reserves in the Aburrá Valley

MATERIAL	ESTIMATED RESERVES
Sand	19 280 300 m ³
Crushed stones and gravels	48 031 696 m ³
Clays	3 255 896 m ³

Source: Ramírez and Caballero (2008)

In the pursuit of sustainability in its original sense, the objective would be accomplished not only through environmental management of the exploitation zones, but also by finding alternative sources for the substitution of this exhaustible resource. Rubble recycling becomes an attractive option, since it not only avoids soil degradation associated with its final disposal, but also reduces the impacts of the exploitation within and outside the Aburrá Valley.

Rubble recycling in the Aburrá Valley

The metropolitan region generates an average of 9000 tons of rubble every day (AMVA, 2009). The formulation of public policy for the management of Building and Demolition Waste, approved in November 2009 by the Municipality Council Agreement, is an important step towards sustainability. The agreement obliges medium and large rubble generators to purchase

the necessary equipment for the storage of rigid and flexible pavement and concrete and adobe structures that can be treated to generate new aggregates.

The *Cámara Colombiana de la Infraestructura*¹⁶ is working on the design of a big plant devoted to the recycling of these materials, while in the city there are already some companies that use concrete and brick chunks and ceramic residues for the production of concrete blocks, paving stones and prefabricated panels (there is a case in which the building and demolition residues constitute 70% of the raw material used). In 2004, there were 2 million tons of building and demolition residues generated in the AMVA¹⁷ (Ott, 2006); 130 000 tons of concrete residues, corresponding to 14% of the demand for housing construction. According to this author, in the most realistic scenario, this number will double by 2018. For brick residues, there is an estimated amount of 177 000 t a⁻¹ per year, corresponding to 32% of the total demand for brick. Therefore, the efficiency in the use of building materials is shaping up as an urgent need.

The impact of building activity over the geomorphology of the valley is of great magnitude. It is necessary to improve the quality of the numbers shown, taking into account not only the quantifying

¹⁶ Colombian Chamber of Infrastructure (TN)

¹⁷ Área Metropolitana del Valle de Aburrá (Aburrá Valley's Metropolitan Area) (TN)

processes of the materials, but also those corresponding to informal building. However, although supported in approximations, they demonstrate their significant impact over the erosive processes, the alteration of the hydric resource and very high energy consumption for transport. The sustainability of building activity therefore requires a complete use of the building and demolition residues and an improvement of the efficiency in the use of the materials.

Impact of the change in the use of land

The exploitation of quarries implies a profound alteration

of the environment. However, urbanization also drastically modifies the natural conditions: destruction of the vegetation, annihilation of the native species that, in order to survive, must migrate (at least the ones that are capable of moving and finding a new ecosystem), soil destruction, etc.

The physical impact of this change of the natural vegetation over pastures or plantations and over urbanization is usually undervalued. Table 2.8 schematizes in qualitative terms hydric behavior variations in relation to different land uses.

Table 2.8 Hydric behavior variations in relation to different land uses

	FOREST	PASTURE	GRASS	URBANIZATION
Evapotranspiration	High	Medium	Low	None
Infiltration	High	Medium	Low	None
Runoff	Low	Medium	High	Total
Concentration time	Low	Medium/high	Medium/high	High
Peak discharge	Low	Medium	Medium/high	High
Sediment production	Low	Medium	Medium	Low

Source: M. Hermelin

According to the previous table, there are several consequences that have not been taken into account in the occupation of basins, all of which are torrential and flow into the Medellín River in the Aburrá Valley.

- The torrential basins have their maximum slopes in the creeks' headwaters. Although the presence of native or artificial forests in those areas is not a guarantee of avoiding the formation of flash floods (more evapotranspiration, more infiltration and therefore less runoff

and less peak discharge), it is indeed a very effective way of mitigating them, at least until a certain rainfall threshold (Caballero and Mejía, 1988).

- The feeding of the aquifers depends on infiltrated waters and therefore decreases with urbanization.
- The elimination of the forest causes a higher runoff and, very often, an increase in the excavation capacity of a creek. This can lead to a higher sediment production.
- Building activity tends to coincide with the highest sediment productivity of a basin, both because of the land movements and the rubble disposal in the basins.
- The urbanization of torrential basins is usually accompanied by an increase in the risk of flash floods, all the more when the buffer zone regulations established by law are not followed.
- Finally, another consequence of the urbanization of mountain basins tends to be their pollution caused by sewage water.

Medellín was originally built in the alluvial fan of Santa Elena Creek, and the same process occurred in most of the municipalities of the

valley: a relatively flat place with water available was chosen. The growth took place in the alluvial plain, recovered via canalizations, but also in the growingly steep slopes that have been occupied, not only by social housing and squatter settlements, but also by luxury apartment buildings (El Poblado, Envigado y Sabaneta).

In addition, the geotechnical quality of the slope soils is low: in many cases they are made of materials deposited by mass movements with very heterogeneous characteristics and variable dimensions. Medellín's worst catastrophes have been produced by the reactivation of these deposits, generally due to human influence. In spite of these problems, Medellín and all the other settlements of the Aburrá Valley continue growing on these steep slopes. The following section offers a summary of the three characteristic uses of the Aburrá Valley's slopes in the last years:

- Slum areas, such as the Northeastern *Comuna*¹⁸ or the Independencia neighborhood: density is high, plots and houses are small, and public utilities were only installed after building, sometimes illegally. Creek's buffer zones are not respected, nor are the areas catalogued as high-risk disaster zones; not recoverable

¹⁸ The *comunas* (districts) are administrative subdivisions. The municipality of Medellín is divided into 16 *comunas*. The *barrios* (neighborhoods) make up the *comunas*. (TN)

in terms of their sensitivity to mass movements. There are numerous geotechnical and environmental problems, in many cases due to the defects of the constructions.

- High socio-economic status neighborhoods, made up of apartment buildings reaching 30 stories high, as in El Poblado and Envigado: in this case complete soil testing is carried out before proceeding with the construction; the piles supporting these buildings can reach 30 m depths. In these areas, it is very unlikely that the buildings suffer damage caused by superficial phenomena (which would only affect the lowest floor) or by earthquakes, since they are designed in accordance with all the requirements of the Colombian Code for Earthquake Resistant Construction.¹⁹The corresponding extra cost is assumed by the apartment owners, whose buildings are usually surrounded by large green areas. However, the instability of these slopes can lead to surprise events, such as what occurred in Alto Verde residential complex in 2008. Two and three-story expensive residences, built in line with all the current regulations, including the previous geotechnical study, were affected by a landslide coming from a neighboring slope where the soils had been infiltrated with a lot of water. The result was tragic: six houses destroyed and twelve casualties. In very different socioeconomic conditions, something similar occurred in 1985 in Villatina, also on the eastern slope of the valley and the same type of rocks. 500 people died and 100 houses were destroyed, in a neighborhood that had been declared safe after a complete geotechnical study based on drilling.
- A third type of settlement for social housing is taking place in the central-western slope (Pajarito). In a zone covered by mass movement deposits, the municipality of Medellín decided to carry out a program of subsidized housing in high buildings, constructed in line with all the adequate technical standards, and the surrounding zones, many of them instable, were used as green areas. The residential complex is connected to the city with the *Metrocable*²⁰(La Aurora Station). Regardless of the social significance of this type of land occupation, it is an

¹⁹ In Spanish: *Código Colombiano de Construcciones Sismo Resistentes* (TN)

²⁰ Cable-car, public- transport system integrated into the Metro system. (TN)

original utilization of lands that could not have been used for one-story social housing and, therefore, deserves follow-up from the geological community.

Ecological footprint

Cities are heavy consumers of energy, natural resources and food produced from outside their territory (figure 2.2). The ecological footprint is a way of measuring human demand on ecosystems, by comparing the weight of this demand with nature's capacity for regeneration (Wachernagel y Rees, 1996) and therefore, it is a measure of sustainability.

An ecological footprint is calculated by the relation between the environmental resources available in a specific zone (in this case the Metropolitan Area) and the human demand (Agudelo, 1997). Regardless of the sophistication of data collection, it is a good indicator, and it turns out to be very useful when comparing the evolution of an area or country over time or in relation to others.

The range of the footprint varies from 0.5 for less developed landscapes to 9.5 for the United

States. In the case of the Aburrá Valley, the environmental offer is atmospheric, hydric, soil-based and biological, while the demand is estimated based on food and materials such as wood, fibers and energy (Agudelo, 1997). The personal planetoid, i.e., the average ecological footprint of each inhabitant of the Aburrá Valley is 2.6 ha; for the total population of the valley it is 7 677 663 ha, equivalent to an area 66.6 times larger than the valley itself.

With regard to water, the daily consumption per capita is 63 l, while the current average discharge of the Medellín River is of 32.8 l s⁻¹, which would only be enough for 44 983 inhabitants.

Finally, supposing an average fixation capacity of 2 t ha⁻¹ a⁻¹, it would take 726 577 ha of forest (an area six times larger than the valley's) to be able to absorb the CO₂ produced by the population of the Aburrá Valley. These numbers clearly demonstrate the current human impact received by the Aburrá Valley. Unfortunately, the current trend indicates a permanent population growth, which will worsen even more the present situation.

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HAZARDS AND RISKS IN THE ABURRÁ VALLEY

Luz Jeannette Mejía & Michel Hermelin

Introduction

Because of its geographic location and geologic and topographic configuration, the Aburrá Valley is constantly exposed to the occurrence of natural events that threaten lives, infrastructure, and people's daily activities. Moreover, negative impacts become critical in those sectors classified as "High Risk Zones" (HRZ) where natural and man-made hazards act together.

Human settlement in the Aburrá Valley has generated significant environmental problems due to the high demographic growth and industrial production indexes, the increasing demand on infrastructure, public utilities, furnishings, the transportation grid, as well as the occupation of High Risk Zones (HRZ), informal and do-it-yourself building processes, intra-urban displacement and the lack of regulation and surveillance

on the settlement processes by local authorities.

Likewise, issues associated with demographic expansion of the most populated municipalities¹ (figure 3.1) that comprise the Aburrá Valley (which holds 80% of the department's total population, with 97% of that being entirely urban) have generated pressure on the territory and changes in land use practices during the last decade. Therefore, human occupancy has reduced the extension of pristine terrains, turning them into industrial or residential areas, and increasing the demand of environmental goods and services, especially water. Consequently, anthropogenic activity has accelerated and increased the environmental impact on local watersheds by invading drainages, spilling sewage water into streams, inadequate debris and waste disposal, and overlooking buffer zones for creeks and other urban-planning regulations.

¹ Municipalities of the Aburrá Valley: Barbosa, Bello, Caldas, Copacabana, Girardota, Itagüí, La Estrella, Medellín and Sabaneta.

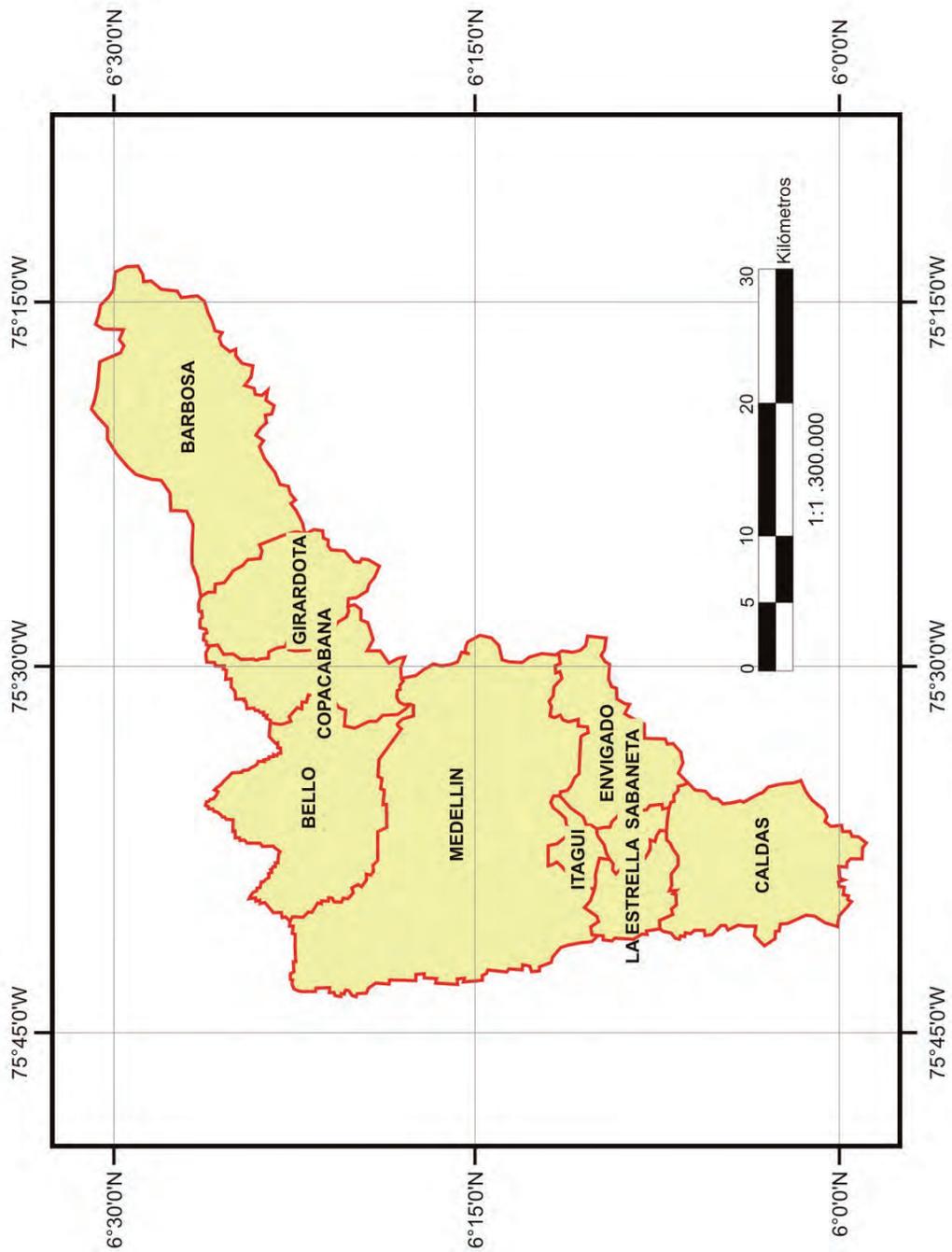


Figure 3.1
 Location of the Metropolitan Area
 Source: IGAC

Uncontrolled development of these municipalities has demanded that the local, regional and national authorities allocate substantial economic and human resources in order to mitigate the environmental impacts produced by emergency situations and to guarantee the timely reestablishment of normal conditions that existed prior to the onset of these emergency events.

In 1980, a government office named *Área Metropolitana del Valle de Aburrá*² was created and it became the public authority in charge of environmental and planning affairs. The office was structured via Law 128 of 1994 and Law 99 of 1993. This office has regulatory control over all of the valley's municipalities with the exception of Envigado. Its mission is oriented to leading the progress and harmonious development of the metropolitan region, consolidating a place where the relationships between human beings and the environment can be balanced. Furthermore, risk management must be an essential factor for the analysis, monitoring, prevention, and control of disasters. This office must cooperate with other related authorities. It must also assist the region in environmental issues and in all the emergency and disaster prevention and response tasks in compliance with current government regulations.

Every municipality has its own local committee for disaster prevention and response according to Law 919 of 1989, which created the National Disaster Prevention and Response Directory.³ Furthermore, the municipalities have gradually implemented disaster risk management policies based on their local development and land-use planning programs.

Basic Concepts

There are many definitions in the literature when it comes to risk management. However, in this paper we will adopt the terms most frequently in use.

Hazard: It refers to the latent threat that represents the possible materialization within a given time interval of a dangerous phenomenon, whether it is naturally, technologically or humanly induced, which may produce adverse effects on people, material assets and the environment. It is an external risk factor composed of a single element or a group of elements that is expressed as the probability that an event takes place with a known intensity, during a certain period of time in a specific location. (BID, 2003)

Vulnerability: Internal risk factor of an element or group of elements exposed to a hazard; directly related to its intrinsic

² Aburrá Valley's Metropolitan Area. (TN)

³ In Spanish: *Dirección Nacional de Prevención y Atención de Desastres* (TN)

predisposition to be affected or susceptible to damage. It is the physical, economic, social or political susceptibility or predisposition of a community of being either: affected, or not being adversely impacted in case of the manifestation of a natural or human induced and dangerous phenomenon. Differences in vulnerability of social and material assets vary according to the intensity of the dangerous phenomenon in these contexts. (BID, 2003)

Risk: It refers to the loss expected from a certain hazard over an element under risk during a specific time interval in the future. Depending on the criteria established for the “element under risk” it can be measured according to: the expected economic loss, the number of human casualties or the physical damages to public or private properties (PNUD, 1991); quoting the definition adopted by the Office of the United Nations Disaster Relief Coordinator (Vargas, 2003).

Disaster Risk Management: Implementation of planning strategies, organizational and administrative actions, physical and social interventions intended to avoid or to mitigate the effects of dangerous phenomena on the civil population, their goods and services, and the natural environment in general. Disaster risk management must be undertaken with the active participation of different State and community institutions, procuring forms of cultural engagement and their effects within the socio-economical development processes. It includes preparative actions and the execution of the response to an

emergency and post-disaster relief cases (BID, 2003).

Retrospective analysis of the High Risk Zones (HRZ) in the Aburrá Valley

The expansion of the Aburrá Valley towards its flanks, canyons, and creek buffer zones has produced a significant increase in the percentage of people exposed to natural or human induced hazards and risk situations, leaving an elevated number of human, material and social losses.

Some of the biggest disasters that have occurred in the city are: 1) The flooding of the Iguana Creek on April 23, 1880; which destroyed the community of Aná (in the municipality of Medellín) near the current soccer stadium (Bustamante, 1988). 2) The Media Luna landslide (Km # 3 via Santa Ana-Medellín) on July 12, 1954. This landslide occurred uphill of the Ocho de Marzo neighborhood, producing hundreds of human deaths (Bustamante, 1990). 3) Santo Domingo Savio landslide (in the municipality of Medellín) on the left bank of La Sucia Creek. It destroyed 80 shanty-houses burying all of its dwellers and leaving a hundred human deaths. (Bustamante, 1988). 4) The Villatina landslide on September 27, 1987 (in the municipality of Medellín). It caused 500 human deaths, destroyed approximately 100 houses and left around 1700 people affected (Figure 3.2) (Bustamante, 1988). 5) The Ayura Creek flash-

flood (municipality of Envigado) on April 14, 1988. It caused the loss of 10 houses and left 31 families affected (Caballero and Mejia, 1988). 6) The rainfall-induced event on May 29 and May 30, 2000, in the municipalities of La Estrella and Sabaneta. This event triggered 264 landslides and a flash-flood leaving 190 families affected, one human death, and 58 houses affected (Cadavid and Hermelin, 2005). 7) The flash-flood on October 6, 2005 in the Barro Creek (municipality of Bello) destroying 12 houses, killing 18 people and leaving another 40 missing (Área Metropolitana, 2005).



Figure 3.2.
Villatina landslide, 1985
Source: M. Bustamante

More specific cases take place every year during the rainy seasons (April/May and September/October) with the increase of landslides, structural building failures and flash floods. The most recent cases occurred on: 1) May 13, 2008, in El Socorro neighborhood (municipality of Medellín).

There, 20 houses were destroyed, 27 people died and 17 more were injured. 2) November 16, 2008, in Altoverde urban complex, in El Poblado neighborhood (municipality of Medellín) where 6 houses collapsed and 12 people died (SIMPAD,⁴ 2008) (Figure 3.3)

⁴ Sistema Municipal para la Atención de Desastres (Municipal Disaster Prevention and Response System) (TN)



Figure 3.3
Mudslide of Villa del
Socorro, May 2008.
Source: M. Hermelin

In addition, the occupancy of HRZ with deficient building constructions made of recyclable material has produced urban fires like the one in Vallejuelos (municipality of Medellín) in 1998 where 280 shanty-houses were burned (SIMPAD, 1998).

In conclusion, the Aburrá Valley is constantly exposed to environmental problems such as water pollution, inadequate land use

practices, inappropriate solid waste disposal, the loss and deterioration of biodiversity, and the occupation and damage of natural or built public spaces.

This is directly related to the increase of emergency situations and disasters which generates negative impacts on the population which faces more frequent exposure to natural or anthropogenic-induced calamities (figure 3.4).

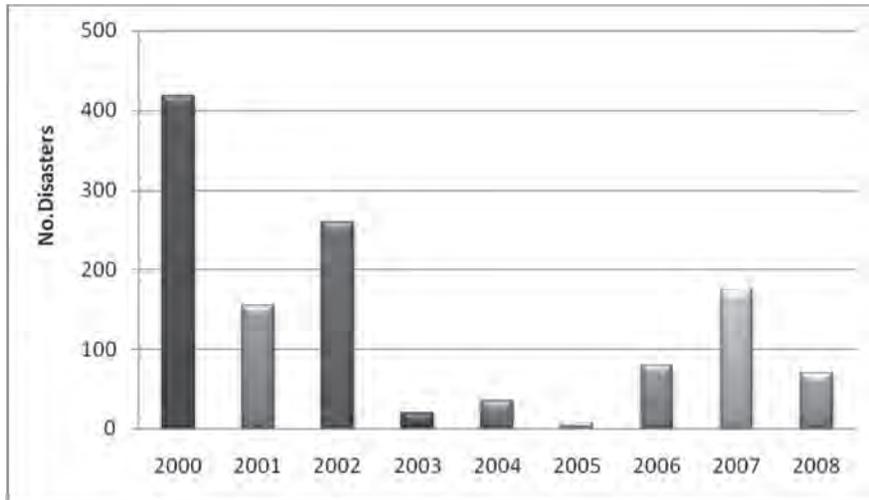


Figure 3.4
Emergency cases
reported on
DesInventar
Source: AMVA⁵ (2008)

According to the disaster systematization inventory for the municipalities of the Aburrá Valley, which was originally compiled by the *Universidad EAFIT* and currently by the *Área Metropolitana* that implemented the software called *DesInventar*;⁶ from 1900 to 2008, the municipality of Medellín has had the largest number of reported disasters in the Aburrá Valley. It is followed respectively by the municipalities of Itagüí, Bello, Envigado and Caldas. Lower down in the ranks are the municipalities of Sabaneta, Girardota, La Estrella, Copacabana, and Barbosa.

In terms of disasters, the events with the largest death toll were: landslides (1264 casualties, 76.5%), flash-floods (265 casualties, 16%), and over-bank floods (122 casualties,

7.4%). As a point of reference, only in the municipality of Medellín there are 29 174 households located in non-recoverable HRZ that make up 4.9% of the total households in this municipality (SIMPAD, 2006).

In addition, there is the data compiled by the Annual Antioquia Statistical Report⁷ for the Aburrá Valley. This publication reports the existence of 33 961 houses within HRZ.

Currently, the *Desinventar* database is used to store all the reported events by the institutions in charge of attending all of the emergency situations, such as: the *CLOPAD*,⁸ the *SIMPAD*, the firefighters' department, the Red Cross, etc.

Saldarriaga (2003) completed an inventory of the disasters that

⁵ Área Metropolitana del Valle de Aburrá (Aburrá Valley's Metropolitan Area) (TN)

⁶ Sistema de Inventario de Desastres (Disaster Inventory System) (TN)

⁷ In Spanish: *Anuario Estadístico de Antioquia* (TN)

⁸ Comité Local de Prevención y Atención de Desastres (Local Committee for Disaster Prevention and Response) (TN)

occurred in the Aburrá Valley between 1900 and 2002. He used the *DesInventar* software to process all the secondary data that he gathered from institutions such as: *Ingeominas*,⁹ *CORANTIOQUIA*,¹⁰ *DNPAD-OSSO*,¹¹ *DAPARD*,¹² *SIMPAD*, *DIPAD-Bello*,¹³ mayors' offices and related institutions (Municipal planning office,

CLOPAD, Public Works Department, Firefighters Departments, Red Cross, Civil Defense, etc.). Additionally, Saldarriaga collected secondary data from other institutions such as universities (the *Universidad de Antioquia*, the *Universidad Nacional - Sede Medellín*, the *Universidad EAFIT*, the *Escuela de Ingeniería de Antioquia*) and public libraries (e.g. *Biblioteca Pública Piloto*) (Table 3.1)

Table 3.1. Number of events reported for the period 1900-2000 in the Aburrá Valley

MUNICIPALITY	TOTAL NUMBER OF REPORTED EVENTS	LANDSLIDES (NUMBER)	FLOODS (NUMBER)	WILDFIRES (NUMBER)	EARTHQUAKES (NUMBER)	OTHER * (NUMBER)
Medellín	8065	3864	2372	382	50	1397
Itagüí	280	32	211	29	---	8
Bello	254	31	149	59	1	14
Envigado	248	28	90	123	2	5
Caldas	131	61	41	26	---	3
Sabaneta	102	19	44	39	---	0
Girardota	98	32	24	38	1	3
Copacabana	66	14	37	13	---	2
La Estrella	57	10	35	12	---	0
Barbosa	49	36	7	1	---	5
Totales	9351	4127	3011	722	54	1437*

Source: Elaborated by the author using the pertinent data and results.

Others: structural damage+flash-floods, toppling+ undermining+ severe-storms, wind-storms, hail-storms+ droughts + urban-fires + others

⁹ Instituto Colombiano de Geología y Minería (Colombian Institute of Geology and Mining) (TN)

¹⁰ Corporación Autónoma Regional del Centro de Antioquia (Regional Independent Corporation of the Center of Antioquia) (TN)

¹¹ Dirección Nacional de Prevención y Atención de Desastres - Observatorio Sismológico de SurOccidente (National Disaster Prevention and Response System- Southwestern Seismic Observatory) (TN)

¹² Departamento Administrativo de Prevención de Desastres (Administrative Department of Disaster Prevention) (TN)

¹³ Dirección de Atención y Prevención de Desastres de Bello (Disaster Prevention and Response System - Bello) (TN)

Ariztizábal (2008) built on Saldarriaga's (2003) research results, analyzing data for the Aburrá Valley between 1880 and the second semester of 2007. He itemized a total of 6750 events. In this study he concluded that flooding events were the most recurrent events (42%) followed by mass-movements (35%) and seasonal fires (15%). (Figure 3.5)

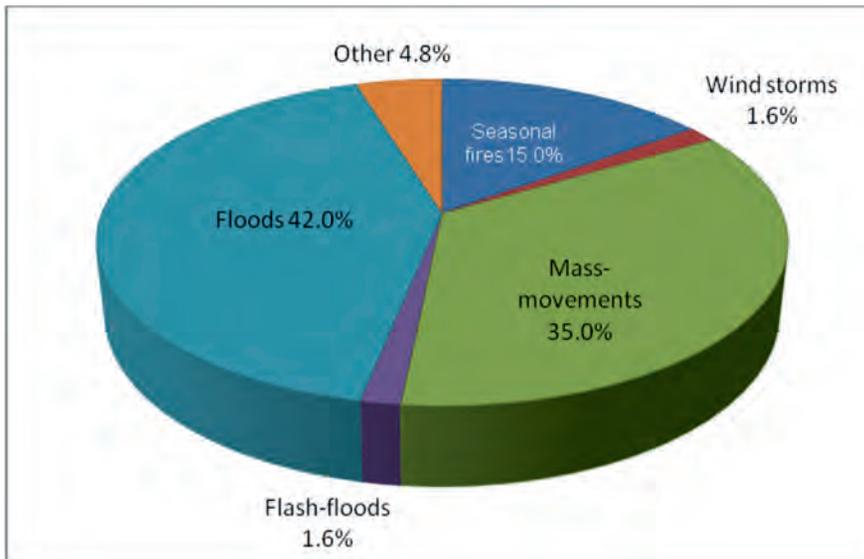


Figure 3.5
Percentage of records according to the originating phenomenon (hydro-meteorological phenomena are the dominant events; anthropogenic induced events are under the "others" item)
Source: R. Saldarriaga

One must make note of the fact that flooding events can include flash-floods, which have very different characteristics - in terms of discharge and mobility - from other flooding events such as over-bank floods.

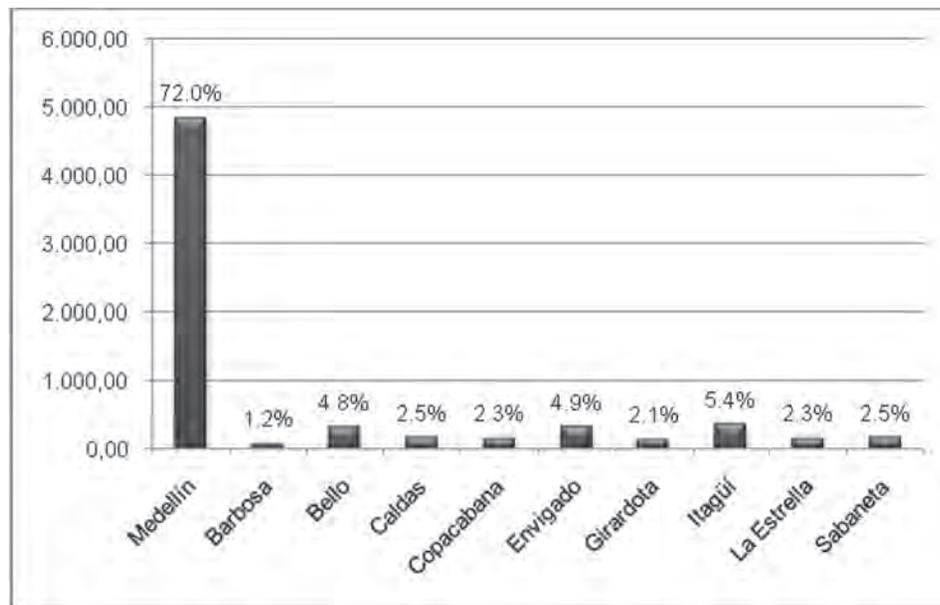
The sum of these 3 types of phenomena (flooding events, mass movements, and wild-fires) equals 92% of all the catastrophic events. 8 out of every 10 natural events in the metropolitan area are either floods or mass movements. Therefore, there exists a strong relationship between the geographic and hydro-meteorological conditions of the Aburrá Valley with the most frequent type of hazard or natural phenomenon.

It is important to highlight that despite the large industrial activity in the region, the natural and socio-natural factors are the most frequent causes of disasters.

Medellín is the municipality with the largest number of records (4849), which represents 72% of the total events. It is followed by Itagüí (5.4%), Envigado (4.9%), and Bello (4.8%). Barbosa is the municipality with the lowest number of recorded events (80), accounting for just 1.2% of all events, (figure 3.6). In terms of demographic figures, the municipalities with the largest number of associated events are: Medellín (population of 2 223 660), Itagüí (population of 231 768), Envigado (population of 175 337)

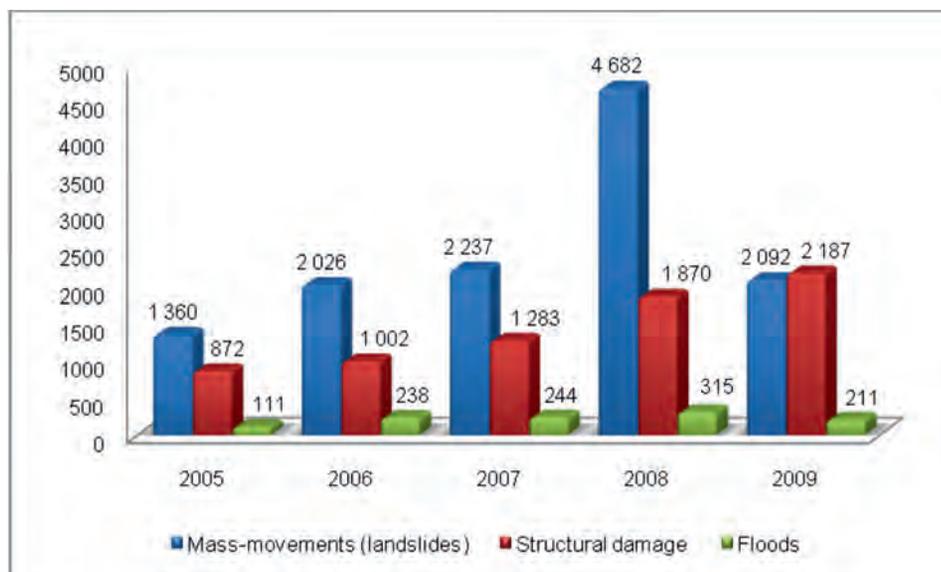
and Bello (population of 373 013). Again, Barbosa has the lowest population (42 547) (Aristizábal, 2008).

Figure 3.6
Number and percentage of records for each municipality. The largest the population, the largest the number of records (Medellín, Bello, Itagüí and Envigado)
Source: E. Aristizábal



The information for Medellín given by the *SIMPAD* corresponds to the inspections of risks and hazards undertaken between 2005 and December 2009. It clearly shows the increase of specific situations with the largest percentage attributed to mass movements (figure 3.7.)

Figure 3.7
SIMPAD Reports:
Number of inspections per emergency per year for Medellín, 2005-2009. Based on the type of emergency case.
Source: *SIMPAD*



The availability of information

The analysis of public policies concerning disaster risk management for the metropolitan area was conducted based on a bibliographic compilation and secondary data collection. The inclusion of the subject in the metropolitan programs, municipal development plans and annual investment operations and action plans of the last 10 years in the metropolitan region was also explored.

This analysis demonstrated the significant amount of studies focused on risk assessment, which at that time, lacked any standard and unified criteria to elaborate an appropriate rubric for risk assessment.

The cartographic information available was insufficient because it was limited to those projects prioritized by the development plans or to specific interventions of a technical nature which were necessary for the improvement and consolidation of public spaces. Moreover, there were no detailed topographic maps available to support studies, research projects and consultation concerning disaster risk management.

The categorization of HRZ in the land-use plans is out of context with the region's reality. Therefore, revision and assessment of these plans was essential. Fur-

thermore, updating the land-use plans generated new strategies for consolidating, entitling and protecting the most critical zones and for assessing new intervention areas in those sectors.

The major task during the bibliographic synthesis was to gather all of the different documents available. The bibliography was largely scattered throughout different public institutions and held by government officials who were reticent to share it with the general public.

Current Projects

Since 2004, the *Área Metropolitana del Valle de Aburrá (AMVA)*, as a part of its disaster risk management program of its Environmental Division, has led different metropolitan projects for the development of the region within the Metropolitan Development Plan - Metropolis Project 2002-2020.¹⁴ The Plan integrates the Disaster Risk and Hazard Prevention and Management within the Environmental and Natural Resources General Strategic Interventions Area. Its main objective is to coordinate and to assist technically and physically the municipalities of the Aburrá Valley on environmental issues associated with prevention and response to emergencies and disasters. It also seeks to promote the development

¹⁴ In Spanish: *Plan de Desarrollo Metropolitano Proyecto Metrópoli 2002-2020*. (TN)

and operation of local committees working on emergency prevention and response, and evaluating the pertinence of integrating the Metropolitan Network for Disaster Prevention and Response. The main activities completed in the last decade include:

- Implementation of the Disaster Risk Management Network in the Aburrá Valley, Risk Network 2007: strengthening of the institutional stewardship skills of the Local Committee for Disaster Prevention and Response (*CLOPAD*). This has been completed by articulating a risk management network for the Aburrá Valley in order to guide and coordinate the actions and policies needed for the prevention, response, and recovery of disasters and emergencies in a joint effort intended to enhance the region's integral development and the improvement in the quality of life of the people of the Aburrá Valley (AMVA, 2007).
- Implementation and completion of the Early Warning System:¹⁵ early warning systems are thought to be a useful tool in risk-mitigation management; fast data transmission can be promptly processed so that siren systems are activated when critical warning thresholds are reached. Thus, previously trained people on warning systems may have a quick response to an imminent catastrophe. There is an ongoing design and implementation of a metropolitan network linked to the municipality of Medellín's network, which has been active since 2003 and has 46 real-time pluviographs (figure 3.8) and 36 acelerographs. Nine of these latter instruments are within the Aburrá Valley's perimeter. In addition, the AMVA is currently negotiating the acquisition of a meteorological radar.
- Inclusion of risk management policies in the new land-use planning projects: to instill hazard and risk awareness is essential in the programs of land-use planning. Consequently, these topics have been included in the revision process of former land use plans of the municipalities. These inclusion strategies are in compliance with the current government legislation, especially in the Law 388 of 1997 regarding land-use planning, which promotes a reduction of hazards by regulating anthropogenic intervention in risk zones.
- Micro-zoning and seismic risk assessment in the Aburrá Valley, 2006. Identification and characterization of seismic hazards in the municipalities

¹⁵ In Spanish: *Sistema de Alerta Temprana* (TN)

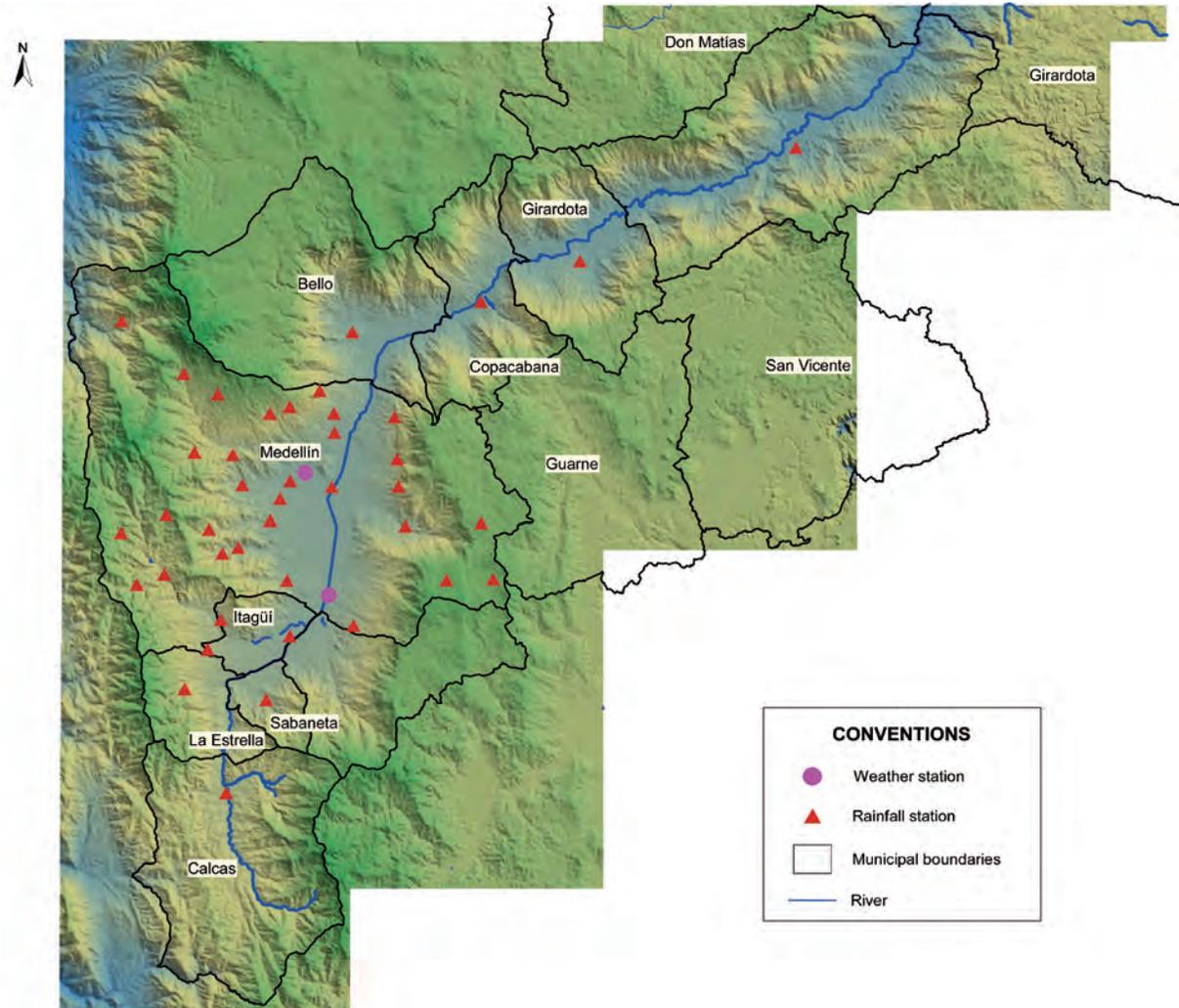


FIGURE 3.8
 Location of SIATA¹⁶
 pluviometric
 stations
 Source: SIMPAD

¹⁶ Sistema de Alerta Temprana de Medellín (Medellín's Early Warning System) (TN)

of the Aburrá Valley and the definition of the homogenous zones in the urban areas mapped to a scale of 1:10 000. From these results a further project looks to include building structural seismic reinforcements that include: indispensable facilities (hospitals, firefighter stations and mayors' offices), schools, public services and transportation grids and public cultural and sports centers (AMVA and Micro-zoning Consortium, 2006)

- Hazard, vulnerability and risk of mass movements, floods and flash floods in the Aburrá Valley as a land-use planning tool. Design proposals for risk management, 2009: robust compilation of data available regarding hazard and risk associated with natural phenomena which has been applied as a useful tool to inform land-use policies and land titling processes in neighborhoods. The proposal includes intervention strategies in the metropolitan area based on hazard, vulnerability and risk characterization and zoning as a tool to inform land-use planning policies, as well as a conceptual model of an information system. (AVMA/ Ingetec, 2007)
- Identification and general inventory of different risk scenarios: since 2008 the

Metropolitan Area is in charge of updating and managing the *DesInventar* database to identify all of the possible risk scenarios in the region. The Metropolitan Area conducted technical studies in all the municipalities. Furthermore, based on additional news reports and local *CLOPAD* reports, the Metropolitan Area updated and organized the entire new dataset according to the standards of the information system. Assessment and zoning of forests susceptibility to wildfires: evaluation of the vegetation's susceptibility to wildfires including: superficial fires, top fires and underground fires. This evaluation also involved preserved existent areas in urban zones. There is a wildfire commission office lead by *Area Metropolitana* and *CORANTIOQUIA*, which is also supported by the regional *CLOPADs*, that socialize and take pertinent actions related to the impacts of wildfire on the forests. These two leading environmental authorities have economic funds to support investment projects intended to strengthen this program.

- Design of chemical risk maps and maps detailing transportation routes of dangerous chemicals in the Aburrá Valley, 2006: detailed inventory regarding general conditions of hazards

induced by technology in urban and suburban areas, and highway corridors. This is a detailed inventory about all the companies that operate chemical products. Furthermore, this inventory outlines a methodology for the classification of this type of risk and it points out some recommendations so that companies follow the corresponding regulations. It also describes emergency and contingency plans and quality control standards and certifications that companies must comply with. (everything above is supported by an applied GIS platform) (AMVA and U.T. Tecnorriesgos, 2006)

- Development of disaster reduction and mitigation measures: infrastructure studies and designs based on the prevention and mitigation of risks, in order to reduce the socio economic and environmental damages expected in different risk scenarios such as: mass movements, floods and flash floods in the Aburrá Valley. This program also entails the completion of public works for disaster mitigation and the recovery of degraded areas. Every municipality has developed concrete actions supported with local funds. The municipality of Medellín is an outstanding example of this pro-active effort. Furthermore,

through resources collected from the environmental taxation, the Metropolitan Area has been able to assign funds for every municipality so that each one can implement research studies, design and contingency works, slope treatment, hydraulic projects etc.

- Vegetation and creek cleaning: even though this is solely the responsibility of municipalities, the Metropolitan Area has undertaken actions geared towards the improvement of the quality of the hydric resources in the Aburrá Valley. The Metropolitan Area has supported the municipalities on issues related to prevention of emergencies caused by floods and flash-floods that are usually triggered by the mismanagement of solid waste on micro-watersheds. In the municipalities of Medellín, Bello, la Estrella and Itagüí actions of improvement are part of current government programs as control mechanisms aimed at mitigating flooding and flash-flooding impacts. In all of the other municipalities not mentioned above, these improvement actions have not yet been implemented.
- Geographic Integrated Information System (GIIS): up to date, the Aburrá Valley lacks of an integrated information system that connects data

from different institutions and organizations to efficiently inform the community, institutions, and the organizations themselves. In sum, there is not an instrument that supports risk management actions conducted by the Aburrá Valley's Management Risk Network. There does exist, however, a website called: "www.redriesgos.gov.co" which is administered by the Metropolitan Area, where the ongoing projects related to risk management issues can be found. Nonetheless, a second development phase is needed to consolidate a GIS platform and a unified hardware technology that supports this initiative of an integrated information system.

- Strengthening human resources, education and training in risk management: currently, several neighborhood, district and environmental committees have been grouped into a metropolitan area coalition. This alliance was first established in Medellín and is currently composed of 170 volunteer groups which have received training in risk management. They have an active operational approach that provides resources on an annual basis to accomplish

processes of formation, training and the supply of technical equipment. In 2005 the AMVA subscribed to this partnership with 40 environmental committees (*CUIDA*) and ten young scholars' research groups. It continues supporting this project procuring the necessary resources for the sustainability and growth of this network in all the municipalities of the Metropolitan Area.

- Public information campaigns: intended to create collective awareness among the Aburrá Valley people about hazard, vulnerability, and risk management.
- Inter-institutional training on emergency-response cases: it is a group of technical, operative and administrative activities offered by a team of specialists, professionals, and managers working for the *Área Metropolitana*, *CORANTIOQUIA*, *SIMPAD*, National Risk Management Direction Office, universities or several other organizations who connect with all of the intervention chain's members in order to optimize disaster and emergency-response programs in the Aburrá Valley improving people's technical skills and expertise.

Conclusions

- For the non-recoverable HRZ of the Aburrá Valley, a large amount of legal and constitutional regulations are available: laws, resolutions and land-use plans, among others. If these regulations had been properly enforced, human settlement on non-suitable zones could have been avoided. However, as this was not the case, the spread of the population in those HRZ produced excess environmental pressure on hydric resources, impoverishing living conditions and increasing vulnerability in all the population.
- All the areas identified as HRZ have yet to be fully controlled in order to avoid new settlements or the returning of people to the zones from where they were previously removed.
- The absence of risk management policies in the municipal development plans has made the distribution of resources and the completion of projects aimed at mitigating vulnerability more difficult.
- The relationship between municipal administration offices and the different environmental institutions of the region (such as the *Área Metropolitana del Valle de Aburrá* and *Corantioquia*) is still ambiguous. Local administration offices lose credibility when a certain situation is first assisted by an organization and then it is redirected to another one. In most of these cases problems take a long time to be solved satisfactorily. In these cases, efforts for reducing vulnerability have not been accomplished.
- Lack of continuity by administrative and technical staff in the local disaster prevention and response committees creates information breaches in the institutional records. Furthermore, the same situation affects and delays all of the work in progress tasks related to risk management issues.
- Regional environmental impact studies and their implications in projects and proposed actions according to their predicted results lack continuity. This situation restrains the allocation of resources for the execution of projects and makes inter-municipality interventions more difficult.
- A decrease in personal income is another factor that affects the environment and raises the probability of disaster or emergency occurrences: fragile and incomplete residential buildings, defective electricity, the use of wood as the main energy resource to cook food, mismanagement of runoff and waste waters and deficient

waste and debris collection and disposal.

- The absent of a well-equipped instrument network to measure weather conditions, and the inexistence of a warning system hamper on-time alerts that allow for the opportune evacuation of people from the areas located near river banks when flooding events take place.
- In general, risk conditions tend to rise due to the increase of the vulnerability of human settlements located in hazard zones, with a higher recurrence during rainy seasons.

Recommendations

The following courses of actions are recommended:

- Monitoring each municipality by implementing the use of risk management indexes to ensure the timely analysis and evaluation of the results of the interventions intended to mitigate vulnerability.
- To develop inter-institutional coordination mechanisms that allow for a unified approach for data management. This information must be available for public access either online or in hard-copy records.
- The Planning and Government secretaries of each municipality should establish controls that

allow for the analysis and assessment of the technical studies and completed projects. In addition, these offices must be in charge of monitoring all the critical sectors.

- The establishment of systematic programs to distribute physical resources in all the disaster prevention and response cases. By implementing these programs it would be possible to identify optimal getaway routes, and to improve minimum-time responses for getting access to the necessary physical and human resources.
- To strengthen the disaster and emergency prevention and response neighborhood committees by supporting them with physical, human, and technological resources so that they can be effective and worth functioning.
- To apply and run an early warning system that allows a forecasting modeling to implement contingency plans and siren activation systems.
- To implement educational programs on building methods for high slope zones, urban building regulations, correct handling of runoff waters, sewage waters, solid waste and debris disposal.
- To conduct local censuses in order to identify the people living in HRZ.

- Taking into account that there are cost-benefit reasons to consider in recovering the so called non-recoverable risk zones, it is relevant to apply field-tested models such as the Juan Bobo creek model (enhancement and in-situ relocation in the city of Medellín). These models should technically, economically and socially assess the cost-benefit relationships. They must also assess the probability of recovery in risk zones by modeling building construction prototypes, adequate materials and building designs, as well as the appraisal of actions of mitigation and vegetation characteristics, among others.
- To incorporate updated real estate information into GIS databases, linking this dataset to process-prevention and mitigation records in order to cross-correlate them with other demographic urban data such as surveys and any other information included in the building records.
- To create a line of research about urban studies focused on new materials and technologies for building in high- slope zones or places with special geotechnical requirements.
- Water pipeline and sewer systems, currently restricted or banned in non-recoverable zones, are necessary to mitigate vulnerability and risk. Therefore, these systems must be considered as first action steps aimed at mitigating risk. Additionally, other urban projects focused on the control of surface waters, slope stability, and flood-monitoring strategies are needed, not only to reduce vulnerability and risk conditions, but to enhance the quality of life of the population in different zones of the region.
- To strengthen the municipalities of the Aburrá Valley through transferring mechanisms and economic taxation plans for risk management. The municipal administrative authorities of the Aburrá Valley must conduct an applicable methodology so that these institutions can propose and implement insurance policies contracted with insurance companies in order to cover all the losses in housing and public and private infrastructure.

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LANDSCAPE MANAGEMENT IN THE ABURRA VALLEY: TOWARDS NATURE CONSERVATION IN THE CITY

Claudia Helena Hoyos Estrada

Sustainable metropolis?

Colombia, like most of the nations of the world, changed in less than 50 years from having a mostly rural population to a predominantly urban society. This tendency also took place in the department of Antioquia, where most of the population was concentrated in Medellín and the Aburrá Valley, in such a way that nowadays 70% of the department¹'s population is concentrated in less than 2% of its territory. The physical repercussions of this problem generated an overflow of the urban areas of Medellín and the surrounding municipalities, producing the phenomenon known as conurbation, which was beyond any planning action in a metropolitan context (AMVA, 2007a).

As a consequence, the rapid and unplanned growth of this city-region

went beyond its environmental limits, due to the profound transformations generated on the natural environment. The urban expansion towards the slopes augments the vulnerability of natural disasters; the alteration of ecosystems significantly reduces their capacity to provide the environmental goods and services essential for the population; the waterproofing of the soils because of the asphalt and concrete alters the natural drainage patterns, increasing the risk of floods; the high air pollution levels, generated by industrial activity and vehicles seriously affects the health of the population; the great asphalt and concrete surfaces generate the so called "heat islands", increasing the temperature because of the reflection of the atmosphere of a significant part of the solar radiation; among other negative effects (Hoyos, 2007).

¹ Departments are country administrative subdivisions, formed by a grouping of municipalities. Colombia is formed by thirty-two departamentos (departments or provinces). (TN)

By the year 2020, an increase of more than one million people with respect to the current population is expected in the Aburrá Valley, a tendency that compels reflection on how to supply the demand for lands appropriate for urbanization in a territory with strong limitations (AMVA, 2007b). It also makes it necessary to think where to direct this overflowing urban expansion: towards the slopes and high areas of the watersheds and other environmental protection areas? Toward the north, in the alluvial river plain? Or towards the interior of the city? What type of landscape do we want to have in the future: one that remains green, or a gray and fragmented one?

Another of the negative effects of the rapid growth of the cities is the reduction of green areas, which are considered by the World Health Organization as indispensable, because of the benefits that they have for the physical and emotional wellbeing of the population. The green areas do not only help to breathe fresh and clean air; they are also places for leisure, recreation and social interaction. They also contribute in mitigating the urban deterioration of cities, making them more habitable. In addition, green areas and vegetation cover in urban and peri-urban zones are essential for the biological and hydrological balance and for economic development. Moreover, it is considered that these green areas are the maximum contact many citizens have with nature (AMVA, 2007a).

The constriction of the landscape

One of the main environmental assets of the Aburrá Valley is the greenery of its landscape, surprising and positively impacting visitors. This is due to the relief forms of a valley flanked by steep slopes, with imposing hills framing the sight from all the points of its geography, both from the bottom of the valley and from its slopes. Additionally, this landscape shows that there is a strong connection between the rural and the urban, the local and the regional, which has shaped its cultural identity and that inevitably reminds us that the city is an open ecosystem that forms part of larger systems integrating it. (Vélez, 2007a).

This rapid and weakly-planned growth of the city is precisely what generates the intensive changes of the landscape, leading to the detriment of these natural attributes, generating an impoverishment of the landscape and a decrease in the characteristic elements producing, not only a feeling of loss and isolation from nature in the society, but also negative impacts over the natural environment (Nohl, 2001; Vélez, 2007a).

The lack of application of an ecological design in function of the landscape and in the organization of the urban growth of the region has been notorious. In the last decade, the establishment of large, high-rise residential complexes, and of

divisions of lands into plots in the urban-rural borders (many of them on the base of hills, high parts of slopes and environmental protection areas) has been a phenomenon that not only reduces the quality of the landscape, but also the capacity of the natural systems to provide the environmental services required by the population, especially the urban one.

The areas predominantly covered by vegetation should be considered as a resource, as a good, as a real asset of the cities, whether it be as part of the natural urban elements with a fundamental ecological and landscape function, or as natural elements associated with artificial or built components. (AMVA, 2007a).

When adequately managed, these areas can guarantee the sustainability of the environmental goods and services that are important for the citizens, such as the fixation of carbon dioxide and other atmospheric pollutants, air purification, water filtration through the soil, winds, temperature, rain and noise regulation, and especially the beautification of the landscape. The increase and improvement of the cities' green areas should be considered as a relevant aspect of urban management, if levels in accordance with the current and future population needs are to be reached. Therefore, it is necessary to promote guidelines for the planning of the land, oriented to protect and increase the landscape's greenery,

both in public space and in private premises. (Vélez, 2007b).

The Main Ecological Structure of the Aburrá Valley

Via the concept of Main Ecological Structure (MES), Bogotá's Land Use Plan set the bases for the construction of a large system, integrating the urban parks and protected areas. The decree 190/04 defines the MES as the "grid of areas and corridors that maintain and conduct the biodiversity and the essential ecological processes through the territory, in its different occupational forms and intensities, providing it with environmental services for its sustainable development".

The MES is a proposal for the reordering of the territory that integrates the rural landscape, the urban structure and nature, creating a grid of spaces that support and conduct the biodiversity processes and the environmental services of the territory (Andrade, 2006).

A series of studies and actions carried out by several entities in the last decade have made it possible to define the MES of the Aburrá Valley as the area containing the main natural and built elements that determine the environmental offer of the territory, constituting a structuring element from upon which the urban and rural systems are organized.

The Metropolitan Land Use Planning Guidelines define the natural base of the Aburrá Valley

as the territory made up by the hydric system of the Medellín - Aburrá River, the natural reserves and land protection systems and some transversal axes for the ecological connectivity articulated with an urban-rural environmental protection border. (AMVA, 2006). The first component of this natural base is conceived as a hydrographic basin from its ordering, management and reappraisal as a fundamental structuring element of the territory. The basic management criterion is to give priority to its natural characteristics over and above the components of mobility and public space.

The second component is made up of the protected areas and protection lands that host strategic ecosystems, the natural cover and regional biodiversity. The notion of “border” is intended to become effective and sustainable, to allow the contention of the urban expansion towards the more vulnerable areas, such as the medium and high parts of the eastern and western slopes of the valley.

The third component covers the transversal connectors or ecological networks, most of them associated with buffer zones of the creeks and of the river, and others connected to green areas of the artificial and built system. The fundamental management criterion is their recovery and care as protection lands and as components of public space.

These MES components have been characterized through different studies, such as the Plan for

Land Use and Management of the Aburrá River Basin (PLUMARB), the Metropolitan System of Protected Areas (MSPA), the Antioquia’s Central Park (ACP) and the Public Urban Green Areas Master Plan (PUGAMP), which will be analyzed in order to present a real image of this natural base supporting the territory’s land use, necessary to ensure the sustainable development of the Aburrá Valley.

Plan for Land Use and Management of the Aburrá River Basin (PLUMARB)

As stated by Law Decree 1729 of 2002 concerning hydrographic basins, “(...) the main purpose of a basin plan is to set up the use and sustainable management of the renewable natural resources, in order to maintain or reestablish an adequate balance between the economic exploitation of such resources and the conservation of the physic-biotic structure of the basin, and specifically of its hydric resources” (AMVA and Universidad Nacional, 2007).

The PLUMARB, adopted by Resolution Number 2 of 2007 of the Common Basin Commission, is a tool for the territory’s administration. It contains a group of regulations and guidelines for its management and of the superior hierarchy of environmental determinants, which should be incorporated by the municipalities in their land use plans.

One of the most important products of this plan is the environmental zoning of the basin of the Aburrá River, with the purpose of orienting the management systems and their corresponding uses according to the natural offer, the restrictions and their potential for the consolidation of a territory under the environmental sustainability parameters, in such a way that the group of actions, both public and private, propend for the improvement of the quality of life of their inhabitants (figure 4.1).

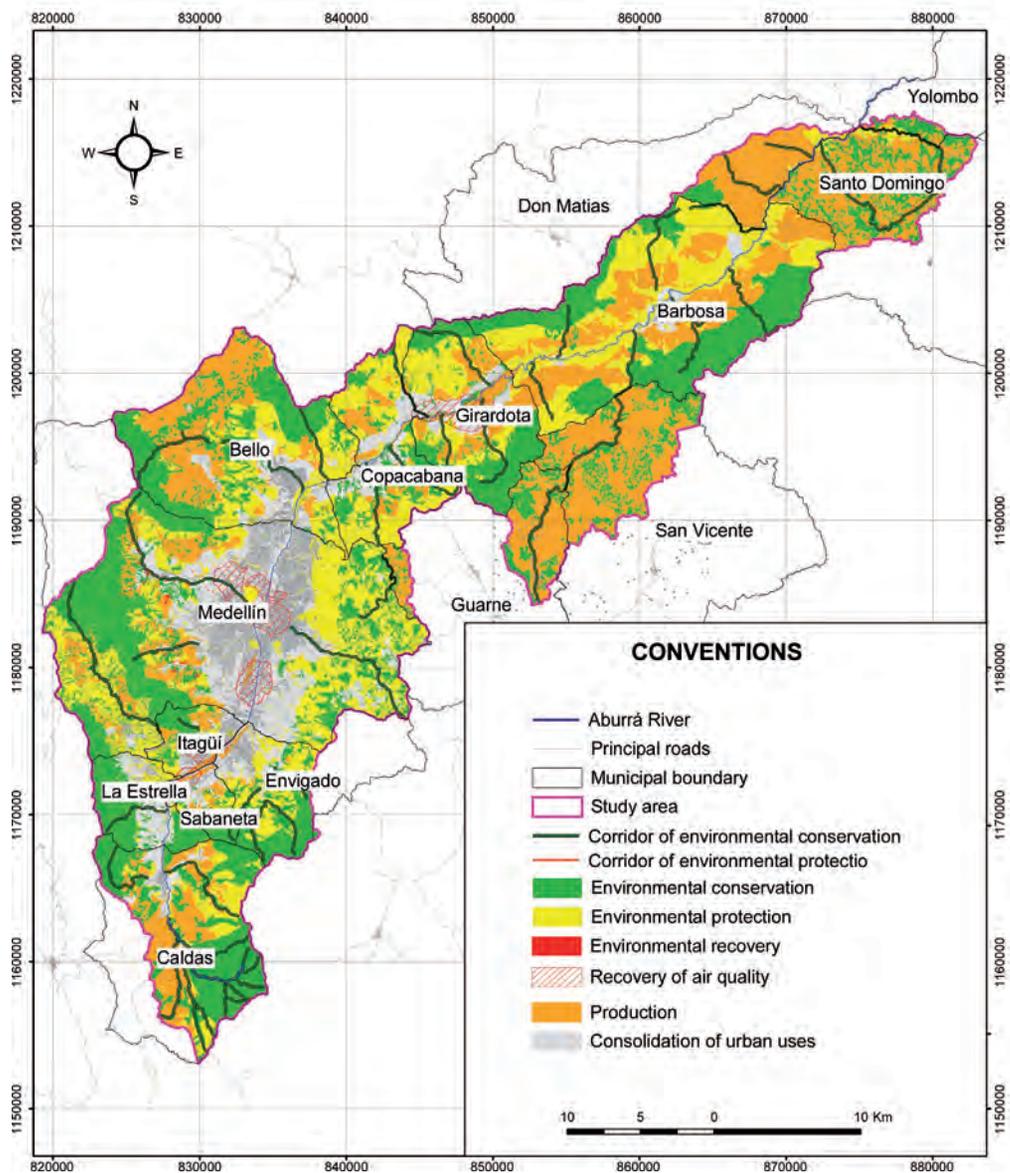


Figure 4.1
 Environmental zoning of the basin of the Aburrá River
 Source: AMVA and Universidad Nacional (2007).

The definition of the different units that make up the environmental zoning of the basin are hereafter explained:

- **Environmental conservation:** it corresponds to the zones that should be oriented by the preservation and conservation of the natural resources, particularly by the maintenance of the natural woody vegetation cover as a support of the biodiversity and the hydric performance of the basin.
- **Environmental protection:** zones that should be oriented towards the protection and safeguarding of the natural resources and the cultural and archaeological patrimony, although a sustainable exploitation could be carried out, guaranteeing a continuous flow of the desired services, without reducing the environmental values or future productivity.
- **Environmental recovery:** zones that present an environmental deterioration and should be recovered, either for their later agricultural, livestock or forest use, or for different urban uses, depending on the context of each zone.
- **Production:** zones for industrial, mining, agricultural, livestock and forest production, these latter in the rural zone of the basin.
- **Consolidation of urban uses:** zones that require an urban

infrastructure for their development, which can be accomplished through appropriate urbanizing and building processes serving as physical support, i.e., uses related with housing, industry, commerce, services and infrastructure works.

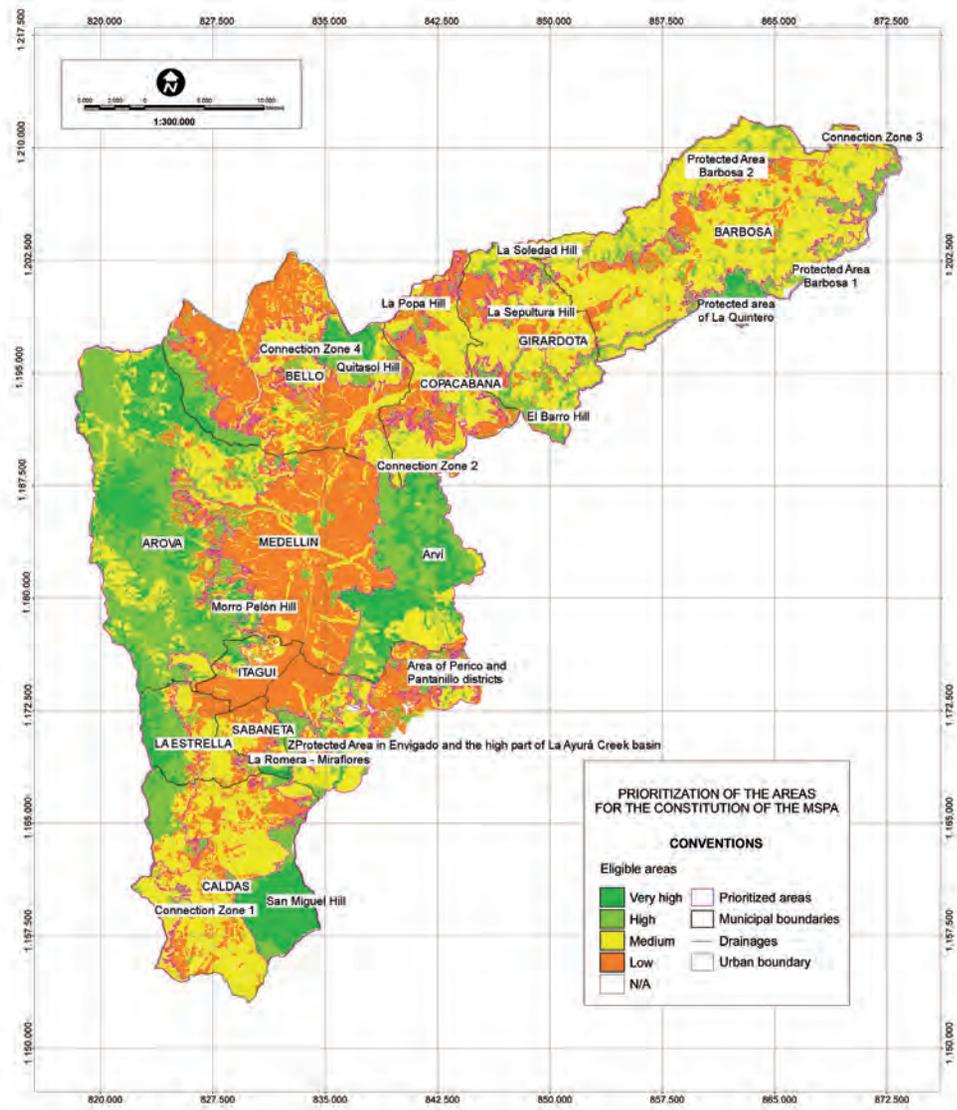
Metropolitan System of Protected Areas (MSPA)

The Metropolitan System of Protected Areas is visualized as a strategy for the conservation of the biological diversity, the environmental goods and services and the socio-cultural values associated with the Aburrá Valley. This system is conceived as a participative and inclusive process that allows the articulation of the urban and the rural. As the PLUMARB, it stands as an environmental determinant for the land use planning of the region (AMVA and Universidad de Antioquia, 2009).

The MSPA deals with the construction of an urban-regional articulation system that connects the big metropolis with its closest environment, allowing to protect, restore and increase the visibility of the existing ecosystems and of the native populations of fauna and flora species, the functional connectivities and the environmental goods and services, the offer of which had already exceeded the possibilities of the nearby and internal environment.

The MSPA constitutive areas are those where there is still a good deal of regional biodiversity (natural covers as woods and undergrowth), which provide environmental services required by the population (such as regulation and hydric potential, climatic regulation, zones for recreation, ecotourism and beautiful landscapes, urban expansion barriers and pollution depuration through CO₂ capture) and those containing archaeological, social and cultural values (figure 4.2).

Figure 4.2
Metropolitan
System of
Protected Areas
Source: AMVA and
Universidad de
Antioquia (2009).



Antioquia's Central Park (ACP)

What happens outside the Aburrá Valley has consequences over what is inside, and vice versa. The Valley critically depends on the environmental offer, services and resources from surrounding regions, while these depend on diverse aspects of the city-region (2009). The *per capita ecological footprint* indicators establish that the population and the metropolitan economy have an impact on a 54 596.237 km² of territory, equivalent to 47.4 times the area of the geographical valley (Agudelo, 2002). As a consequence, the ecological dependence of the Aburrá Valley comes to 99.99%, since its carrying capacity only supplies a small part of the food, water and recreation spaces demanded. Therefore, the Aburrá Valley as a functional urban system "imports" its sustainability from a much larger eco-region, which contains the strategic ecosystems upon which it depends (AMVA, 2006).

Taking this into account, Antioquia's Central Park Regional System of Protected Areas was structured with the general objective of contributing to the conservation of the biodiversity and the sustainability of environmental goods and services that are essential for the sustainable development of Antioquia's central region, which is

made up by 50 municipalities and an area close to 900 000 hectares (CORANTIOQUIA, 2008).

The prioritized areas of the ACP are those providing environmental services for recreation, enjoyment and leisure; for diminishing the atmospheric pollution, for the conservation of biodiversity, for the supply of conservation and hydric regulation, which together, all guarantee the environmental sustainability of the region, including the Aburrá Valley (figure 4.3)

Public Urban Green Areas Master Plan (PUGAMP)

The Public Urban Green Areas Master Plan is a planning and management instrument for the improvement of the urban green areas, which also permits its articulation with the natural ecosystems that surround the Aburrá Valley. One of its main proposals is the Public Green Areas System, which includes those areas where nature, vegetation cover or plantations with ornamental purposes prevail and make up the frame or structure of the social and environmental functions. It also includes the natural elements of the private facilities that, because of their nature or use, are destined for the satisfaction of urban collective needs that transcend the boundaries of individual interests. (AMVA, 2007a).

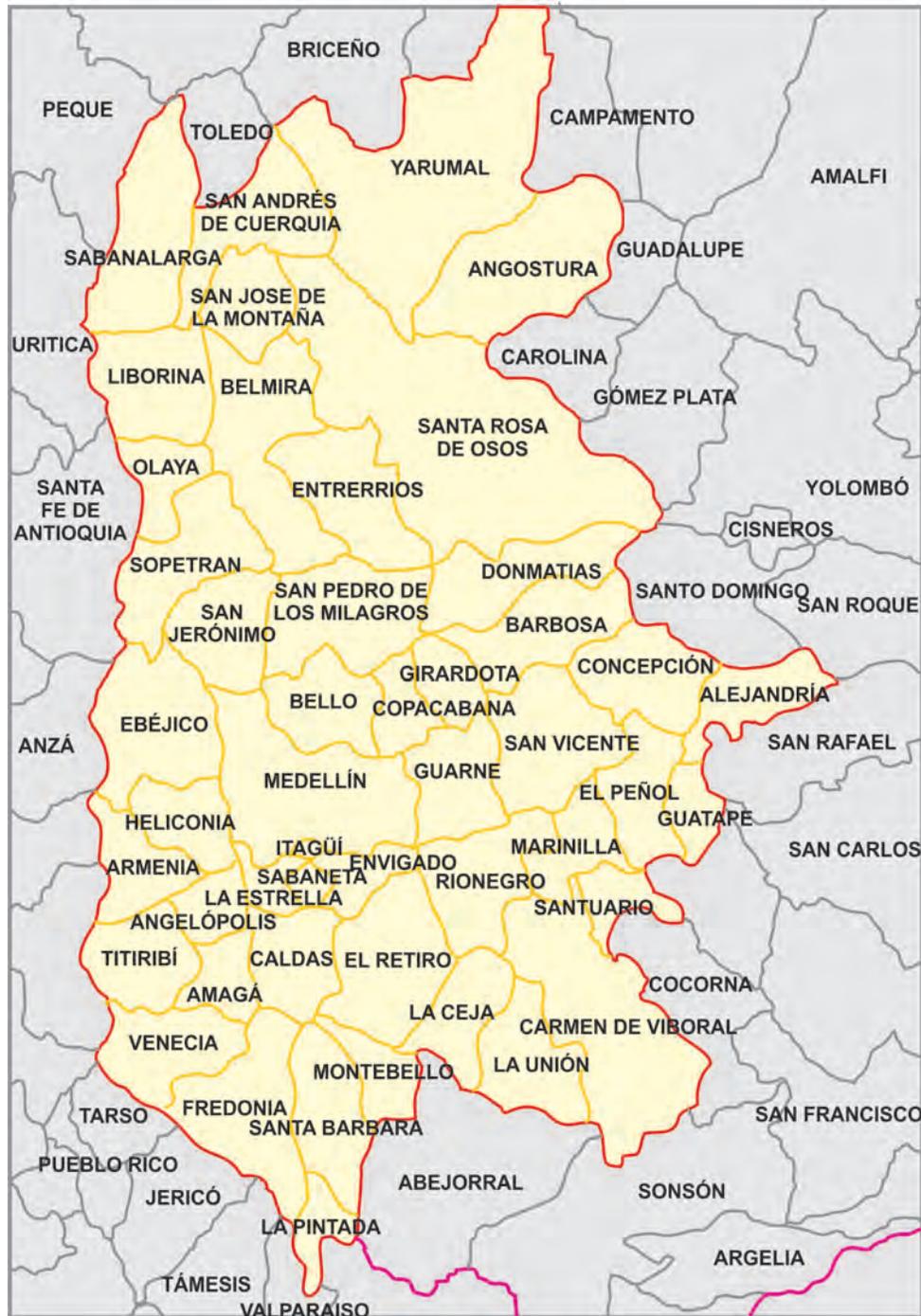


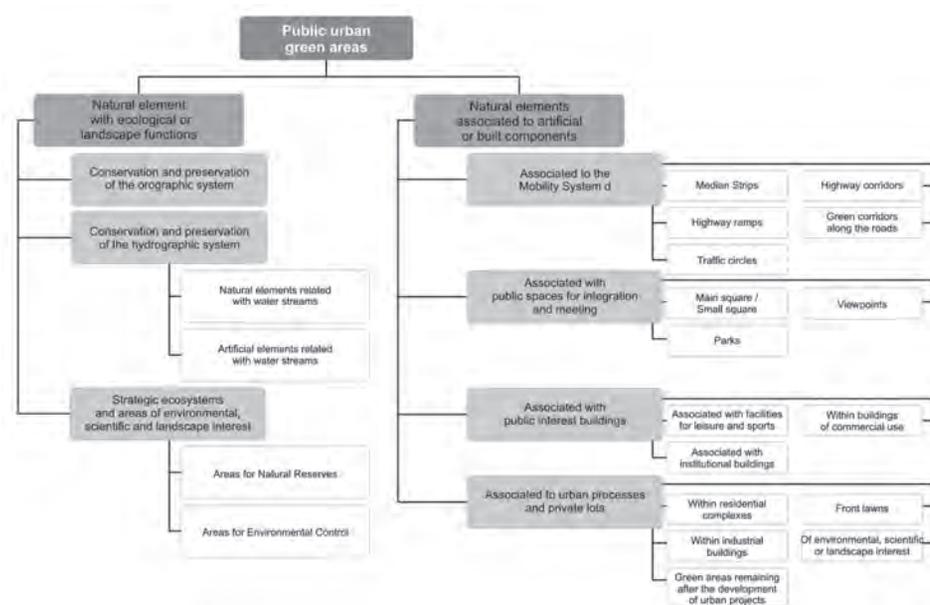
Figure 4.3
 The delimitation of Antioquia's
 central region
 Source: CORANTIOQUIA, (2008).

The traditional view of public space considers the cities' green areas as zones for recreation and the embellishment of the landscape, while trees are considered to be part of urban facilities. Due to the environmental problems associated with the rapid growth of cities, their inhabitants are increasingly demanding decision makers and planners to acknowledge that the urban green areas must be conceived and valued in an integrated and holistic manner, since they provide many other social and environmental benefits, beyond their traditional recreational or aesthetic uses. The benefits include the support to the physical and emotional health of the citizens, the supply of drinkable water, flood control, residual water treatment, reduction of air pollution, solid waste management, micro-

climate regulation, enrichment of biodiversity and poverty reduction through income generation, among others. (Sorensen *et al.*, 1998).

One of the main products of the PUGAMP is the proposal of the Public Urban Green Areas System, through which it is possible to plan, manage and preserve the natural base of the Aburrá Valley. This system is made up by two subsystems that reflect the forms of intervention of the natural zones or green areas in the metropolitan urban development processes: the natural elements that perform an ecological and landscape function, and the natural elements, associated with artificial or built elements (chart 4.1), which are described in the following section:

Chart 4.1 Public Urban Green Areas system for the Aburrá Valley



Source: AMVA (2007a).

Natural elements that perform an ecological and landscape function

- Green areas for the conservation and preservation of the orographic system: they constitute the natural base of the territory and are formed by the mountain ranges surrounding the cities, as well as the orographic accidents, such as hills, slopes and mountains. The green spaces, public or privately owned, of restricted or limited use, are the ones that make up the general structuring system of the territory, and correspond to the areas and elements of protection and conservation of the system, as well as those offering a significant ecological, environmental or landscape importance, since they perform the function of primary organizers. These elements offer the highest landscape, recreational and public space potential for the urban zones, as well as being the border between the urban and the rural zones, which makes them a basic urban and peri-urban environmental resource.
- Green Areas for the conservation and preservation of the hydric system: they are made up of the buffer zones of the most important currents and tributaries that cut through the urban territory. They are

areas of ecological reserve, not for building, of public use for passive and contemplative recreation, made up by a stripe with a variable width (parallel in each side to their permanent courses and to the source zones). Its main destination is the maintenance, protection, preservation and ecological restoration of the hydric sources and nearby ecosystems.

These public green areas perform important environmental functions in the urban environment because, in addition to preserving the city's hydrological resource and configuring a direct connection with their natural environment through ecological networks, they serve as protection stripes against floods and overflows, give stability to steep slopes in settlement areas, can be used for utility lines and as spaces for landscape naturalization and recreation.

- Strategic ecosystems or green areas of special environmental, scientific and landscape interest: areas or ecosystems that, because of their ecological attributes and natural conditions, provide basic environmental services, additional to their own ecological importance, such as water production, biodiversity conservation, soils

protection and the depuration of atmospheric pollutants.

Therefore, higher parts of watersheds where water is used for domestic consumption - urban or rural - must receive special treatment.

This natural component is subdivided into three functional types: natural parks, regional and municipal protected areas and environmental control areas.

System of natural elements associated with the artificial or built system

- Green areas associated with mobility systems: they are made up by the road network system, the railway system, cycle paths, pedestrian paths, old paths and other elements that are part of or complementary to the mobility systems. The areas correspond to traffic circles, median strips, highway ramps, highway corridors and green corridors along the roads.
- Green areas associated with public spaces for integration and meeting: areas included in public spaces that make part of the city's structuring system, i.e. built and artificial spaces resulting from direct human intervention, providing diverse services to the population according to the character, arena, cultural and patrimonial value and activity to which they are destined. This component is subdivided into four functional types: parks, main squares, small squares and scenic viewpoints.
- Green areas associated with public buildings and collective facilities: areas destined to the satisfaction of basic collective needs, both the ones that allow the supply of public utilities to the community, and the ones that support the running and operation of the city as a whole. They include the zones associated with national monuments, murals, sculptures, ornamental fountains, sports centers, cultural centers and outdoor shows. This component is subdivided into two functional types: the green areas associated with nodes of activities or centralities, and green areas associated with institutional buildings.
- Green areas associated with urban projects and private premises: most of them are private or the result of an urban project, and have an ornamental, landscape, security or functional character. This component is subdivided into five types: green areas remaining after the development or urban projects, green areas within residential

complexes, green areas within industrial buildings, front lawns, and private premises of special environmental, scientific or landscape interest. The characterization of Public Green Areas (PGA) in nine of the ten municipalities that make up the Aburrá Valley accorded a total of 2153 hectares of green urban areas, representing 18.2% of the net urban area (table 4.1)

Table 4.1 Public Urban Green Areas in the Aburrá Valley

MUNICIPALITY	NET URBAN AREA (ha)	URBAN PGA (ha)	PERCENTAGE OF THE URBAN AREA IN PGA	NUMBER OF PGA
Medellín	8439	1591	18.9%	3238
Bello	1043	397	38.1%	289
Itagüí	881	39	4.4%	211
Barbosa	107	4	3.3%	36
Caldas	215	9	4.4%	22
Copacabana	313	33	10.5%	98
Girardota	198	17	8.7%	39
La Estrella	292	14	4.8%	83
Sabaneta	335	49	14.6%	77
Total Metropolitan Region	11 822	2153	18.2%	4093

Source: AMVA, 2007a.

According to the table 4.2, the number of PGAs associated with the natural elements that perform an ecological and landscape function of the system represents only 11.7% of the total regional number. Nevertheless, the area is more than half of the total regional area (51.7%), indicating that this is a very important category of the system, made up of spaces that, on average, are considerably larger and more representative than the green areas associated with the artificial or built component.

Table 4.2 Metropolitan System of Public Urban Green Areas, by subsystems

SYSTEM	N.º PGA	AREA (ha)
Natural elements that perform an ecological and landscape function	465	881
Natural elements, associated with artificial or built components	3527	791
Total public urban green areas	3992	1672

Source: AMVA, 2007a.

Along these lines, the Public Green Areas System represents a structure that permits an integral and differentiated management of the green urban areas, in accordance with the social, public, security and ecological requirements of the Aburrá Valley.

Ecological urban network of the Aburrá Valley

The term “connectivity” refers to the capacity of a landscape to maintain the movement of organisms, genes, materials and energy. It also implies the linkage between habitats, species, communities and ecological processes at spatial and temporal scales. Similarly, connectivity maintains ecological processes that have been interrupted by human activities. For that reason, the restoration of connectivity contributes to the reparation of the negative impacts generated by development that takes place on top of natural ecosystems and biodiversity.

Ecological networks can be defined as systems in which the

natural elements are interconnected, and therefore they behave like biological diversity reserves, increasing the natural flow of organisms, energy and minerals; directing the natural processes of dispersion and migration; as well as behaving like stabilizing factors of the landscape. (AMVA, 2007a)

Ecological networks generate basic physical conditions for the ecosystems and biodiversity maintenance of a landscape or territory such as the urban one, where socioeconomic development places great pressure and creates fragmentation processes on the natural ecosystems. As a consequence, these networks are not only strategies that permit the reduction of the landscape fragmentation, but they can also drive urban expansion towards more compact forms, with less impact and more sustainability (AMVA and Universidad Nacional, 2008).

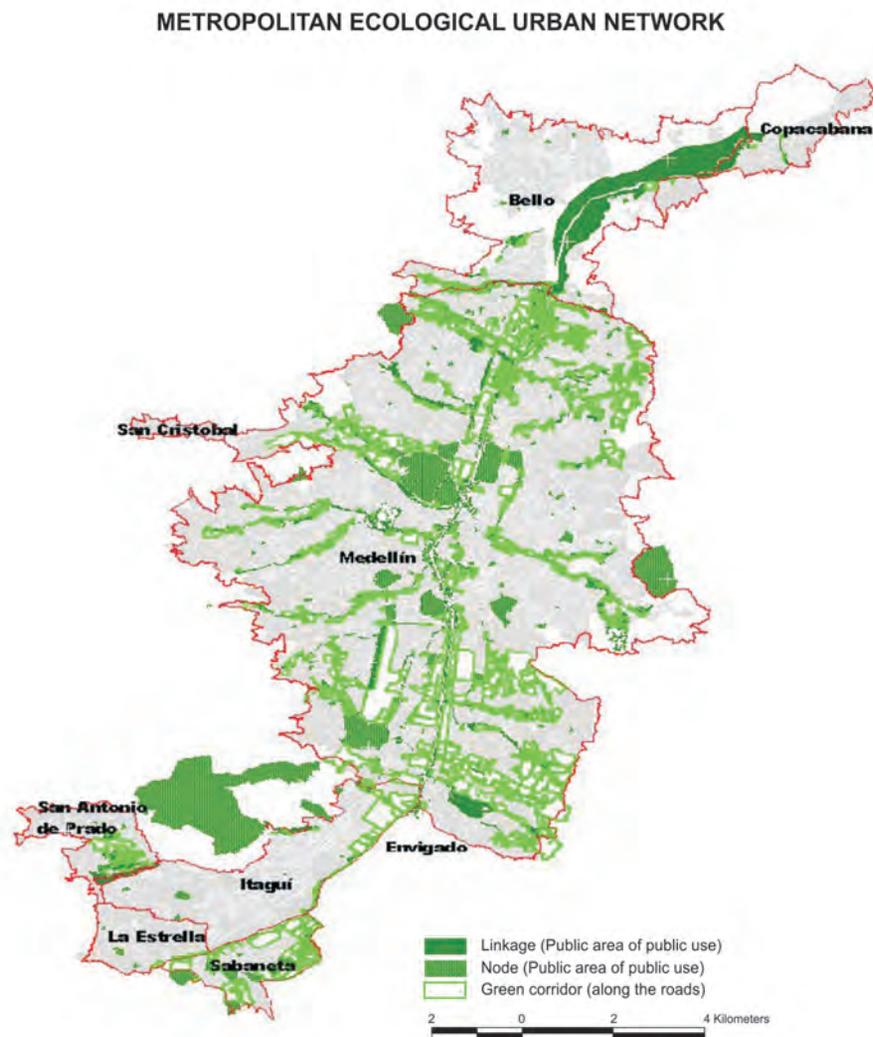
Along these lines, the PUGAMP identified an urban ecological network in the Aburrá Valley, made up of 43 corridors connecting

in 103 nodes, 818 fragments and 1452 linkages, over a total of 4093 polygons that make up the Metropolitan System of Public Green Areas. (AMVA, 2007a)

Each of the 43 identified corridors is characterized according to the environmental function it performs and the green areas each are made up of, therefore revealing a close connection to the buffer zones of the creeks that drain towards the Aburrá-Medellín River

and with the mobility corridors. In some cases, these corridors are constituted by polygons with the predominance of the green areas associated with urban processes and private premises (figure 4.4). From these, 17 are associated with the hydric system, 13 with the mobility system and 13 with the rest of the artificial and built system (green areas remaining after the urban processes and public spaces for integration and meeting).

Figure 4.4
Aburrá Valley's
ecological urban
network
Source: AMVA
(2007a).



Private areas (empty urban plots and open spaces such as clubs, educational institutions, industries, among others) have an important presence in the group of urban green spaces, while many of them are strategic for the regional ecological network. In both cases they not only bring green areas closer in general, but can also have better ecological features than the public ones, which demands a strategy of continuance and maintenance if the existing ecological network is to be consolidated or expanded. In doing this it is very helpful to act in accordance with urban obligations for the assignment of green or free areas, in housing, industry and service projects in the metropolitan region. (2007a).

Finally, it is important to point out that the main functions of the transversal connectors in the land use model proposed by the metropolitan guidelines is the articulation between protection boundaries within the Medellín-Aburrá River system and the adjacent strategic ecosystems. Therefore, it is necessary to attempt to preserve the basins in their natural state. Anthropogenic intervention should only occur when instability or risk conditions call for it, or when it is absolutely necessary for the incorporation of new structures for the mobility system. In such cases, proposals involving biotechnology or ecological design are to be used.

Conclusions

In order to guarantee a green landscape in the Aburrá Valley it is necessary to conceive public space as an integrator and connector of the urban and the rural, of the public and the private spheres; for these reasons it is essential to identify and apply rapid and effective mechanisms that allow the increase, conservation and management of the green areas and their associated natural ecosystems. The consolidation of a public space system integrating natural and built areas with connectivity units and networks with defined environmental functions represents, not only a challenge, but an opportunity for the city-region and, especially, for governors and planners.

In order to achieve better ecological connectivity and functionality in the metropolitan urban landscape, it is necessary to preserve the existing green public areas and to formally incorporate public spaces included in the Aburrá Valley's urban ecological network, guaranteeing its permanence as a public space that is essentially green. In consequence, land use planning and urban design have a fundamental role in the identification of special solutions and management instruments, in order to orient urban processes towards projects that cause less landscape fragmentation.

The Aburrá Valley critically depends on the environmental offer of the services and resources of the surrounding regions, which, at the same time, depend on the big city in several aspects. Recognizing this phenomenon and facing the problems from the municipal perspective is a critical challenge to ensure regional equity and sustainable development.

The interdependencies between the natural base of the territory, the goods and services, and the communities that constitute part of the Aburrá Valley, evidence the necessary and urgent transition of our society towards one with a different political, ecological and social awareness, assuming its need for joint responsibility, cooperation and integration.

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THE POTENTIAL OF SATELLITE REMOTE SENSING AS A TOOL FOR URBAN AND ENVIRONMENTAL PLANNING IN THE ABURRÁ VALLEY

Jorge Eduardo Patiño Quinchía

Introduction

Remote sensing imagery availability has dramatically increased in recent decades, which has influenced the diversification of applications and the exploration for new uses for this kind of information to address urban issues. Beside traditional applications in areas such as security and defense, natural resources exploration and monitoring, environmental management and natural disaster relief, new issues have gradually emerged in the scientific literature on the use of satellite remote sensing in topics related to urban planning and management, demographics, economics and sociology, among others.

Urban ecosystems, whose physical expression is reflected in ur-

ban morphology, can be described in terms of both *bio-physical variables* –that account for environmental conditions like moisture, temperature, vegetation, soil type, etc.–, and *human related variables*, i.e., the presence of pavement and man made structures, demographics, health and the socioeconomic conditions of the population (Ridd, 1995). Figure 5.1 illustrates the role of remote sensed data in the study of urban ecosystems.

Most traditional applications of remote sensed data are related to natural resources and environmental issues, which is due to some extent to the characteristics of wide spatial coverage and the low level of detail of the first satellite images of the Earth's surface. Landsat MSS¹ sensor images have

¹ Landsat Multispectral Scanner (MSS) data provide a historical record of the Earth's land surface from the early 1970's to the early 1990's. (TN)

A significant sample of studies that combined the use of remote sensed data and socioeconomic information for characterizing and analyzing the urban landscape can be found in scientific literature. Even though it can be argued that socioeconomic and cultural information cannot be directly observed in remote sensed images, these applications are based on the hypothesis that the physical expression of a settlement reflects the social and cultural conditions of its population. Green (1957) and Green and Monier (1957) are early applications that used aerial photography in the social analysis of cities (Lo and Faber, 1997). They related physical information of the environment manually extracted from aerial photographs with socioeconomic data on education, crime rates, and rental rates in the city of Birmingham, Alabama. Mullens and Senger (1969) reported consistent relationships between the appearance of vegetation, the number of vacant lots, the size of houses and road conditions observed in aerial photographs and the demographic and socioeconomic characteristics of the neighborhoods of Los Angeles, California (Rashed et al., 2003). Miller and Winner (1984) reported differences in the composition of the urban vegetation in Los Angeles, not only between residential and non-residential areas, but also between

areas with different racial profiles. The work of Herold *et al.* (2002) analyzed spectral properties of urban materials using remote sensing data and showed that building roofs in the cities of California are varied and diverse in materials and colors, and stated that this diversity seems to be influenced by socioeconomic conditions and land use in the building surrounding areas. Weeks *et al.* (2007) studied the possibility of identifying slum areas based on QuickBird images and census data in Accra, Ghana, and also mention that the racial composition of a neighborhood is associated with what they called slumness degree, while Stow *et al.* (2007) stated that the main indicator derived from remote sensed data regarding socioeconomic status of the population in the same city is the presence of vegetation in the urban landscape.

Applications

The most common use given to satellite images in urban environments in Colombia has been the updating of basic cartography and land cover and land use mapping. These latter are often previous steps for other applications, among which we can highlight the following:

- Opencast mining monitoring.
- Identification and evaluation of social vulnerability to natural hazards.

- Impervious surface quantification in urban watersheds.
- Characterization of urban morphology.
- Land cover types, vegetation and socioeconomic variables relationships.
- Slum detection.
- Urban quality of life measurement.
- Urban spatial and temporal dynamics.

In the following section, each application will be briefly described.

Opencast mining monitoring

The identification and characterization of bare soils and opencast mining can be easily achieved using satellite images. In a humid, tropical environment like Medellín's, these areas show high contrast with their surroundings, which are normally covered by vegetation or houses, and therefore can be rapidly detected and plotted. Figure 5.2 shows a piece of a very high-resolution image (pixel size 0.6 m), taken by QuickBird satellite on July 26, 2005, in which an opencast mining site located in the southwestern part of Medellín can be observed. In this image, the real boundaries of the mining operation can be clearly seen: the terraces in the steepest areas, the access and internal circulation ways of the quarry and the details of the geometry of the mining site. By looking at the image it is also possible to separate

two areas of the quarry: the west zone, more organized and where the terraces have been carefully made while the quarry has been exploited, and the east area, where the lack of terraces can be observed with the consequent occurrence of rill erosion on the slope, which in turn increases the sediment load delivery to the drainage network. This kind of information helps authorities to track the status of the mining operation, and helps to verify the situation of surrounding water flows and forest areas in order to make management recommendations based on the detection of undesirable situations.

Identification and evaluation of social vulnerability to natural hazards

The social vulnerability of the population to natural hazards is understood as the community's differential incapacity to deal with natural hazards, according to the geographical and social position of human groups and individuals (Clark *et al.*, quoted by Ebert and Kerle, 2008); and it should be measured against a particular kind of natural hazard. In a pilot study conducted in Tegucigalpa, Honduras, Ebert and Kerle (2008) used very high resolution images from QuickBird and ResourceSat P-6 satellites, together with elevation models and risk maps of floods and landslides in order to test whether it was possible to



Figure 5.2
Opencast mining in the
corregimiento of Altavista, west
of Medellín.
Source: Área Metropolitana del
Valle de Aburrá, © Procálculo-
Prosis SA and Digital Globe
(2005).

evaluate the social vulnerability to those phenomena with remote sensing in 87 neighborhoods of Tegucigalpa. They used images and complementary data for the estimation of proxy variables² that describe the environment and conditions under which people live and built an index of social vulnerability based on them.

Some of the proxy variables considered are: the type of the settlement according to the proportions of vegetation and built area, road conditions, roof and building materials, the position of the construction relative to the slope, building height, the number of evacuation routes and the distance between the buildings and evacuation routes, among others. They found that although remote sensed data by itself do not allow to replace traditional methods (such as door to door censuses and surveys), the synergy of the use of remote sensed data with field surveys, the application of a census and the combination of these data in a geographic information system helped to improve the evaluation of social vulnerability in terms of efficiency, frequency, coverage, and on different spatial scales. The importance of using these techniques that combine traditional approaches with the

analysis of remote sensed data lies in the possibility of transference to other regions and the applicability of these methods in a sustainable way over time (Ebert and Kerle, 2008).

Impervious surface quantification in urban watersheds

According to Weng (2008), as the impervious cover increases in a watershed or administrative unit, the vegetation cover diminishes. Since soil permeability significantly varies according to the type of cover and land use (SCS, 1975, quoted in Weng, 2008), the estimation and mapping of impervious surfaces are important not only for environmental management but also for urban planning; i.e., for infrastructure building and sustainable urban growth. Images of the fraction of impervious surfaces derived from satellite imagery have been successfully used as input data for storm event hydrologic modeling and hydraulic structures design for rainwater collection and sewer systems. Bauer *et al.* (2008) stated that the Minnesota Pollution Control Agency has been incorporating the use of this type of information obtained after processing Landsat satellite images for watershed management and for improving management practices

² A proxy variable is one which lacks interest by itself but *allows* to establish an estimation of other variables via a statistical relation.

on environmental planning and monitoring in the city of Minnesota.

Characterization of urban morphology

Urban morphology can be seen as a result of the interactions of urban communities with their surroundings. Several studies have tested the use of remote sensed data to characterize urban morphology in the last decade: Phinn *et al.* (2002) used Landsat TM images and aerial photographs at a 1:5000 scale to map the composition of the urban environment in the city of Brisbane, in Queensland, Australia; Rashed *et al.* (2003) used Landsat TM images to map the physical composition of urban morphology in a county in Los Angeles, California; Lu and Weng (2004) developed a model to characterize the urban landscape in Indianapolis, Indiana, using Landsat ETM+ images; Mesev (2005) used precise data in the location of buildings and structures and an IKONOS image to characterize urban patterns in two British cities; Rashed *et al.* (2005) worked with Landsat TM and the Indian satellite IRS-1C images to characterize the urban morphology and its changes from 1987 to 1998; and Setiawan *et al.* (2006) used Landsat TM images to map urban land use in Yogyakarta, Indonesia.

The use of satellite images to characterize urban morphology has always been accompanied by advanced techniques for image

processing, such as Spectral Mixture Analysis, Principal Components Analysis, and techniques for object-oriented image classification, to mention just a few. It is common to find a multidisciplinary approach in these studies, with experts in remote sensing working together with architects, urban planners, sociologists and geographers, and it is also a common practice to borrow techniques from other disciplines and apply them for urban analysis, such as fragment analysis, which was initially developed in the field of landscape ecology.

Land cover types, vegetation and socioeconomic variables relationships

The relations between the characteristics of land cover and other environmental factors and the variables that describe socioeconomic conditions of people have been explored since the late 1950's. There are some studies of the last decade from several countries and regions of the world that show the possibility of establishing these kind of relations in different urban contexts using remote sensing. Mennis (2006) explored the relationship between urban vegetation and socioeconomic conditions in Denver, Colorado, using Landsat TM images and census data, using multivariable analysis and data mining. Jenerette *et al.* (2007) established relationships between surface temperature, ve-

getation conditions and human settlement patterns in the region of Phoenix, Arizona, through the use of census data, topographic data and a Landsat ETM+ image that provided information of temperature and vegetation. Ebert and Kerle (2008) uncovered the relationships between data derived from a QuickBird image and census data with socioeconomic status as a previous step for the evaluation of social vulnerability to landslides in Tegucigalpa, Honduras. Avelar *et al.* (2009) explored the relationships between land cover in Lima, Peru, and the distribution of socioeconomic classes using a QuickBird image, census data and fieldwork data on socioeconomic classes. Rajasekar and Weng (2009) used data mining techniques in order to explore relationships between urban surface temperature and some biophysical and social parameters, integrating an ASTER satellite image and census data.

In the Aburrá Valley it is possible to make inferences about the prevailing socioeconomic status in urban areas using visual interpretation of satellite images. Figure 5.3 shows three different areas of Medellín, each of them with different socioeconomic status. Some of the parameters that can be taken into account as socioeconomic indicators in the Aburrá Valley are the amount and average width of access and circulation roads, building types, roof materials, the

presence of landscape vegetation and urban amenities, as well as the presence of private swimming pools.

In figure 5.3 it is possible to observe the difference in the appearance of the urban landscape in three areas, which can be related to their differences in terms of the predominant socioeconomic status. In the image of the area of low socioeconomic status (figure 5.3A), it is notable the lack of vegetation around the houses, gray roofs prevail (mainly made of zinc or tin), average building size is relatively small and building density is very high, and the roads are irregular and narrow. In the image of the area of medium socioeconomic status (figure 5.3B), there is some vegetation around the houses, on the facades and even in small parks, clay tiles roofs prevail, average building size is larger than observed in figure 5.3A, and the road network is regular and with better technical specifications than in the previous case. In the image of the area of high socioeconomic status (Figure 5.3C) there is plenty of urban vegetation, clay roof tiles dominate the scene, average building size is much larger than in the two previous images, the width of access roads is also higher and private swimming pools are abundant in the lots, which indicate that owners are able to pay for their construction and maintenance.

Slum detection

During recent years some specific studies have been carried out for the remote detection of slums inside cities. In this regard the work of the Department of Geography of San Diego State University is remarkable, having published, among others, a study that evaluates the capacity to spot slum areas in Accra, Ghana, using a QuickBird image and census data (Weeks *et al.*, 2007), and another one in which the residential areas of different socioeconomic status groups are identified based on the classification of the same kind of images (Stow *et al.*, 2007). It was found that for the city of Accra, the main indicator of socioeconomic status derived from remote sensed data is the presence of urban vegetation. The work of Avelar *et al.* (2009) can also be considered within this group since its result is a map that shows the spatial distribution of the different socioeconomic classes in an area of Lima, including the lowest classes, which in Latin American cities are located mostly in slums. They evaluate several factors that are considered indicative of slumness, such as the kind of materials used to build houses, their size, access to drinking water, connection to the sewer system, presence and distribution of roads, among others, some of

which can be evaluated from information directly extracted from a satellite image.

Urban quality of life measurement

An important topic to be highlighted is the development of studies for the quantification of quality of life indexes in urban areas using satellite remote sensing, that take into account not only socioeconomic information from census data, but also information about the geographical context and environmental conditions in which people live. Several indexes have been proposed through this approach. One of the first publications illustrating the use of satellite remote sensed data in these kind of studies is Weber and Hirsch's (1992) study, which proposes the quantification of quality of life indexes in Strasburg, France, based on census data and the quality of the landscape, characterized and mapped from SPOT satellite images. Lo (1997) and Faber (Lo and Faber, 1997) used Landsat TM images combined with census data to evaluate the quality of life in Athens-Clarke county, Georgia, using image processing techniques and information overlap in a Geographic Information System (GIS). Jensen *et al.* (2004) used field data that measured the Leaf Area Index (LAI)³ of the vegetation, which were later extended to the

³ The Leaf Area Index (LAI) measures the relationship between the leaf area of a tree and the area of land in which the tree grows.



Figure 5.3A: Medellín's northwestern area, El Picacho neighborhood, where there is a prevalence of low socioeconomic status; 5.3B: Medellín's western area, Santa Lucía neighborhood, where there is a prevalence of medium socioeconomic status; and 5.3C: Medellín's northwestern area, La Pilarica neighborhood, where there is a prevalence of high socioeconomic status (QuickBird image, July 26, 2005) Source: Área Metropolitana del Valle de Aburrá, © Procálculo-Prosis SA and Digital Globe (2005).

entire area of study based on data from an ASTER satellite image. This result was integrated with census data in order to establish relationships between the Leaf Area Index and the socioeconomic variables in the city of Terre Haute, Indiana and to quantify a quality of life index. Similar studies were developed by Stathopoulou and Cartalis (2006) in the metropolitan area of Athens, Greece, and by Li and Weng (2007) in Indianapolis, Indiana, developing maps of quality of life indexes integrating census data and satellite remote sensing data.

Urban spatial and temporal dynamics

The following studies stand out in the literature of spatio-temporal evolution in urban areas and their expansion that used remote sensing: Ward *et al.* (2000) used Landsat TM images taken on different dates in order to classify urban cover types as entry data for an urban growth model in southeast Queensland, Australia; Medhavan *et al.* (2001) studied changes in land cover and use in the metropolitan area of Bangkok, Thailand, over a six year period, using Landsat images to determine the trajectory of the following changes: from agricultural use to open areas, from open areas to residential use and finally, from residential to commercial use; Recio *et al.* (2003) used image classification techniques with texture and landscape analysis, in

order to measure urban expansion with Landsat ETM+ images in the area of l'Horta Nord in Valencia, Spain; Yin *et al.* (2005) worked with census data and Landsat ETM+ images to study changes in the distribution of the population in Cairo, Egypt, between 1986 and 1999; Schneider *et al.* (2005) used multi-temporal analysis techniques with Landsat TM and ETM+ images taken on different dates, between 1978 and 2002, and census data, to study urban growth dynamics in the Chengdu region, in the province of Sichuan, West China, and to evaluate the policy of incentives for migration to these areas known as "Go West", started in 1990; Rashed *et al.* (2005) integrated data from Landsat TM and IRS-1C images taken on different dates in order to characterize urban morphology on each date, and then comparing them to analyze changes over time; Yang and Liu (2005) tested the efficacy of the use of Landsat TM and ETM+ images for finding impervious indexes on different dates as a proxy variable to characterize urban growth in Pensacola, Florida, between 1989 and 2002; and Taubenböck *et al.* (2009) studied urban growth dynamics in twelve cities of India based on Landsat ETM+ images taken at three different moments in each city, analyzing the changes between the three dates using landscape metrics techniques applied to urban polygons on each

date and comparing the values of the urban morphology indexes obtained for each city, on the three dates, in radar-like diagrams.

Conclusions

Remote sensed data have proved to be highly useful in urban and environmental planning: the success of integrating landscape analysis techniques with image processing and spatial analysis techniques to characterize the anatomy of cities and to study their spatio-temporal evolution and urban sprawl has been demonstrated in studies conducted in other countries than Colombia (Ridd, 1995; Ward *et al.*, 2000; Madhavan *et al.*, 2001; Phinn *et al.*, 2002; Recio *et al.*, 2003; Rashed *et al.*, 2003; Mennis, 2006; Taubenböck *et al.*, 2009). Increasing availability of this kind of data as well as its decreasing acquisition costs justify the implementation of research processes and the application of these new technologies for urban and environmental planning in this country.

The need of advancing research in this kind of applications in Colombia is evident: the Space Commission of Colombia⁴ was created in July 2006 by presidential decree. It is a group of ministries, institutions and organizations led by the Vice Presidency of the Re-

public, and its objective is “to optimize the contribution of science and space technologies to social, economic and cultural development in Colombia, via its application to solve national problems and strengthening the State, the academic and productive sectors, sustainable development and the competitiveness of the country” (CCE, n.d.). Among the plans of the Commission is the launching and operation of an Earth observation satellite, and therefore, an increase in remote sensed data over the coming decades is expected. The need to support the Commission on the development of new applications that can use the information available today and the new data that would be obtained with the implementation of the Colombian observation satellite of the Earth is self evident. This constitutes both an opportunity and a challenge for Colombian institutions and city governments, which should improve their abilities in terms of the management and processing of satellite images in order to integrate this kind of data in their daily workflows, because having large amounts of data would be useless if it cannot be transformed into useful information for the country’s development.

⁴ In Spanish: *Comisión Colombiana del Espacio (CCE) (TN)*

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U R B

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A N I S M

INFORMALITY AND SOCIAL URBANISM IN MEDELLÍN

Alejandro Echeverri Restrepo
Francesco M. Orsini

Today, for the first time in history, more than 50% of the world's population live in urban centers, and it is estimated that before 2050 this percentage will reach 75% (ONU-Hábitat, 2006). These figures illustrate the resounding extent to which urbanization is an irreversible process, and the way in which the city has become a primordial theme in the international political agenda.

In the coming decades, growing urbanization will be principally absorbed by the cities of developing countries.¹ It is estimated that by 2030, 80% of the world's urban population, equal to 4 billion inhabitants, will reside in the cities of Asia, Africa and Latin America (2006). While it is true that a higher rate of urbanization implies the

need for more stable economies, more competitiveness, employment generation and stronger institutions, there is also a need to take into account the enormous challenges that this phenomenon implies.

The urbanization process is necessarily linked to a growing demand for land, public services, housing and infrastructure, all elements which place strong pressure on national and local public institutions. For this reason, as well as due to the recurrent incapacity of the governments of developing countries to supply this demand and guarantee to every citizen what in Brazil has been defined as the *right to the city* (Fernández, 2001). From the mid-point of the past century, an alternative and spontaneous form of making cities

¹ In this group of regions, Asia and Africa are the ones that present the highest rates of urban growth, with an average of 4% per annum. On the contrary, Latin America presents a more moderate growth rate due to the fact that its urbanization level stands today at 77%.

began to appear, associated with the production of informal settlements.

These types of settlements, distinguished, depending on the country, by names such as *tugurios*, *villas miserias*, *favelas*, *katchi abadis*, *slums*, etcetera, today represent a common element in our cities, if one thinks that in the world, one in every three habitants currently reside in informal-type neighborhoods (ONU-Hábitat, 2008). These housing solutions, while on one hand, try to guarantee the right to the city, and especially a shelter's provision, via methods of self-help housing; on the other hand, due to their formative processes, they present serious inequalities in terms of their physical, environmental and social character, all of which have a dramatic incidence on the quality of life of the cities' habitants.

According to the operational definition used by the ONU-Hábitat (2003), an informal settlement is characterized by the way it displays one or more of the following conditions: critical overcrowding, critically precarious state of the housing (in relation to the physical structure and its environment), absence of some of the necessary public services and illegality of tenure. Although these conditions allow one to comprehend the degree of informality of a settlement, they are limited to classifying the

problem from within a purely physical and legal perspective, leaving aside the socio-economic dimension despite its importance for an integral interpretation of the phenomenon.

If not all of the urban poor people necessarily reside in slums (2003), it is clear that there exists a direct correlation between informality and poverty, where both finally become cause and effect, one of the other. On one side, urban informality is born as a consequence of the economic inability of poor people to enter into the formal city. On the other side, as poverty is understood also as deriving from having a low level of education and precarious health, a degrading habitat leads to, on its own, a worsening of the conditions of poverty (ONU-Hábitat, 2006).

Additionally, the informal sectors of a city generally tend to coincide with the areas that generate crime and violence, as a consequence of the high degree of social inequality that distinguishes these areas from the formal city (2006). From the favelas of Rio, to the slums of Nairobi, passing over to the *katchi abadis* of Karachi, without mentioning the *comunas*² of Medellín, there are many cases that give testimony to how in these sectors there is a concentration and proliferation of armed illegal groups, dedicated to illicit activities such as narcotics trafficking, kidnappings,

² Although the *comunas* (districts) are each of the 16 administrative subdivisions of Medellín, the word is sometimes used –and it is the case here– to refer to the poor neighborhoods of the surrounding slopes. (TN)

robberies, etcetera, all of which end up widening their radio of action to the entire city.

In this global context, Latin America has 30% of its population living in informal settlements. The rate of regional annual growth of this phenomenon is 1.2%, with a clear decreasing tendency in the last decades. If one thinks that between the 1960s and the 1970s, the percentage of informality in many countries of the region reached 60%, then the achievements in this sense are more than evident (ONU-Hábitat, 2005). Despite these figures, the challenges that remain to be resolved are many: the inequality index is among the highest on the planet and a significant proportion of the neighborhoods still present very high levels of abject poverty.

Under this regional panorama the Colombian case is exemplary in terms of how it typifies the problematic evidenced on the regional level. The country, with more than 75% of its population living in cities, has between 20 and 30% of its urban population living in precarious settlements (ONU-Hábitat, 2006). Colombia is, together with Brazil, the Latin American country with the highest index of urban inequality and insecurity (ONU-Hábitat, 2009). Despite this, it is also one of the countries that have been doing the best work in terms of countering the phenomenon of urban informality in the last decades, as shown by the growth index of informality in the country (ONU-Hábitat, 2003).

Medellín is among the Colombian cities that have confronted

Figure 1.1
Medellín seen from the high northeastern neighborhoods; in the top right hand corner the Metrocable, a cable-car, public-transport system integrated into the Metro system
Source: Lorenzo Castro J.



most challenges in this regard. The objective of this article is to describe the characteristics and origins of this phenomenon at the local level and, afterwards, to concentrate on analyzing some successful examples of public policies implemented by the local administrations. This is done as a means of extrapolating from these experiences the principal achievements and mistakes, as well as highlighting the strengths and identifying the present and future challenges.

Marginality in Medellín

The process of “informalization”, understood as the formation of precarious neighborhoods, has been a characteristic of Medellín’s history throughout the entire past century as a consequence of the growing migrations towards the city, which took place continuously throughout the main part of the 20th century. These migrations originated in the final decades of the 19th century and came about due to the catalyzing effect of the industrialization process in the Aburrá Valley which had an irreversible and dynamic effect on its urban development, making Medellín the principle economic pole of the region (Coupé, 1996).

The effects of this demographic growth began to be perceived from the beginnings of last century, due to a considerable rise in the

demand for housing. This rise in the demand was associated with the production of working-class residences, a consequence of the huge numbers of manual workers required by the emerging industrial sector (Poveda, 1996). In the 1920s, to cite as an example, approximately 500 new residences were needed each year, when the actual effective production only arrived at half that number (Botero, 1996).

In this way, from this moment on, new neighborhoods of both public and private initiative began appearing, for the most part, towards the north-eastern bank and along the entire tram route and principal roads. The public residences were the product of the conformation of institutions that were created *ad hoc*, such as the Institute for Territorial Credit,³ and the Central Mortgage Fund⁴ while the private residences were representations of the hefty effort of local landowners who saw in this process an opportunity to appropriate the urban surplus value (Toro, 1988). The land surplus value result of these different actions is represented by the conformation of neighborhoods such as Villa Hermosa, Manrique, Campo Valdez, Berlín and Aranjuez, to cite but a few.

Despite the huge “public-private” effort, the demand for housing continued to grow in the

³ In Spanish: *Instituto de Crédito Territorial* (TN)

⁴ In Spanish: *Fondo Central Hipotecario* (TN)

following decades. Due to a new migratory wave, the product of rural displacement caused by the political violence of the 1950s, the rate of the city's annual growth climbed to 6% (Coupé, 1996). In ten years Medellín duplicated its population and informal settlements began to appear in the most inaccessible areas and in the most peripheral lands, under the figure of squatter settlements.⁵ and illegal neighborhoods.⁶ From this period we find, to cite a few examples, the neighborhoods of Popular, Santo Domingo, Granizal, towards the eastern bank, and Doce de Octubre and Picacho, towards the western bank.

These neighborhoods, constituted by illegal processes of subdivision, the sale of land and the progressive self-construction of housing, and characterized by the absence, in the initial stage, of infrastructure and public services, represented, for the low income population, the only opportunity of building their homes. In this way, rapidly, the informal city, characterized by a diffuse growth outwards of the legally defined urban perimeter, came to occupy geographically complicated and fragile zones, and came to accommodate 50% of the total population (PRIMED, 1996).

The new urbanizing dynamic, increasing in intensity, began to generate a profound segregation of the city's physical, social and

⁵ In Spanish: *urbanizaciones piratas* (TN)

⁶ In Spanish: *barrios de invasión* (TN)

Figure 1.2
a) Panoramic view
of the northern
neighborhoods
of the city
Source:
Jhon Octavio Ortiz



economic order. Towards the North and towards the high parts of the eastern and western slopes, the informal city began to position itself; it is in these areas that one finds the unfinished residences of the city's low income people. Parallel to these areas, the middle and upper classes occupy the center and South of the valley, on top of the planned surface of the formal city. Medellín defines its path in two realities, two opposing "cities", dramatically segregated by their conditions of location and their geographical relief.

Thirty years later, with a new wave of violence, rural displacement, and the emergence of narcotics trafficking, the phenomenon began to take on a dramatic political and social dimension, never before

experienced. The neighborhoods of the northern slopes of the valley, commonly termed "comunas", were converted into the natural habitat of the illegal gangs, bands of assassins who acted according to the orders of narcotics' traffickers and common delinquents. It is worth mentioning that State control and presence in these sectors was almost non-existent.

As a result of this process of informalization, Medellín today, in accordance with the classification of its land in the Land Use Plan,⁷ has 25% of its territory in neighborhoods with different levels of marginality, in a total of 2400 hectares. 900 of these hectares have

⁷ In Spanish: *Plan de Ordenamiento Territorial (POT)*. (TN)



b) Metrocable
Nuevo Occidente –
Vallejuelos Station
Source:
Andrea González

been defined as Areas of Integral Improvement,⁸ with settlements in precarious conditions and socio-spatial segregation. 1500 hectares have been defined as level 3 consolidations, with a critical deficit in infrastructure, public space and furnishings, but with a higher level of consolidation that facilitates their articulation with the formal city. The *comunas* located towards the northern, center-east and center-west zones, concentrate the socio-economic strata 1 and 2 (Alcaldía de Medellín, 2006), which correspond to those areas with the lowest quality of life and human development indexes (Alcaldía de Medellín, 2004) as well as coinciding with those sectors with the highest indexes of violence.

Ever since the 1990s, the public administrations, the academy and non-governmental organizations, have been studying and implementing programs aimed at transforming the quality of life of the habitants of marginal neighborhoods, and recompense part of this social debt accumulated during decades of inequality. It is evident that the drama of the informal city with its conditions of inequality, violence and segregation, was an integral part of its past. It still remains part of the present, but there is a bet for change and it is dependent on us whether it will be part of the future of Medellín.

Neighborhood improvement

Neighborhood improvement emerges as a response to the failure of all those coercive actions and measures of control which saw the eradication of urban informality as the only possible solution (Rojas, 2009). This focus was shown to be ineffective as it did not attack the roots of the problem, concentrating instead, on spending time and public resources on repressive actions which not only failed to resolve the growing housing deficit but also produced conflicts of public order with severe social impacts.

The policies of neighborhood improvement, on the contrary, imply the implementation of actions that channel resources to perfect the physical conditions of a settlement for its progressive incorporation into the formal urban fabric. This, depending on the context, implies the allocation of public resources, improving the state and the coverage of infrastructure (roads, parks, and transport systems), guaranteeing the allocation of collective types of furnishings, as well as looking at how to motivate actions that are channeled towards the improvement of housing and the provision of formal property titles.

These measures, by mitigating the structural deficiencies originating due to the absence of a conventional process of planning and urbanization of settlements

⁸ In Spanish: Áreas de Mejoramiento Integral (MI). (TN)

in their initial formative phases, look to make the “problem” part of the solution (Davis, 2006). By recognizing the right to the city of informal neighborhoods, their improvement becomes a valid complement to the production of social interest housing, thereby alleviating the pressure for new land.

On the other hand, by limiting the processes of habitat relocation and the eradication of neighborhoods, and fomenting community construction, there is a decrease in the risks associated with the detriment of social capital, a fundamental factor in the struggle to reduce poverty. Finally, as has been suggested by Hernando De Soto (2000), by promoting processes that legalize property there is a triggering of assets formalization that brings potential economic benefits to the proprietors and the city as a whole.

On the national level Medellín is, together with Bogotá, the city that has had most success in implementing programs of this type “due to the general impact in terms of the life quality of its population” (Departamento Nacional de Planeación, 2009). Among the case studies that are most emblematic on the local level

are: the Program for the Integral Improvement of Subnormal Neighborhoods (*PRIMED*)⁹ which was implemented in the 1990s, and as of 2004, the policy of Social Urbanism with actions such as the Integral Urban Projects (*PUI*)¹⁰ and the Project of Habitat Building and Consolidation of Housing¹¹ in the Juan Bobo Creek.

PRIMED

PRIMED began in 1993 as a pilot program of cooperation between the city of Medellín, the governments of Colombia and Germany (via the Ministry for Economic Cooperation and Development BMZ¹² and the Governmental Bank for Reconstruction and Development KfW)¹³ and the United Nations Development Program (UNDP). It was conceived as a strategy for neighborhood improvement designed in two temporary stages and led by a local agency which was put together ad hoc (Betancur, 2007). The program lasted seven years, finishing in 2000 due to an incorrect political decision, which was a clear example of the lack of continuity of public policies.

PRIMED represented a historic hit in the city as it introduced a new methodology of intervention that

⁹ In Spanish: *Programa Integral de Mejoramiento de Barrios Subnormales*. (TN)

¹⁰ In Spanish: *Proyectos Urbanos Integrales* (TN)

¹¹ In Spanish: *Proyecto de Construcción de Hábitat y Consolidación de Vivienda* (TN)

¹² *Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung* (Federal Ministry for Economic Cooperation and Development) (TN)

¹³ *Kreditanstalt für Wiederaufbau* (Reconstruction Credit Institute) (TN)

differed radically from previous experiences. Due to the integrity of the actions' implemented, the program identified eight polygons of intervention, located in the high sections of the center-east, north and center-west *comunas*. The specific objectives of the program were subdivided into three large character areas: physical, social and management. These included processes of community participation, the improvement of basic infrastructure, the improvement of housing and the relocation of high-risk zones, the legalization of land tenure and the mitigation of geological risk (*PRIMED*, 1996).

One of the principle achievements of the program was the high level of efficiency in the implementation of the respective actions. If one thinks that *PRIMED* worked simultaneously on different areas of intervention, with a combination of actions that covered each aspect of neighborhood improvement, and that these implied the interaction of multiple actors, it becomes evident that the inter-institutional coordination represented a determining factor

in the success. An independent management structure was set up as the *PRIMED* unit, ascribed to *CORVIDE*¹⁴ and with total dedication to the program. *PRIMED* had the role of coordinating all the actors, channeling the resources, and articulating the physical actions carried out on the territory (Montoya, 2010).

The international entities (UNDP and KFW) provided technical consultation and resources. The national organs (Treasury Ministry,¹⁵ *INURBE*,¹⁶ *SENA*¹⁷ channeled the resources of cooperation, provided subsidies, and financed community training in the improvement of housing. On the local level, the municipal instances (Public Works,¹⁸ Treasury,¹⁹ Metropolitan Planning,²⁰ *EPM*,²¹ etc.), provided financial, technical and human resources within the areas of their competence. Finally, the non-governmental organizations (NGOs), Base Communities, and private contractors all participated in the physical execution of the works (*PRIMED*, 1992).

As well as the inter-institutional management, the program placed particular attention on the rela-

¹⁴ *Corporación de Vivienda y Desarrollo Social* (Housing and Social Development Corporation) (TN)

¹⁵ In Spanish: *Ministerio de Hacienda* (TN)

¹⁶ *Instituto Colombiano de la Reforma Urbana* (Colombian Institute of Urban Reform) (TN)

¹⁷ *Servicio Nacional de Aprendizaje* (National Learning Service) (TN)

¹⁸ In Spanish: *Obras Públicas* (TN)

¹⁹ In Spanish: *Hacienda* (TN)

²⁰ In Spanish: *Planeación Metropolitana* (TN)

²¹ *Empresas Públicas de Medellín* (Medellin's Public Utilities Enterprises) (TN)

tionship with the community (*PRIMED*, 1996), involving it in distinct ways, from the stage of identifying necessities and prioritizing problems, up until the phase of building the actual works. What more, there was a search to build local-level capacity, via training in self-construction, in environmental education, in leader formation and in the formulation of project management, all with the objective of fomenting social development.

Obviously, there were limitations and difficulties. In territorial terms, little attention was placed on the structuration of the territory. Even if there was an improvement in the quality of some spaces, ordering them correctly was not achieved. On the other hand, the standard of interventions was low, which had consequences in terms of their durability (Montoya, 2010). There was a scarce number of projects of a social character that were channeled towards improvements in conditions of poverty, violence and unemployment, which was also the case for projects offering attention to juveniles and old people. There were difficulties in the legalization processes; of all the program's components, this was perhaps the most complex one, which was also due to the high goals that had been proposed (Betancur, 2007).

Finally, from a political-institutional perspective, the program

displayed its weakness by not being inserted in an institutional manner within the city's territorial plans. It was always considered a special program, separate to the other programs and projects of the Mayor's Office. This ensured that upon the change in administration, when the political will to guarantee the program's continuity disappeared, the program was ended (2007).

To conclude, *PRIMED* managed to lay down the bases for a new form of tackling marginality, for its methodological design, the capacity for achieving management and institutional coordination, and a strong political commitment during the seven years of its duration. What more, it was a very important reference point for the Social Urbanism strategy.

Social Urbanism²²

Under the leadership of the mayor, Sergio Fajardo, the city, in 2004, decided to bet on a public policy that was focused on reducing the profound social debts that had accumulated during decades, as well as the problems of violence. In this way, in a decisive manner, structural transformations that combined, integrally, programs of education, culture and entrepreneurship were implemented, together with a "face-lift" of some neighborhoods located in the most critical zones of the city. The strategy was de-

²² A major part of the information contained in this section of the article stems from the direct experiences that the authors acquired as part of the team charged with leading the planning and development of those projects here outlined.

finied by the concept “Medellín the most educated”, which for the transformation of the *comunas* involved Social Urbanism, together with Integral Urban Projects, as one of the strategies of change. For this, in the selected territories, the best technical knowledge and designs were applied (Rodríguez, 2010).

The Strategic Urban Projects that were defined as priorities in the Municipality’s Development Plan were located within Medellín’s *Empresa de Desarrollo Urbano (EDU)*,²³ a decentralized entity that makes up part of Medellín’s municipal structure, founded in 1993. Among these projects, the entities created the Library-Parks,²⁴ the Schools of Quality,²⁵ the City Center Plan,²⁶ the Poblado’s Plan,²⁷ the Projects for “a New North”,²⁸ and the Integral Urban Projects, as well as others. The *EDU* suffered

an internal transformation, as a specialized and interdisciplinary team with exclusive dedication to each one of the Strategic Urban Projects was set up. As such, it was converted into a key instrument that planned and executed the urban projects in the prioritized territories.

As the *EDU* assumed for a period of years, as an interim task, the sole technical leadership in this exclusive group of projects and territories, some of the keys to success, without doubt, were the political leadership and inter-

²³ Urban Development Enterprise (TN)

²⁴ In Spanish: *Parques Biblioteca* (TN)

²⁵ In Spanish: *Colegios de Calidad* (TN)

²⁶ In Spanish: *Plan del Centro* (TN)

²⁷ In Spanish: *Plan del Poblado* (TN)

²⁸ In Spanish: *Proyectos del Nuevo Norte* (TN)



Figure 1.3
Public meeting spaces
Source: Andrea González

institutional coordination. The teamwork conducted with the city's Direction of Planning, and the detailed and rigorous monitoring that was done for all the internal processes of administration and execution by the Private Secretary, allowed, in only a few years, for the conclusion of a wide group of high complex projects.

An Integral Urban Project is an instrument of planning and physical intervention in zones which are characterized by high indices of marginality, segregation, poverty and crime (EDU, s.f.). In agreement with these criteria, Medellín's north-eastern *comuna* was chosen as the ideal scenario for the implementation of the first pilot program. Firstly, this zone was the city sector with the lowest levels of LQI and HDI²⁹ (Alcaldía de Medellín, 2004). Secondly, at that moment and in the same area, the inauguration of the mid-level capacity, transport system – the *Metrocable* – was fast approaching, which would connect by way of ski-lift the informal city to the Metro.

The implementation of the cable transport system and its new stations was the essential base in the definition of the territorial strategy. The Integral Urban Project helped in selecting and making dynamic the location of the stations, with the objective of complementing and amplifying the impact generated by the *Metrocable*. A process of

neighborhood consolidation was implemented, which permitted the structuring and ordering of the territory (not only improving its accessibility) via works and projects of a public character such as community furnishings, parks, streets, paths and pedestrian bridges to connect the neighborhoods, among others. The north-eastern Integral Urban Project focused on the provision and improvement of public infrastructure as the motor for social transformation, giving special attention to those areas that were densely populated that had first formed in the 1950s, mainly via illegal processes of urbanization (La Francia, Andalucía, La Cruz), and those formed via invasion processes (Popular, Santo Domingo 1, Santo Domingo 2, and Granizal) (Naranjo, 1992).

The magnitude and the complexity of the polygon of intervention, with a population of more than 150,000 habitants concentrated in more than 10 neighborhoods, all of which displayed complex topographical and morphological conditions, required a detailed analysis of the territory. In 2004, the desktop reconstruction of the process of evolution of the urban form of the neighborhoods was done, as was a typological analysis of their structural elements, supported by the methodology of Barcelona's Urban Laboratory (*LUB*).³⁰ What more, there was a systematization of

²⁹ LQI stands for Life-Quality Index and HDI stands for Human Development Index. (TN)

³⁰ In Spanish: *Laboratorio de Urbanismo de Barcelona*. (TN)

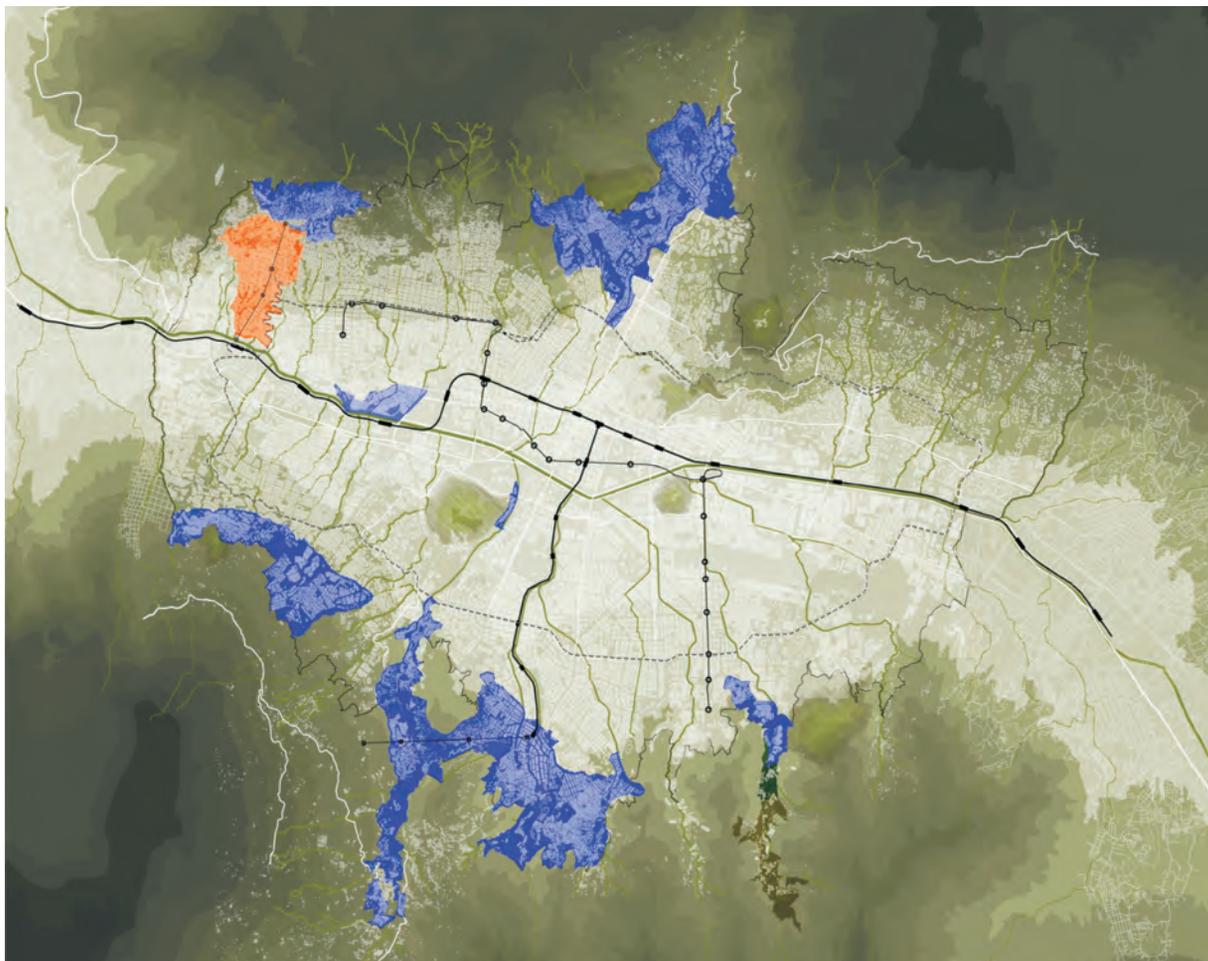
the different studies and proposals that had been done on the city, and technical teams were set up, originating in certain universities that had developed applied research that explored solutions to some of the problems in these territories. All this allowed for the categorization, in a short period, of what initially had seemed to be a chaotic urban grid, identifying problems and opportunities with precision.

As a result of this process, a plan of action was elaborated, looking for an integral physical transformation and combining actions at different

scales. The urban project, its architectural design, and technical rigor, were the key instruments with which to begin the process of neighborhood recuperation and work with the community.

The urban project became the dynamic force in processes of inclusion and social development as alternatives to the violence and indifference that had ruled the roost for decades in the sector. In this way, bridges over creeks, for example, as well as simple connecting pathways, became means of integrating communities which had been, up until

Figure 1.4
Location of the
Urban Integral
Projects, 2004-
2015. In orange, the
north-eastern Urban
Integral Project.
Source: EDU



that point in time, divided by imaginary and impassable boundary lines; or the Santo Domingo library, due to its strategic location and its educational programs, became the community's principal reference point as well as a promoter of coming closer to knowledge and education as alternatives to arms.

From the phase of diagnoses and planning, up until the phase of execution, the community was invited to actively participate in the process, accompanying the technical teams, the social workers and the

communicators in the realization of their tasks. Due to the breadth of the territory, neighborhood committees were set up, grouped in the areas of influence of each *Metrocable* station: Andalucía, Popular and Santo Domingo. These were not necessarily linked to the Boards of Community Action (*JAC*)³¹ to ensure the prevention of possible political influences and broaden the level of participation. The result

³¹ In Spanish: *Juntas de Acción Comunal*. (TN)

Figure 1.5
El Mirador Park
and Street 106 urban
passageway,
connecting
Santo Domingo
Savio Metrocable
Station with
España Library
Source: EDU



was, for example, the conformation of Imagery Workshops³² in which the community directly participated in the definition and design of the projects. The workshops were notorious for fomenting leadership, elevating the spirit of belonging and the level of compromise of the community towards the neighborhood.

As well as the participation processes, numerous projects and programs of a social order were developed and coordinated in the area, via the Integral Urban Project team, and under the management of the Mayor's Office and the public and civil sectors. These projects reached 650,000 million Colombian pesos, equivalent to 80% of the total investment undertaken in the sector (Pérez, 2010). Among other things, there was an improvement in the coverage of primary and secondary educational services, projects that were channeled towards protecting the vulnerable population were promoted, programs of recreation, culture and sport were promoted for the youngest population groups, as well as other specific programs aimed at citizenship formation with regards to the use of public space, respecting human rights, etc.

In order to coordinate and lead a strategic project of such complexity, a special management group was set up, comprising an interdisciplinary

team with exclusive dedication for this territory, supported within the *EDU* organizational structure. The manager had periodical work committees with the mayor and his direct support team, and he became an integral part of the weekly meetings of the Government Council,³³ which in Medellín is a first-level team of the city's secretaries and functionaries.

The north-eastern Integral Urban Project was almost totally financed by Medellín's public administration. The resources, derived from the annual budget of different secretaries involved in the project, reached 144,000 million pesos in investment in physical transformation during the first four years. This investment allowed the execution of a total of 125,000 m² of works that included 18 public parks of different hierarchies (zones and neighborhoods), the adaptation of streets for pedestrian and vehicular use, and the construction of numerous public edifices such as the España –Library-Park, the Santo Domingo School, the Granizal Sports Center and the Center for Entrepreneurial Development Zone (*CEDEZCO*).³⁴ For the execution of these works, local laborers were contracted, coming to a total of more than 2300 people employed during the project's four-year duration (2010).

³² In Spanish: *Talleres de Imaginarios* (TN)

³³ In Spanish: *Consejo de Gobierno* (TN)

³⁴ In Spanish: *Centro de Desarrollo Empresarial Zonal* (TN)



Figure 1.6
España
Library in
Santo Do-
mingo Savio
neighbor-
hood
Source:
Andrea
González



Figure 1.7
De la Paz y
la Cultura
Bridge,
between La
Francia and
Andalucía
neighbor-
hoods
Source: EDU

The construction and improvement of the habitat in these territories that had low levels of consolidation was an integral part of the policy of Social Urbanism. As a complement to the north-eastern Integral Urban Project that focused construction of new spaces of encounter and public buildings, the Pilot Project for Habitat Consolidation in the Juan Bobo Creek was identified as the first model of housing intervention in “invaded urban ecosystems”.

This term is understood as all those natural systems, such as hills and creeks that have been occupied by way of invasion by highly precarious settlements. These ecosystems present a high concentration of high-risk housing, low levels of consolidation, low coverage of services, infrastructure and public space, illegality of tenure and high levels of poverty, as well as a worrying state of environmental degradation, among other problems.

Generally, these territories have been identified by the Land Use Plan as relocation areas. Nevertheless, the magnitude of the phenomenon makes such a policy quite unviable: on one hand, it is unthinkable to relocate all the natural systems that have been invaded; on the other hand, the scarcity of land fit for urbanization, as well as the high value of the market, evidence the impossibility of meeting the demand for new housing that would be generated by the mass relocation of these areas. Under

such premises, with the objective of making viable a more sustainable model of performance from a social and physical-environmental perspective, and with the technical knowledge that some of these zones could be consolidated in adequate conditions without risk, the first pilot project for housing and the improvement of the surroundings of the Juan Bobo Creek came into being.

Due to the fact that the habitat was a substantial component of this project, an exclusive technical team was set up in the Housing Management wing of the *EDU*. This team had been an integral part of the formulation of the first lineament of the north-eastern Integral Urban Project. An intervention plan was elaborated which comprised different types of complementary actions, among which the search for the total intervention of the territory of the creek’s polygon was fundamental.

More than ten small recipient edifices were built for relocated families, the well-located and with acceptable levels of consolidation residencies were improved, and some residences were replaced on site, which allowed for the conformation of a more regular plot. Parallel to these initiatives, retaining walls were built to mitigate the risk of landslides and the territory was equipped with public service networks, which implied the need to sanitize the creek. As well as this, pathways, bridges

and public spaces were built as a way of dignifying the surrounding area and improving its precarious accessibility, and protective zones were set up for the preservation of the existing vegetative layer.

Bringing the project close to the community in an intervention with such a strong housing component, with more than 300 households affected, was a determining factor. To enable this, among other measures, area committees were set up to facilitate the channels of communication and strengthen the leadership of the community members; pacts and agreements between the State and the community were outlined to build reciprocal trust and credibility, and in the phase of execution of the project, families were involved via practices of self-construction.

The final result was the integral recuperation of the creek and the dignification of a much deteriorated sector, located in the area of intervention of the north-eastern Integral Urban Project of the *Comuna 2*, until this time considered more a gravel than a true neighborhood. The project had an approximate cost of 8000 million pesos,³⁵ and despite the constrictive nature of the intervention, it was successful in permitting the

definition of a model to recover invaded urban ecosystems which was highly necessary for the present conditions of the city, and so that the only alternative would not be eradication, a practice that could be replaced in many cases by the recognition of the right to stay put.

Notwithstanding the success of the project, which was worthy of recognition even by the international community,³⁶ in the development phase a series of difficulties that are worth mentioning were identified. In particular, just as occurred with *PRIMED*, the legalization process of housing turned out to be very complicated as was, in general, the whole juridical component that was associated with the regulation of land use, due in part to the administrative impediments on the national level.

Another aspect to take into account is the small availability of the community to participate in the self-construction of its residences. In many cases the families, notwithstanding their disposable time, opted to contract a head builder who would undertake the task. This is contrary to the principles of self-construction which look for the active collaboration of the community as a way of forming them in the trade of building (which

³⁵ This is the sum, according to the *EDU* sources. This included the construction of more than 6000 m² of public space and a 1000ml of networks, the building of more than 100 new residences and the improvement of more than 100 existing residences, the stabilization of soils, and more generally, all the costs associated with the formulation, planning and management of the project.

³⁶ In 2008 the Project was among the winners of the Dubai International Award for Best Practices.

in Medellín represents one of the motors of the economy) and empowering them, limiting the excessive paternalism on behalf of the State.

By way of conclusion, it is important to highlight how this project offers an appropriate manner of insertion into the broader strategy of territorial consolidation, implemented by the Integral Urban Project by way of articulating actions of consolidation and territorial ordering in phases of advanced densification, something that well describes the majority of the neighborhoods of the north-eastern *comuna*, with other actions geared towards correcting incipient development in fragile areas with

characteristics similar to the Juan Bobo Creek (where housing and the environment are the priority). The strategy developed in the creek represented an easily adaptable tool for the distinct situations present in the Aburrá Valley. These projects have served as models for change in the definition of local and national policies concerning settlement upgrading.

The policy of Social Urbanism, implemented from 2004, looks to take a qualitative leap from the traditional manner in which improvement is understood. It makes use of tools such as the Integral Urban Project that has the goal of making structural transformations in an integral way in the

Figure 1.8
a) Marginal residences in Juan Bobo Creek, before the intervention
Source: EDU



strategic activities sectors of the poorly consolidated neighborhoods, and the projects of housing construction in these fragile natural systems as a means of achieving the definitive integration of marginal communities.

Lessons learned and future challenges

As we have seen, in recent decades, the Latin American city has experienced a strong decrease in the rate of growth of informal-type settlements. This is due to the fact that the urban population of the region has reached more than 80% of the total population, with a consequential reduction in the

migratory processes towards the city.

Despite this, more than 30% of Medellín's urban territory today presents some type of precariousness in terms of its physical and social character. Parallel to this, the production of social housing continues without being able to meet the existing demand, with repercussions in the rate of informality. For these reasons, since the 1990s, policies and programs centered on housing improvement have been implemented which, due to their generated impact, are today important national references.

Programs such as *PRIMED* and projects such as Integral Urban Project and Juan Bobo, display some



b) Housing and surroundings of Juan Bobo Creek improvement project. Source: EDU

of the common patterns which we could, initially, catalogue as being among the possible conditions for success, although the necessity of a more exhaustive analysis is more than evident as a means of tracing more resounding conclusions in this sense. These factors belong to the technical, institutional, the public and the social spheres.

In the first place, the cases analyzed coincide in that they opt for interventions which are territorially delimited, wherein the integral nature of the physical actions represent a constant. By articulating housing programs with interventions on public space and infrastructure in a particular sector, one looks to increase the impact generated on the territory, augmenting the levels of coordination and inter-institutional collaboration among all the actors. This allows for an increased degree of rationalization in terms of the use of public resources.

On the other side, the diversity of the adopted strategies has been shown to be a highlight. By articulating programs of consolidation such as the Integral Urban Project with others that are focused on actions geared towards improvement, such as Juan Bobo, complementary practices have been developed, which demonstrate the way in which this initiative could be replicated. Each real situation is typified and is given a specific treatment according to its necessities. To this is added the significant attention given

during the designing and planning phase, defining actions in line with the model of occupation the city requires and with quality standards of intervention.

Another common aspect is in the definition and implementation of management mechanisms which are set up *ad hoc*. Each one of the cases described here presented an organizational structure that was made up of multidisciplinary teams dedicated exclusively to the execution of the respective project, with evident advantages in terms of efficiency. Also, the support and political will turned out to be fundamental, as a guarantee of the continuity of any public policy of the programs of a public character, a condition without which a widespread impact could never be achieved.

In an analogous manner, the processes of community participation have proven to be more important each time. Such processes look to augment the level of commitment and empowerment of the community, motivating the creation of a more democratic and governable society in which a broad consensus becomes the basis to success. Despite this, in the cases analyzed, the implemented mechanisms still place limits on the capacity of the community for making decisions, evidencing the necessity of providing more incentives each time for the putting into practice of a planning process that is of a bottom-up nature, as also suggested by the international community.

Parallel to these characteristics, it is important to evidence certain aspects that, if they improve, would help to strengthen the degree of sustainability of these projects. In this respect, we shall demonstrate how policies of improvement guarantee, principally, the environmental and social sustainability, limiting the production of new urban land in line with Medellín's dense occupation and allowing for the preservation of social capital with the right to stay put.

In this context and due to the high cost of the interventions and the magnitude of the phenomenon, the implementation of mechanisms of financing that allow for the reduction in the use of local public resources is recommended. A possible solution is the utilization of mechanisms that capture the surplus value of the highest-income sectors, to transfer these resources to informal sectors, something that occurs in Brazil which, in difference to Colombia, utilizes the tools which its legislation contemplates with regard to land use policies (Sandroni, 2001).

It is also necessary to articulate even more the physical actions with socio-economic, cultural and educational development programs that transcend the temporality of the interventions and lead to the building of local-level capacity and permit the sustainability of the communities. This will help the communities improve their economic conditions via the generation of employment,

providing access to better education and improving their health and hygienic conditions, among others. All of these factors are fundamental in mitigating urban poverty and combating the germ of violence that still permeates these sectors.

In terms of the replicability of the identified models of intervention, it is important to pay attention not to bypass already developed methodologies. This means, in particular, to avoid modifying those criteria that have guaranteed their success. While it may be necessary to standardize processes; it is important to identify and preserve above all else those elements that constitute the value-added of each model.

In the case of the Integral Urban Project, for example, it is worrying to note the relative ease with which such an integral model is being transformed, in some cases, into a simple construction of infrastructure, in which the planning and sequence of the interventions pass to a second level. Simultaneously, a risk exists in widening the scale of the perimeter of action, as it is fundamental that the integrity and the articulation of the projects in a contoured territory are guaranteed. It is recommended that in the case of projects like Juan Bobo one not waste such an intricate and meticulous movement that allowed for the integration of the new on top of the existent almost without leaving a mark: we are worried about the spatiality of some of the new interventions

which alter the concept of the urban *acupuncture* which was so celebrated in its moment.

Because of this, and considering that the institutional memory cannot remain in the hands of but a few individuals (institutions remain, functionaries change), it is timely to begin proposing processes of systematization, monitoring and evaluation of interventions. This allows for the fine tuning and consolidation of the experiences here described, to identify both good and bad choices, progressively making these projects the basis to an urban policy of improvement and consolidation of marginal neighborhoods.

To conclude, it is clear that, notwithstanding all that has been done,

there still remains much ground to cover. Medellín's *comunas* are far from being the ideal habitats that their habitants desire and deserve: inequality, the lack of opportunities, the degradation of the physical and natural environment, just as the insecurity and violence, continue to be the common denominators that characterize them. The projects described here should be considered as the important first seed in the process of physical and social integration between the informal city and the conventional one; a process that represents one of the principle challenges facing Medellín and the other cities of Colombia in the search for a more equitable society.

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THE PUBLICITY OF PUBLIC SPACE

Carlos Mario Rodríguez Osorio

Luis Fernando Arbeláez Sierra

Introduction

The city of Medellín, in the interior of the country, is located in a valley which is formed by two mountain range systems that run in a North-South direction, and has an area of about 380 km². The city currently has a population of two million two hundred thousand inhabitants in its urban area and three million three hundred thousand in its “metropolitan area”. A good portion of this population dwells on the slopes, most of them with a gradient of more than 25%, where a significant part of the informal housing of the city’s ten municipalities has settled.

The city was born as a small settlement in 1541, and in the year 1675 the Villa de Nuestra Señora de la Candelaria de Medellín was founded. However, it was not until 1813, during the Independence period, that this settlement was given the status of city. In 1926 the city was finally declared the capital of the department of Antioquia.

The city, which was originally settled on the right bank of the

Aburrá River, is a result of crossroads, promoting its development as a center of important commercial exchanges; its urban consolidation process only started in the first decades of the 20th century, due to the rapid growth of the population which settled in the territory due to the expansion of commerce, coffee plantations, mining production, and the initiation of industrial activities which became established in the city, as well as the opportunities offered by its strategic location. This process of urbanization accelerated in the second half of the 20th century with the formal and informal occupation of the territory, as a result of the housing demand and its associated need for services.

The first precedent of urban planning was the so-called “Future Medellín Plan”, carried out in 1913 via an official announcement by the *Sociedad de Mejoras Públicas*.¹ The second referent where the city addresses a serious and methodic planning process was the “Pilot

¹ Society for Public Improvements (TN)

Plan”, directed by European architects and city planners Paul Lester Wiener and Jose Luis Sert between 1948 and 1952, when the Municipal Agreement was finally approved.

During the main part of the 20th century, the process of the city’s growth exceeded the provisions of the territorial occupation and the city’s capacity for planning and organizing. The result was either an informally occupied territory or incomplete planning processes, which basically solved the housing problem by developing a precarious form of urbanism. Connectivity

was only solved in a functional way and public space, understood as collective areas for the construction of community, was absent in these zones of the city.

This chaotic, overflowing growth process surpassed the control mechanisms of the municipal authorities, bringing about large squatter settlements with organic layouts, which lacked the necessary provisions for the construction of road systems and collective amenities, and as such, the existing social gaps between the informal and the planned city increased.

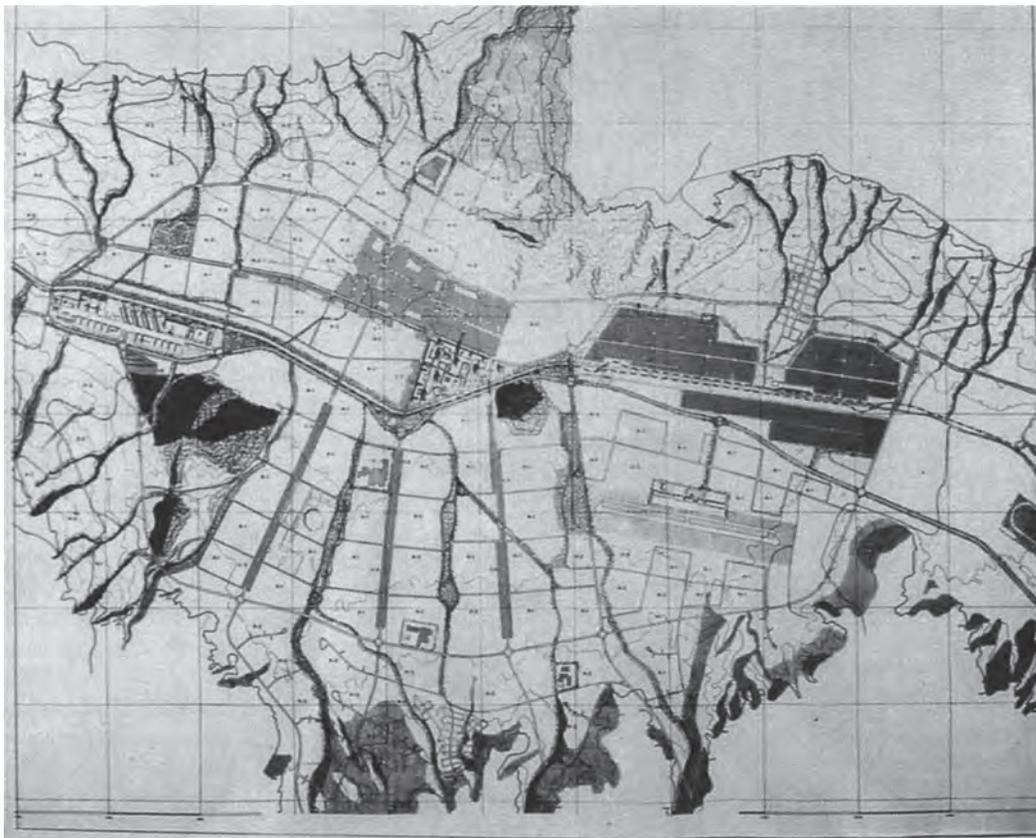


Figure 2.1
Pilot Plan for the city of Medellín

Source: Roberto Luis Jaramillo y Verónica Perfetti (1993). *Cartografía urbana de Medellín, 1790 -1950*. Medellín: Concejo de Medellín-Comisión Asesora para la Cultura.



Figure 2.2
Panoramic view
of Santo Domingo
neighborhood
Source: Alcaldía de
Medellín – Carlos
Vidal

These marks and historic problems, consequences of the absence of the State, had their strongest expression at the end of the 1980s and the beginnings of the 21st century. This phenomenon, without any doubt, became one of the most complex social and security issues of the city, also fed by the presence of drug dealing and urban guerrillas. This situation led to the city having a homicide rate of 381 persons per 100,000 inhabitants, unleashing a characteristic phenomenon of a sick and socially disintegrated society, a consequence of the lack of institutional presence in all its forms, and the absence of a State that was able to guarantee fundamental

rights and the protection of life as the most important social good.

In this deteriorated social, economic and political scenario, the citizenry lost the few and poorly qualified public spaces it possessed and people were forced to hide behind the doors of their own homes in order to survive. This generated profound gaps and imbalances within the population, as people could not find in their environment the meeting spaces of any civilized city, necessary to construct agreements of coexistence. On the contrary, these empty areas became spaces absent of social and communitarian life, therefore promoting the emergence of insecurity.

This historical summary intends to present, in a general way, an outlook of the city's urban growth and of the different formal and informal models of territorial occupation. It is an important starting point to evaluate and understand the current conditions of public space in the city and to review, from the different spheres of territorial scales, its structure and the developmental conditions of the city's public space. It is also the starting point to propose the present and future of a city structure based on public spatiality.

Figure 2.3
Andalucía urban
passageway under
the Metrocable²
system
Source: Alcaldía de
Medellín –
Carlos Vidal



² Cable-car, public-transport system integrated into the Metro system

The concept of public space

The concept of public space is attributed to Aristotle, who acknowledged it as the vital and humanizing space where society met to share opinions, evaluate proposals and take democratic decisions; this was how a political public space was envisioned.

Different landscapes, including urban ones, are the result of the ancestral practice of giving specific uses to particular territories. These landscapes correspond to a spatial organization, related to a group of social, mental and technical customs which, over the course of time have produced characteristic forms through which the cultural track or evolution of a group can be recognized, so that it can be differentiated from other ethnic groups. Therefore, the landscape is the product of the culture of the group that dwells on it and shapes it.

The urban landscape originates as a consequence of the relationship of man with his culture in a given natural environment. It is perceived as the manifestation of values that are common to a human group within a conception of time and space that involves form and function.

Since the landscape is the visible part of a functional territorial system which is alive and in permanent evolution, it can be considered cultural for being the product of human genius or –as has been said– of the culture of a given group. In addition, the landscape

can be seen as producing culture in the people who are trying to understand it.

The urban landscape refers to the landscape of cities and, within them, to the open spaces and elements that constitute them. Open spaces correspond to the places where people meet to go for a walk, to travel, sometimes to buy something, to ride on a bicycle or drive; they are spaces for meeting and participation in community life within the space that is recognized as the city. And of course, they are also the areas where nature imposes its dominion: rivers, mountains, steep slopes, etc., within the city.

Green areas, when they constitute part of the public space devoted to the satisfaction of co-

llective urban needs, as explained in Chapter 1, Article 2 of Decree 1504 of 1998, should not be understood only as those that exist on urban land, defined in the Law 388 of 1997. Since many of the urban needs are satisfied by the rural land, the rural sphere should not be thought of as opposed to the urban one, or as the expression of backwardness or the place where agricultural goods are produced. More integrally, the fact that this space is required for environmental, cultural and socio-political services not only revalues rural space, but also “makes inadequate the division of the territory into urban and rural, at least in relation to the concept of public space” (Bejarano, 1998).

Figure 2.4
Carabobo Urban
Passageway, The
Park of los Deseos,
Universidad Metro
Station
Source:
Andrea González





Figure 2.5
Granizal Sport Center. In the background, España Library –
Northeastern Metrocable.
Source: Andrea González



Figure 2.6
La Presidenta Creek's Lineal Park
Source: Andrea González

The term public space has become a very common expression nowadays: technicians, legislators, governors, traders and ordinary people identify it as space that can be accessed without restrictions and where the expression of their rights and obligations is possible in their everyday scenarios. Very often the planner considers it as the mere series of laws, decrees, resolutions and agreements that, far from enriching the concept, seem to minimize it in such a way that he/she forgets not only its cultural value, but also the functions that make it a concept of the integration of man as a living and social being. The current legislation, particularly the Decree 1504 of 1998, applies the concept of public space in an integral way, considering it not only as one that can be accessed freely, but giving particular importance to its diverse functions, regardless of its tenure.

In some cases, the public and the private sphere appear as two counterpoised elements, from within which, the complexity of the city is to be understood. Rossi (1966) sustains in his book *La arquitectura de la ciudad*,³ that:

(...) the contrast between particular and universal, between individual and collective, is one of the principal viewpoints

from which (...) [the city is studied, and he adds]: (...) It manifests itself in different ways: in the relationship between the public and private sphere, in the contrast between the rational design of urban architecture and the values of locus, between public and private buildings; [concluding that] (...) although the division of the city into public and private spheres, primary elements and residential districts, has been pointed out several times, it has never received the primary importance it deserves.

Beyond the apparent opposition between the public and private sphere, it is necessary to understand the relationships, compositions, complementary aspects and subdivisions established between them in order to perceive the systemic relationships of what urban spatiality really is.

The structuring space

Public space is made up of, in the first place, what we would call PROFANE SPACE, from the latin *pro* (in front of) and *fanus* (temple) and, in the second place, of SACRED SPACE.

The former, i.e. profane space, expresses urbanity and is characterized by free access (open space) and by being the scene of an intense social activity (Summary sketch)

³ The architecture of the city (TN)

Although it is true that, like any part of the territory, profane space has an ecological, economic and landscape value, its historical and cultural value prevails since it is full of memories, meanings and activities transcending the inner space. Far from understanding it as a plane where the State exerts its property, it should be understood as the complexity of anthropological and urban actions that develop on it.

The latter, i.e. sacred space, is the one that confers identity to the territory as part of the collective memory; its access is permitted and generally it is built. Activities

that tend to be passive take place in sacred spaces. This space, in addition to temples, is made up of public and communitarian buildings and amenities, buildings of historical and cultural value, and any other constitutive building or natural element (Decree 1504/98, Article 5) to which the community confers a specific value.

Both the profane and the sacred spaces form the structuring space of the city, which is, par excellence, PERENNIAL SPACE, the one that over time maintains the landmarks and elements that identify the city and its culture.

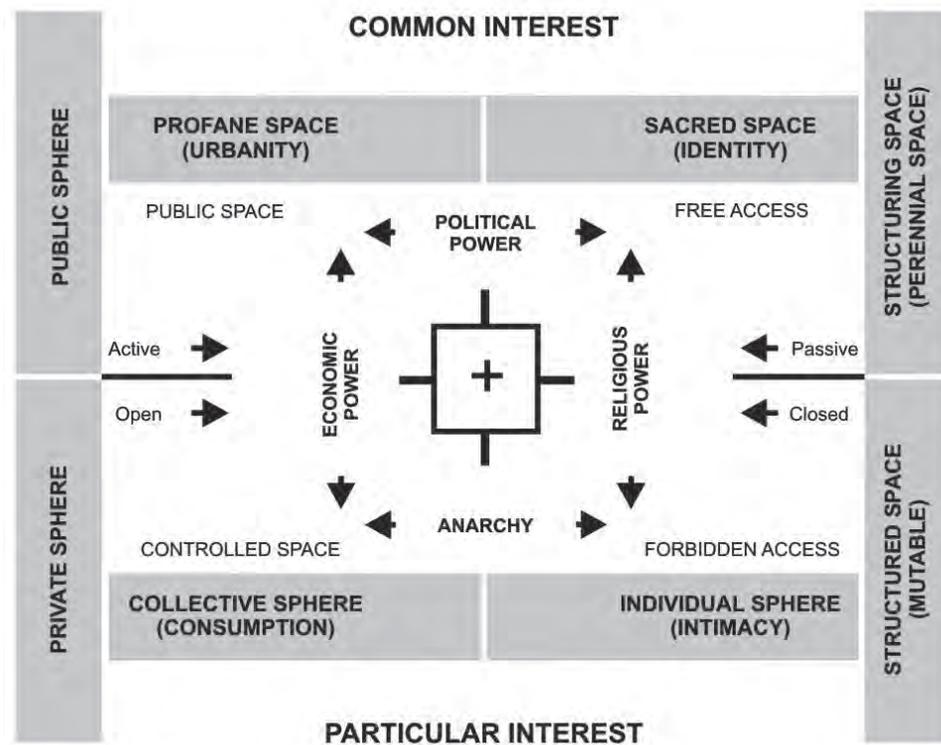


Figure 2.7
Summary sketch. The conceptualization
of public space
Source: Luis Fernando Arbeláez.

When talking about identity we make reference to the cultural interconnections of the city and its relationship with environmental citizenship and its historical tradition.

The identity of a city consists of a group of features –not merely apparent or formal– that give it its own air, that identifies it and by which it can be recognized. Notice that “identity” already indicates, etymologically, an “own identity” or, if you want, the “quality of being oneself” (Terricabras, 1990)

The permanence of urban monuments expresses the collectivity of the city:

The monuments, the signs of collective will, expressed through the principles of architecture, can be placed as primary elements, as fixed points of urban dynamics (Rossi, 1996).

Profane space, made up basically of “open space”, is constituted by the places of memory that, in the modern organization of the territory, should be the objects of cultural promotion. It includes main squares, parks, avenues and streets that, when stretching over the territory, vary their configuration and extension, forming a fabric that gives coherence to the city. There are, however, expressions of sacred space that invade profane space: a public monument, for example, that, as

an extension of sacred space, is located on the profane one, giving it a specific value, characterizing it and therefore making it part of the city’s identity.

By monuments we refer not only to those elements that intend to honor an important figure, or a specific deed, but to all kinds of works of art located on profane space that manage to characterize it in such a way that it begins to make up part of the sacred spatiality.

Structured space

It is important to understand private space not only as that in which a specific group or person exerts their dominion through ownership, but as a spatiality with different characteristics. It comprises, in the first place, the individual space that gives intimacy to which access is forbidden (negative) and limited, such as the house in its most restricted meaning, i.e., a shelter. The term also includes all those spatialities with limited access because of their ownership regime; here we refer to places of work, offices, industries and, in general, all those spaces where there is strict control on behalf of the particular interest.

Nowadays, in western culture, when we speak about private collective space we refer to all those controlled spatialities with functions that express a service to the community, which is its *raison d’être*. All kinds of establishments open to the public are expressions

of the private-collective space, including places for collective entertainment, (bars, restaurants and theaters), places for fairs and exhibitions and, in general, all those places devoted to leisure activities, to the buying and selling of objects and other activities associated with the consumer society.

Relationships

Interactions between the private and public sphere are expressed through a coordinate system that relates its components (see the summary sketch). The relationship between the sacred and the profane sphere expresses political power. Examples of this kind can be found in those cities built with the sole objective of being large administrative capitals, such as Brasilia, Washington and Chandigarh.

A close relationship between private collective space and profane public space expresses the strength of economic power, as is the case in cities such as Las Vegas, Miami or those where the market around the private collective spaces becomes the structuring essence of the city: in these cities, publicity invades “the profane sphere”, characterizing it and giving it a different “identity”. As Mutis (1998) says:

Today there is a huge conspiracy between the technical world, the media and advertising to turn the world into a huge supermarket. They have already achieved it... Publicity is part of the

established system of our world to turn everything into monetary value.

When the predominant relationships take place between sacred public space and individual private space, cities are characterized by the expression of the religious power through their spatial structures. This can be found in cities like Mecca and Vatican City or, in general, those cities of religious cult) where the ceremonial sphere becomes prevalent.

Therefore, public space must be understood as the structuring and perennial space of the city, and private space as the structured and mutable one. In the former, the common interest manifests itself; in the latter, specific interests prevail.

Obviously, the relationships between collective private space and individual private space only express the existence of a “ghetto”, but not an urban spatiality, which can only be understood through the existence of public spatiality as the structuring element of the city.

The city itself is the concrete, systemic expression that correlates the public and private spatialities, not in a quantitative but in a qualitative balance, which permits the establishment of an order –according to its cultural and natural features and relationships– that makes a city.

Since its founding, the Colombian city has expressed the

relationships between the sacred and the individual sphere: religious power. In the city of Medellín, for example, it is said that, “One of the aspects that most caught the attention of the town Council in the second half of the 18th century was the one related with the image that it was supposed to project. In Medellín, with the exception of the parish church, there was not one building that made reference to power, either of the Crown or of any individual. The citizenry’s homes did not have the big front doors that distinguished the houses of the rich neighbors of Tunja, Santa Fe or Popayán. Not even the Council distinguished itself from the rest of the houses. Until 1776 the Council was basically a ranch house” (Córdoba, 1998).

With the advent of the Republic the preeminence of the relationship between the sacred and the profane sphere continues: political power. The National Capitol of Bogotá, for example, was built in the mid-20th century as representation of civil power. Today, mercantilism imposes dominant relationships between the profane and the collective sphere: economic power. However, “laissez-fairism” rapidly leads to emphasizing the relationships between the individual and the collective sphere: “The city ghetto”, where the big shopping centers substitute public spatiality for profane space also induces privatization by private vehicles.

Application

On the grounds of this conceptualization and the current conditions of the city of Medellín, we formulate the principle of *restoring the city as a public space in itself*, for its social and cultural conditions as a place for collective coexistence. Public space in the city should be considered as an essential space for the construction of social life and as a fundamental means for the formation and expression of the political expectations of the population.

In the case of Medellín, public spaces have specific features according to the form in which they emerge and interact with the urban territory. These conditions reflect spatial characteristics and forms of use defined by the urban growth model and the particularities of the territorial settlement brought about by the urban process.

Profane public space, open by nature, has its main expression in a checkerboard pattern inherited from the Colony (the Laws of the Indies). Using this pattern as reference, and with the main square as the starting point, the city was structured by roadway continuity, repeating the scheme of the main square in the numerous neighborhoods that emerged, both formally and informally, which today are reference points of the city.

Urban patterns, with the main square as the center, were always accompanied by a “sacred”

public space, that manifested itself fundamentally on the church and the school and, occasionally, with the presence of the State through police stations.

As a result, neighborhoods with their own features and identities emerged in the second half of the 20th century, such as La Milagrosa, Buenos Aires, Villa Hermosa, Campo Valdez, Aranjuez, Boston, Prado, Manrique, Jesús Nazareno, and the incorporation of the urban area of El Poblado, on the right bank of the river, among others. Other areas focused on commercial development, such as El Perpetuo Socorro and El Corazón de Jesús.

On the left bank of the river, after the 1950s, neighborhoods such as Guayabal, San Javier, Fátima and Laureles emerged, in addition to the incorporation of Belén, Robledo and La América, and the subsequent development of the northwestern zone as a result of building projects, typically for housing, set up by government institutions. However, this rational growth was not interested in incorporating the numerous creeks that ran through the slopes. Its incipient urbanism never valued environmental factors and, as a result, these places became “non-places”, i.e., territories without appropriation that were later the objects of massive informal settlements.

Subsequently, the formal city regulated the areas of mandatory territory transfer. These areas were

never part of a planned public space, structured at a larger scale and, as a consequence, many of them eventually ended up being only additional residual places.

Taking into account this historical background of the physical growth of our territory and public space, generated by the development model, it is important to review in detail the social and cultural scenarios of our city in recent years in order to find the existing relationships between the quality, character and identity of public space. Likewise, it is necessary to evaluate the availability of public space for the construction of appropriate scenarios for the development of a society capable of generating pacts of coexistence and respect for citizenship. The ideal position of having spaces for the construction of citizenship coexistence is a far cry from the social and historical realities of our territory, where many of the conflicts and problems that have generated violence are grounded.

This city has huge social inequities and a historical background of violence, partly associated with a lack of institutional presence and qualification of its public space. Therefore, the city requires the implementation of strategies for the generation of appropriate scenarios for the meeting of citizens, and the construction of citizenship. Such strategies can be pursued through the conception and implementation

of projects capable of redefining the structuring system of the public space in each of the territorial scales, and giving them added value by redesigning their urban processes in search of a more integrated territory, with social equity.

Actions

In the 1960s the city of Medellín initiated a series of actions intended to recover the original central spaces of the city (the profane space) for pedestrians. Some examples were: the recovery of Junín Avenue, La Bastilla Urban Passageway, Boyacá Street and, subsequently, the renewal project of Bolívar Park in order to integrate the Cathedral with the Park through the closing of a section of Bolivia Street.

The urban renewal of Junín Avenue was a milestone in the city, giving pedestrians the opportunity of making tangible a strongly rooted tradition: to conjugate the verb “*Juniniar*”⁴ in all the tenses.

It is clear that the main urban renewal projects have been focused on “sacred spaces” (amenities), concrete urban projects that, basically in the educational and cultural fields, have made up for existing deficits in the areas of lower socioeconomic status of the city, not always contextualized in their immediate environment.

These actions, supported by the political will of the city mayors who understood the importance of public space as a scenario for integration as well as social and political agreements, made feasible the transformation process of the city. Through this transformation came about the construction of greater social equity which lifted hopes for the future and acted as a tool of democratic and inclusive values.

This urban transformation process has as a precedent the development of a fragmented territory, where the automobile and the road system, developed particularly in the 1970s and 80s, outlined and built a public, unconnected spatiality, configuring imaginary walls between neighborhoods and parts of the city.

This new urban recovery project has redefined public space as the structuring system of the city and as an ideal scenario for the construction of a compact city. The urban renewal projects of recent years, based on the search for the “Civility of the Street”, have made it possible to place great value on urban renewals by embracing traditional scenarios such as Junín Street and Carabobo Street (figure 2.9), experiences with great social and cultural impact for the citizens.

⁴ In the city slang, *Juniniar* means to go for a walk along Junín Urban Passageway, a very traditional place downtown. (TN)

These urban renewal projects, aimed at recovering the street space of the city, could be proposed from different viewpoints in which the scale of the actions varies, depending not only on the conditions of the territory but on the social and cultural conditions of the inhabitants. In this way, the remodeling of Carabobo, Oriental Avenue and 70th Avenue, in addition to the urban renewal of Poblado Avenue, 107th Street in the Andalucía neighborhood, and Castilla's Boulevard, strengthen the connectivity between different zones of the territory through urban passageways, privileging pedestrians and triggering urban processes of transformation. It is important to highlight the social response to these urban renewal projects, where new meeting places

that encourage the construction of identity and participation emerge spontaneously from the initiative of groups that find their place in which to “chill out” and “hang around”.

One of the most important and relevant projects is the Carabobo Urban Passageway, which will be constantly referred to in this text for its complexity and impact, and because it became a model for urban renewal. This project, which has as a precedent the downtown pedestrian projects of the 1980s –such as the one known as Junín Urban Passageway– recovers the value of the street as public space, and marks the recovery of a group of institutional subsidiary buildings and amenities that acquired a different usage, after they had been left as isolated entities operating downtown.



Figure 2.8A
70th Avenue urban
passageway
Source: Mauricio
Mendoza

The previous positive comments about the urban renewal add up to the potential of this “urban passageway” for the commercial activities of the zone and to its possible broader integration through transversal streets and passageways that come out onto Carabobo, revitalizing this part of the city. Here, the integration of the public and the private sphere through numerous commercial passageways colloquially known as “*El Hueco*”⁵ create a very vital private-public system for the area. These characteristics, in addition to a simple and rational urban design, make the renewal of the street an unquestionable precedent for the

power of public space as a place for meeting and for the construction of citizenry.

Nonetheless, the urban renewal carried out in the last decade cannot be currently considered as a successful process in all its aspects. There are streets of the city, both in the peripheral neighborhoods and in the central areas, where there is a huge historic debt that becomes evident in the lack of attention given to pedestrians so that they may inhabit the streets with all the basic comfort and security conditions, and to encourage the meeting and free displacement of citizens in all areas of the territory.

⁵ “El hueco”, whose literal translation would be “the hole”, is a large commercial area with numerous passageways that communicate its stores, where they sell clothes, electronics and other goods at low prices. (TN)

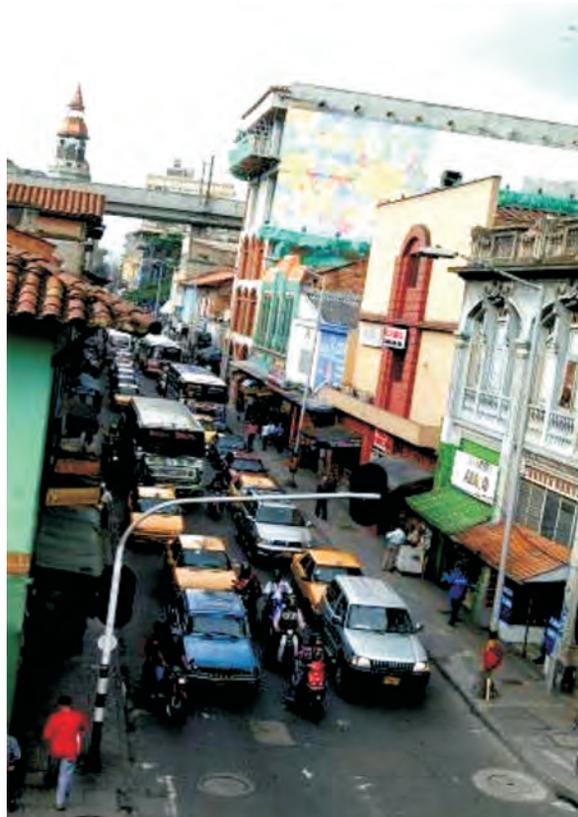


Figure 2.8B
106th urban
passageway in
Santo Domingo
neighborhood
Source:
Andrea González

Figure 2.9
Carabobo Urban
Passageway,
downtown
Source:
Andrea
González



Figure 2.10
Carabobo
Street
Source:
Alcaldía de
Medellín



This essay, although it celebrates the work carried out for the city through public management, adopts a critical position concerning the lack of spaces in many places of the territory; spaces where to walk with dignity on sidewalks, minimum quality standards in the connectivity systems of the neighborhoods and continuity between the different places of the territories, not only for functional, but for social and cultural purposes.

The public building as a space for meeting and social inclusion

If one thing has characterized the city of Medellín it has been its vitality as a dynamic urban center: a place of convergence for different social classes, a place of memory and identity marked by a series of profane spaces; squares that tell stories of the city, enriched by the names of its streets, avenues, squares and parks that make reference to independence battles, national heroes and the countries that participated in the revolutionary cause.

Figure 2.11
La Bermejala Creek
urban passageway,
in Moravia
neighborhood
Source:
Andrea González



This urban center has resisted many urban renewals that have taken away a fundamental part of its activities: the public buildings were moved to La Alpujarra in the 1960s, while the fundamental commemorative events withered in the hands of administrations that never understood the concept of identity and carried out a systematic destruction in search of road solutions that ended with the fragmentation of the traditional centrality. Nonetheless, the centrality or, more appropriately, the people, continue to stick to tradition, and its validity manifests itself with a permanent strength through the facts that restored the value of the sacred sphere: the public building.

The recovery of the old Municipal Palace, an emblematic building of the public sector, and its adaptation as the *Museo de Antioquia*, Botero's Square and its sculptures, the old Departmental Palace –today's Palace of Culture Rafael Uribe Uribe–, the temples, churches, main and small squares; they all speak of a city that has been able to overcome fear, incorporate formality and tolerate situations that do not paint a picture of a city with social equity. Medellín can be read in its centrality: its streets are the spaces of everyone, its trade is diverse and sometimes bizarre, and everything is possible here. Carabobo has contributed to a great extent, since it is and always

has been the great “urban street of the city”.

The neighborhoods have not been exempt from inadequate renewal projects; their squares have lost their character because of unplanned public renewal works of administrations that never understood the function, nor the social expression of a space that was always public, where the presence of the tree, the bench, the lamp, along with the policeman, the priest and the teacher, were always emblems of the city. The neighborhood was the center of everything in the city, and today it strives to preserve its validity; the church and the school are its most significant public buildings while, in the private sphere, the traditional *café*, sometimes called *cantina*,⁷ *salón social*,⁸ *cafetería*⁹ or *tienda mixta*,¹⁰ are meeting places of a community where the people know and recognize each other.

Although it is necessary to accept that the new public buildings, schools and library-parks are today the pride of many communities, it is also necessary to acknowledge that, in most cases, their architecture has not been successfully integrated into

⁶ Cafe (TN)

⁷ Bar or canteen (TN)

⁸ Drop-in lounge or tearoom (TN)

⁹ Coffee house (TN)

¹⁰ Corner store (TN)

the street, the block, the neighborhood. Today, efforts should be directed at the recovery of the urban fabric, i.e., the street for the man, the pedestrian, the boy.

In many scenarios, closing off houses, different types of businesses and even public buildings is the response to the insecurity that emerges from enclosure itself, generating more fear among inhabitants. The street has lost its sense of appropriation; therefore

our duty and the principal actions must be oriented towards its qualification, not for vehicles but for unexpected meetings, for adventure, for play, for leisure, for being there and building citizenry between equals.

The public building is vital, but citizen experiences are even more so; private activity is the engine that gives life to the street, while the *café* continues to be the emblematic place of the ordinary citizen.



Figure 2.12
Police Station in
Belén neighborhood
Source: Grupo UR

From this perspective, the city and the municipality have pledged their commitment to a redefinition of public buildings and, through them, to the strengthening of the neighborhoods and the improvement of the conditions that support cultural, educational and health activities, among others. This criterion for the urban renewal of public amenities) is being carried out in the light of the Municipal Development Plans, as an important line that has had continuity through recent administrations.

These renewals of the city's public amenities have an important architectonic tradition and the di-

rect work of architects with proposals of good quality buildings have had an urban impact on the territory of influence, and have generated spaces of great urban quality. The most relevant buildings of the last decade include those built by public initiative, including the headquarters of EPM.¹¹ Los Pies Descalzos Park, the EPM Thematic Library in the Plaza de la Luz; the restoration of the building of IDEA and De los Deseos Park, among others. Nevertheless, these renewals were carried out in the traditional city center, and do not contribute to a balanced development of the city.

Figure 2.13
Los Pies Descalzos
Park – Empre-
sas Públicas de
Medellín's building
(Medellin's Utilities
Public Enterprises)
Source: Alcaldía de
Medellín

¹¹ In Spanish: Empresas Públicas de Medellín (Medellin's Public Utilities Enterprises) (TN)



Therefore, the city has undertaken a renewal process of the public sphere in the last years with the generation of spaces for the meeting of citizens, dignifying the neighborhoods and their inhabitants with high quality public buildings, and rebuilding the urban landscape of the neighborhoods with the presence of the public building as a referent and meeting space.

This process took shape by way of several fundamental programs: the construction and initiation of the Library-Parks, the Quality Schools program –developing large public schools and carrying out the restoration of a hundred existing infrastructures–, as well as the development of public buildings and parks for the support of security, health and recreation, among others. These projects were carried out in areas of the city with very low human development indexes and serious problems of violence and social conflicts, with the objective of proposing an improvement in life conditions and the generation of opportunities in each of these neighborhoods.

The Library-Parks program turned out to be an exact model for recreating space for the meeting of citizens and for demonstrating how it is possible to think about education as a model of transformation. The social construction process becomes evident in these spaces, which are presently receiving more than three million visitors per year. The



Figure 2.14A
Central courtyard, Belén's Library-Park
Source: Diana Moreno



Figure 2.14B
Central courtyard, Moravia Cultural Center
Source: Mauricio Mosquera

Library-Parks were strategically located throughout the territory and rapidly became urban reference points due to their easy access via public transport, the strengthening of the centralities of their zones and neighborhoods and the creation of free admission and green areas that allowed for environmental recovery.

Similarly, the schools infrastructure improvement program, called “Quality Schools”: an opportunity for the construction of an Open School”, started from a bet to improve educational indexes and levels, as well as the quality of all the buildings, recovering their character as public buildings for the communities, and equipping them for their academic activities with the best possible quality standards.

A very important amenities program is one oriented towards recreation and sports, developed in the framework of other higher scale urban renewal projects, which has generated a gradual strengthening of these spaces in the local sphere, creating important synergies with public space renewal by the integration of these specific projects within the existing neighborhoods’ systems by means of urban passageways and streets that generate a greater impact.

One of the most relevant examples that evidences the value of public space and its amenities is the urban renewal of the Carabobo corridor, all the way to what has come to be called “the new north”, where the renewal projects of the *Jardín Botánico*¹² and the

¹² Botanic Garden (TN)

Figure 2.15A
San Javier’s Library
Park, integrated
with the Metro and
with Metrocable
Nuevo Occidente
Source:
Andrea González



construction of the *Parque Explora*¹³ and Moravia's Cultural Center were carried out. This urban renewal, besides redefining Carabobo Avenue as the historical axis structuring the city, rehabilitates the patrimonial buildings located along the street, such as the Carré, the Vásquez, the *Edificio de la Gobernación* (today's Palace of the Culture) and the *Museo de Antioquia*. One of the points of the renewal is the possibility of going from this central place of downtown all the

way to the north, where a new cultural and educational centrality is being built.

Another project with great urban impact in terms of being a model of urban renewal that integrates the building and public space is the one carried out under the auspices of the South American Games,¹⁴ an event that promoted the development of new sports facilities of great architectonic quality, integrated through public space, and which became scenarios

¹³ *Parque Explora* is an interactive museum and park dedicated to science and technology.

¹⁴ In Spanish: *Juegos Suramericanos* (TN)

Figure 2.15B
Public school in Santo Domingo's neighborhood
Source: Luis Adriano Ramírez





Figure 2.16
El Poblado Avenue's
urban passageway
Source:
Andrea González

for citizenry meeting and everyday recreation and sports. This urban renewal was complemented by the recovery of 70th Avenue, generating through these kinds of synergies a model for renewal projects in the search for the city's urban transformation.

Private amenities, the publicity of the private sphere

In this essay it is important to analyze not only those renewals that resulted from public initiatives, but also those derived from private initiatives and actions, since they complement the urban fabric and make up, in general terms, the largest part of built territory

available around public works such as roads, streets and open spaces. In these settings it is important to place emphasis especially on the shopping centers, which clearly evidence the “publicity of the private sphere”, with interior spaces where citizens can find cultural and social expressions of urban life. These kinds of buildings have been built mainly on the peripheries of the centrality. Although they are usually not very favorable for urban relationships, these centers bring the possibility of replacing the activities that traditionally take place in the streets of the city, with better conditions of security. Appearing

in our city in the 1960s with the advent of shopping centers and supermarkets, today's explosion of "shopping malls" is more and more evident as a consequence of the demand for these kinds of services.

Housing and public space

The process of urban transformation, and the growth and improvement of the quality of life that the city of Medellín has experienced in recent years, have provoked continuous migrations, motivated by the search for better opportunities or securer conditions. This displacement phenomenon adds to the natural increase of the population, thereby generating an urgent need for dignified housing. Surpassing municipal boundaries, especially in terms of financing, this housing problem is one of the most complex scenarios faced by the municipal and metropolitan land use planning departments in terms of providing assistance to the population. This issue, which is very complex not only for Medellín, but for the entire metropolitan territory, has had isolated solutions in each part of the territory according to the economic conditions of each territorial entity. The current model has focused on providing quantitative solutions, specifically defined through the operation and methodology of a housing allowance and financial closing, oriented to the basic housing unit.

Defined by national policies, this methodology does not include the development of integral housing programs, which would allow, in accordance with what is stated in the Law 388, the development of public space, structures and amenities which promote the development of a dignified life within the community.

These conditions and situations have motivated, within the public and private institutions in charge of social housing, the development and implementation of large-scale programs that produce a great number of solutions in areas of territorial expansion, but which lack minimum urban standards of quality for the development of normal activities of community life. Moreover, this situation is aggravated by the displacement of families and their resettlement to areas with precarious basic services of connectivity with the center of the city, and a lack of opportunities for the development of economic activities. Beyond basic social, cultural and economic considerations, the result of this process is a lack of adequate public spaces and, in some cases, urban models that do not provide any public space upon which to consolidate the urban fabric of the city, resulting in the formation of "ghettos" in their territories and generating communities with unequal social conditions and opportunities in comparison to the rest of the city.



Figure 2.17
 Arrival square of Metrocable Nuevo Occidente
 - Villa Suramericana
 Source: Comfama



Figure 2.18
 Children's park
 Source: Andrea González

Conclusions

From an exogenous viewpoint

- To think of Medellín from within its political and administrative boundaries, and to formulate policies and projects of public spatialities without awareness of a broader context, including not only the Metropolitan Area but also what we could call the “Metropolitan Region”, would lead to the practice of continuing to establish differences that not only do not contribute to the integration of the urban region, but create an uncomfortable pressure within the “municipality’s nucleus” –i.e. Medellín–, ignoring the larger cultural and economic reality. Only a well-balanced development of the public sphere will permit the creation of a structure of centralities and services that can stimulate the emergence of a compact metropolitan city.
- All projects aimed at structuring public space –the profane and the sacred spheres– must fall within the context of a real city project, expressed in an urban project that, coming from the land use plans, settles upon a significant advance towards the consolidation of public spatialities. Along these lines, the Special Plan for Public Space and Amenities must be the starting point.
- In the short-term, it is necessary to start “urban regeneration”

- projects to renovate large central areas of the city (partial plans). With the contribution of the administration, these areas can be integrated into the urban dynamics through multiple uses, guaranteeing a density of population that can not only make up for the current housing deficit, but can also create social dynamics linked to the urban economy.
- In the mid-term, the challenge for the city is to recover the green areas and urban parks in the metropolitan sphere that are suitable for mass recreation, where the incorporation of water, native trees and appropriate scenarios for large public shows become a fundamental demand.
 - The redefinition of the neighborhood and its amenities as an expression of life in the community; recovering neighborhood identity and a sense of belonging as a principle of identity.
 - The street for the man, for the pedestrian; the sidewalk as the base point for the recovery of a kind city. The mobility of pedestrians and the sidewalk as meeting points are signs of civility.
 - Informality should be recognized not only as an activity on the public space, but as a means of subsistence for many people. Instead of denying it, it is necessary to propose an order that responds to the social situation through tolerance.

Figure 2.19
El Poblado Avenue's urban passageway in the area of La Presidenta Park
Source:
Andrea González



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MOBILITY-TRANSFORMING EVENTS

ABURRÁ VALLEY, 1995-2010

José Fernando Ángel Pérez
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Introduction

This chapter summarizes the most relevant events in the evolution of mobility culture and urban infrastructure, as well as in the transformation of public transportation systems towards rationalization, modernization and integration with the Metro during the past 15 years. It also discusses aspects such as an increasing vehicle, motorcycle and taxi fleet, observing its impact on urban life in the metropolitan city as a system of seven neighboring municipalities.

Projects and programs related to public space and pedestrians are analyzed, changing the focus on “Roads and Traffic” for that of “Mobility” as a more integral concept. Finally and as a way of concluding, important aspects to consider in the present to achieve a pleasant and sustainable future of the city are presented.

The Metropolitan City

Morphology, structure and road system

The Aburrá Valley is home to a city that drains both its waterways and roads into the Medellín river axis. When the valley rises on the steep slopes, the terrain is broken and it becomes geologically and environmentally fragile. Original settlements such as El Poblado, Buenos Aires, La Candelaria, Aranjuez, Belén, La América and Robledo, are located in flat and medium-sloped areas, near creeks that served them; around which eventually some residential neighborhoods developed, thus forming a polycentric city. Their paths evolved into the first roads, avoiding settlements on lower valley areas for health reasons, leaving the city divided by an “inside edge” along the Medellín River.

In the first half of the twentieth century the initial phase of the Metropolitan road system was built on the west bank of the river, when the river was channeled and the “South Highway”¹ was built. This way the beginning of a general road network was formed with bridges linking centralities.

The Winner and Sert plan in the late forties proposed the streets named Colombia, San Juan, 33 and

30 as wide multimodal axes. The authorities of the time considered them over-dimensioned and they were built with modest specifications. The relevance of the original proposal is nowadays recognized for its mobility and environmental quality.

The largest industries and services settled on the low end of the city, which was colonized after channeling the river, forming a

¹ In Spanish: “Autopista Sur”: Coded as Cra.50, it is one of the main roads in the city used primarily to cross the city from north to south. (TN)

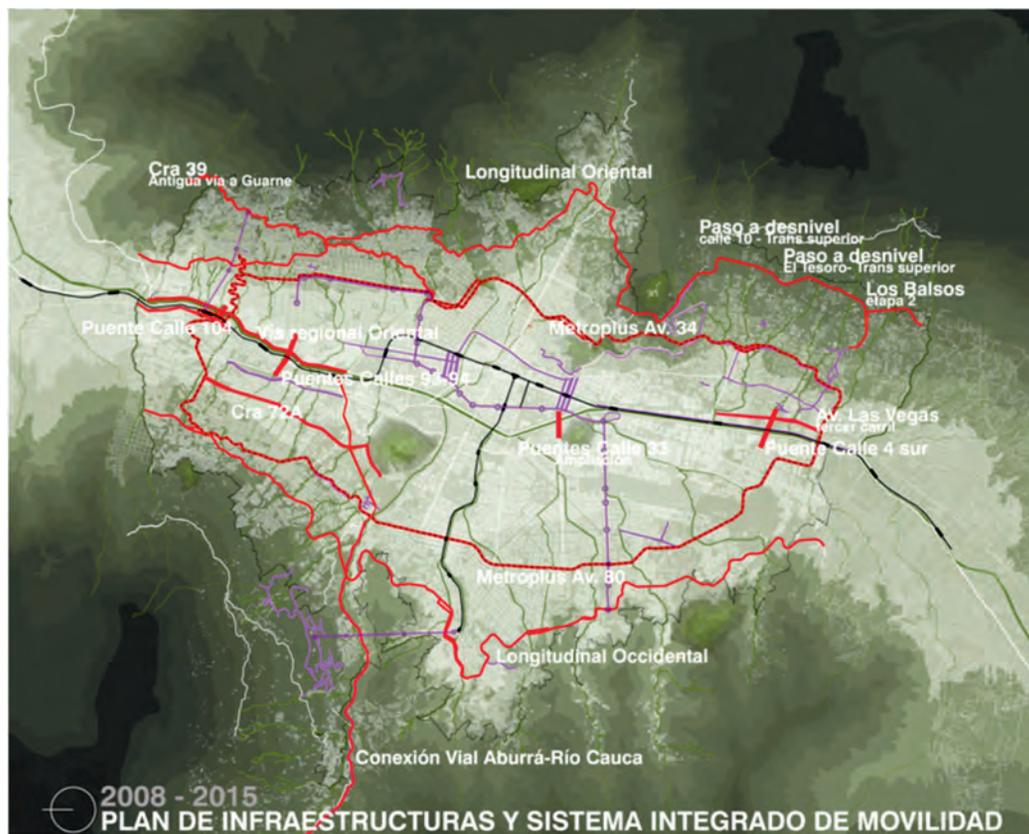


Figure 3.1:
Location of the highway projects for 2008 -2015
Source: Map developed by the
Empresa de Desarrollo Urbano (EDU)

metropolitan city with a specialized geographical center. For a further illustration of the period 1890-1990, the book: *100 years of the life of Medellín* by Fabio Botero, published by the Municipal Council of Medellín in 1994 should be consulted.

Normative aspects and present panorama

The municipalities of the Aburrá Valley do not have an authority that is fully recognized by their local entities, since the Ministry of Transport, the only national authority, delegated the *Area Metropolitana del Valle del Aburrá (AMVA)* as the only authority for the mass transit system of medium capacity “*Metroplús*”,² and in 2006 it did the same for the Metro. In legal aspects, the AMVA should clearly be the transport authority for the massive system in all operation modes, including its feeder routes as well as taxis and inter-municipal buses.

In practice, Medellín is the recipient of metropolitan routes that converge in its center, with well-known effects on urban environmental quality. For social reasons it is not possible to remove these routes without further consider-

ation, to avoid increasing the costs and transfers of the traditional and socially “logical” system. This can only be changed after there is a Metropolitan Mass Public Integrated Transport System,³ with full coverage and reasonable costs of travel based on efficiency. Other issues are also yet to be addressed, such as the oversupply of taxis, a common phenomenon of large cities in Colombia, due to a national judicial impossibility. Every day individual motorization of cars and motorcycles increases, with visible and increasing repercussions.

The CONPES⁴ document number 3260 seeks to implement Bus Rapid Transit (BRT) technology projects such as *TransMilenio* in Bogotá, *Metroplús* in the Aburrá Valley, as well in other cities, within the program of Mass Transport Integrated System.⁵ These refer to specific projects without giving them the grade of complete systems, where traditional transport operators may evolve into operators of safe, economical and efficient systems, designed and controlled by the State. Only then is it possible to combat the trend of overlapping and redundant modes of transportation.

² Bus Rapid Transit system, integrated into the Metro system (TN)

³ In Spanish: *Sistema Integrado de Transporte Público Masivo Metropolitano (SITVA)* (TN)

⁴ *Consejo Nacional de Política Económica y Social* (TN)

⁵ In Spanish: *Sistema Integrado de Transporte Masivo (SITM)* (TN)

Recent relevant studies

The first Mobility Master Plan⁶ in the metropolitan region (10 municipalities, 3.3 million inhabitants according to DANE 2005), with projection to 2020 (AMVA, 2007), replaced the former Metropolitan Road Plan⁷ of 1986. The Mobility Master Plan was based on the Origin-Destination Survey⁸ conducted by Universidad Nacional for the AMVA. Within the Mobility Master Plan, the preliminary plots for the *Metroplús* were also incorporated, designed in accordance with CONPES as a binding system within the Metropolitan Mass Public Integrated Transport System, which had been considered by Medellín's *Empresa de Desarrollo Urbano*⁹ (EDU) and the AMVA in 2004 and then updated in a technical-legal and financial structure study by the Metropolitan Mass Public Integrated Transport System in 2007. In 2009 and 2010, the AMVA held technical and financial structuring of bus routes complementary to the Metropolitan Mass Public Integrated Transport System, both for urban and metropolitan areas.

According to the Mobility Master Plan, a vision of the territorial occupation model is needed, since there is no coordination between national, regional and municipal levels. It points out the lack of tools to move from Land Use Planning¹⁰ to thematic planning, i.e. the lack of plans for mobility, public space, housing, etc., and the lack of indicator systems. Instruments such as the distribution of costs and benefits and capital gain have not been used. For example, there are different aspirations on the use of the river strip, between mobility and linear parks.

The AMVA had lost strength as a planning entity. Following the *Metrópolis* Plan 2002-2020,¹¹ it undertook a planning effort with the Land Use and Management of the Aburrá River Basin,¹² the Metropolitan Guidelines and the Mobility Master Plan, which were complemented by other studies in the municipality of Medellín (special planning for the City Center, El Poblado, and Public Space). With this, it strengthened its planning function even for transportation

⁶ In Spanish: *Plan Maestro de Movilidad (PMM)* (TN)

⁷ In Spanish: *Plan Vial Metropolitano* (TN)

⁸ In Spanish: *Encuesta Origen Destino (EOD)* (TN)

⁹ Urban Development Enterprise (TN)

¹⁰ In Spanish: *Plan de Ordenamiento Territorial (POT)* (TN)

¹¹ In Spanish: *Plan Metrópoli 2002-2020* (TN)

¹² In Spanish: *Plan the Ordenamiento y Manejo de la Cuenca del Río Aburrá (POMCA)* (TN)

which, despite its declared status as a “Metropolitan Fact”, had not been exercised for some time. Due to this, in 2009 a Mobility Branch was founded.

In 2005 the most noticeable problems were an inadequate Public Transport System,¹³ with poor quality and over-supply, the lack of an Integrated System, the unclear role of the car and taxi, weak external connections and internal road infrastructure with critical points in terms of congestion, high

number of accidents and problems of environmental pollution caused by mobile devices.

Travel Origin-Destination Survey of Households

The most widely used modes of transportation are public transport (buses and Metro) and walking (30% each). However, the transit of cars, motorcycles and taxis together constitute 28% of trips (1.37 million), very close as a whole to the main modes.

Table 3.1: Daily mobility in the Aburrá Valley

MAIN TRANSPORTATION MODE	VALIDATED TRIPS*	%
Bus	1 450 000	30%
Walk: 3 or more blocks	1 420 000	29%
Car	600 000	12%
Taxi	540 000	11%
Metro	380 000	8%
Motorcycle	230 000	5%
Other	200 000	4%
Bicycle	50 000	1%
TOTAL	4 870 000	100%

* Values validated with measurements made in bus, taxi and Metro companies.

Source: UNAL (2009)

¹³ In Spanish: *Transporte Público Colectivo (TPC) (TN)*

Hence it appears that policies should be primarily directed to serve the user of mass public transport systems and pedestrians, but it is also important to address the needs of transit in general, which constitutes a non-negligible number of trips, with a high use of road space and energy consumption per trip.

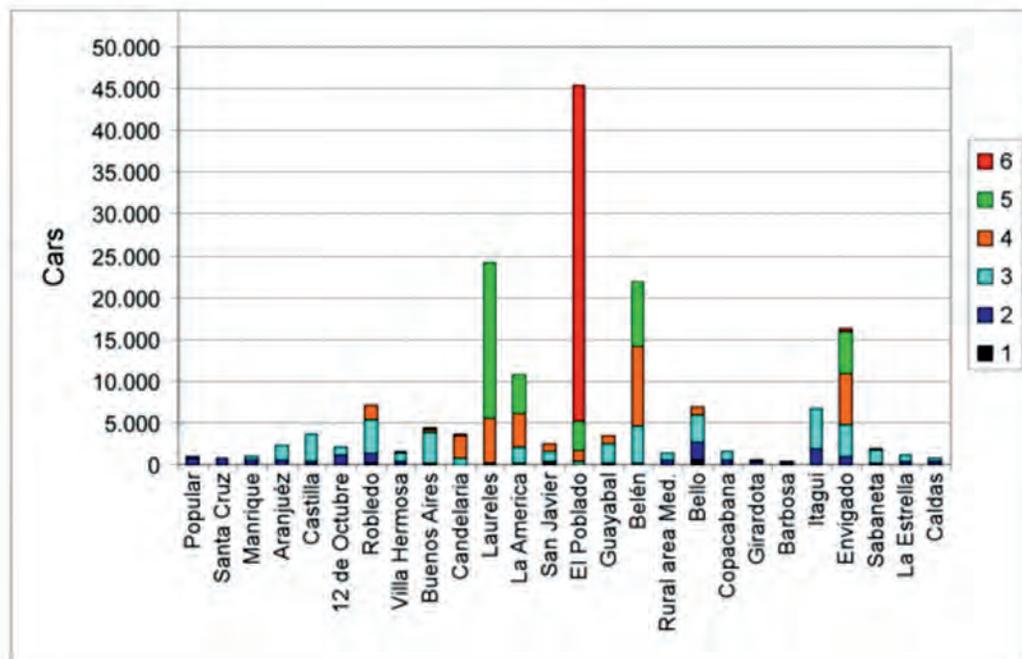
Motorization, average speeds and travel times in 2005

The Socioeconomic Level 6¹⁴ showed a rate of 1.58 cars/household; strata 5 came to 0.74, 4 came to 0.39. After this point the relations triplicate: Socioeconomic Level 3 has 0.14 cars/household, 2 has 0.044 and

1 has 0.017. 83.7% of households had no car and only 2.9% had more than two. In Socioeconomic Level 1 there are four people per household and in 6 there are 3.2. Nevertheless motorcycle use comes to replace the lack of motorization in the Socioeconomic Levels 2 and 3, because it concentrates almost 70% of these vehicles (Figure 3.2).

Between 2006 and 2008 the number of motorcycles grew by more than 15% annually, while the number of cars and Metro travel increased by 5% per year. The increase in bus travel was less than 3%. Taxis showed virtually unchanged use levels in 2008 compared to those of 2005 (UNAL, 2008).

Figure 3.2:
Car ownership
in the comunas
of Medellin and
in other
municipalities
Source:
AMVA (2007)



¹⁴ In Colombia there are 6 socioeconomic levels, called “estratos socioeconómicos”, 1 is the lowest and 6 is the highest. Socioeconomic stratification is used in Colombia to classify residential households, taking into account the income level, public utilities, location of the household, etc. (TN)

It is noteworthy that although a measure called “*Pico y Placa*”¹⁵ has regulated traffic in rush hours, car trips for 2008 were higher than 2005. The global economic crisis that began in late 2008 has slowed the growth of GDP in Colombia and the region, with the effect of a lower growth in mobility between 2008 and 2010.

As for transfers, for the totality of travel only 10% of users make them. However, excluding travel on foot, of the 3.4 million motorized trips per day in 2005, 13% had transfers. Nevertheless, if only the 1.83 million trips per day in 2005 of the Public Transport and Mass Transport systems are analyzed, 24% had transfers. 17.5% of the passengers who use the Public Transport System and 50% of those using the Metro make transfers, a fact which shows that a good part of the transport system feeds the Metro, because its path, except in the center of Medellín, is on sparsely populated or low density areas. In recent years (2007-2010) it is expected that the level of transfers on public transport has increased in the Metro by the increased use of feeder routes leading to reductions

in bus use for this same reason, together with the increased use of motorcycles.

The average distance of travel *only by foot* is high (more than a kilometer), while for bicycles it is 4.3 km and for motorcycles 6.1km. The majority of pedestrian trips are made within the same zone or neighborhood, and a similar percentage between neighborhoods (close), while the majority of motorcycle trips are inter-zonal.

The network of bike paths, with only 13km built so far in Medellín, is too short to expect a growth in demand. This would require a real network that can impact the territory and bring about economies of scale for this type of travel.

Objectives and policies in the Mobility Master Plan

According to the AMVA (2008) there are some general and specific objectives that were fed into policies and subsequently into strategies, which are specified in plans and programs. Plans are broken down into projects and programs into actions. Objectives are grouped into six general and ten specific ones (Table 3.2).

¹⁵ “*Pico y placa*” (peak and [license] plate) is a traffic congestion mitigation policy that was initially used in Bogotá in 2000 to help regulate traffic during rush hours, and was later used in Medellín and other Colombian cities. It restricts vehicles with license plate numbers ending in certain digits from travelling the streets between certain times. (TN)

Figure 3.3
a) Cycle path
in North Carabobo urban
passageway
Source: Alcaldía de Medellín – Diana
Moreno



b) Detail of
cycle path in
North Carabobo
urban passageway
Source: Alcaldía
de Medellín



Table 3.2: General and Specific Objectives of the Mobility Master Plan

GENERAL OBJECTIVES	SPECIFIC OBJECTIVES
1. Support and sustain economic development through regional integration and positioning in the national and international contexts, and contribute to good governance.	Improve levels of connectivity, accessibility and integration both internally as well as with its regional, national and international environment, in all modes.
2. Support and sustain social and human development, social integration, to contribute to the quality of life and health of the population.	Promote training, awareness and education. Improve the quantity, quality and accessibility of public spaces.
3. Facilitate a transport system that is low cost, efficient, has a rational use of resources, and is equitable and environmentally sustainable.	Promote institutional strengthening.
4. Facilitate a fast, reliable and high-quality transport system.	Optimize the use of infrastructure and transport equipment, ensure its conservation and the efficiency and effectiveness of the investments in them. Reduce levels of congestion and the user's travel times. Reduce air pollution and noise emissions. Ensure access to public transport for people with physical, sensory or economic limitations. Promote technological innovation.
5. Facilitate a safe transportation system.	Promote the safety of the most vulnerable users of the system, such as pedestrians, cyclists and motorcyclists.

Source: AMVA (2007)

Policies for the Aburrá Valley, according to the Mobility Master Plan

Of Land use:

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Encourage multiple uses and densities around public transport stations. 2. Consolidate the north and south centralities. | <ol style="list-style-type: none"> 3. Expand, protect and build new and better public spaces. 4. Establish barriers and green belts to regulate urban expansion. 5. Expand and build facilities in accordance with the population's demand. |
|--|--|

6. Develop tools to enforce compliance with the Land Use Plans.
7. Reduce conflict by inadequate mixing of land uses.
8. Create new centralities for the provision of equipment and services in populated localities, to lower demand for motor transport.
9. Integrate transport policies and land use.
10. Enhance the historical industrial and commercial specializations as a means of generating employment and competitiveness.
11. Enhance the comparative and competitive advantages of the metropolitan region.
12. Strengthen the potential for tourism.

Of transportation and mobility:

1. Physical, pricing, operational and institutional integration of public transport.
2. Encourage the development and modernization of public transport.
3. Encourage the development of non-motorized transportation.
4. Constitute the multimodal corridor of the Medellin River as a structuring axis and implement the Metropolitan Mass Public Integrated Transport System as a hierarchical element of metropolitan mobility.
5. Implement and strengthen a transit and metropolitan transport system management.
6. Promote the continuity and connectivity of the metropolitan corridors.

7. Establish a routine maintenance program for roads and ensure its financial sustainability.
8. Improve connection within the department, the nation and abroad.
9. Improve road connection to the Jose Maria Cordova Airport.
10. Encourage the rehabilitation and activation of the local and national rail network.
11. Support the modernization of freight and passenger transport by road.
12. Operational integration of the Enrique Olaya Herrera and José María Córdoba airports.
13. Promote connectivity of the Aburrá Valley with a deepwater port in the Pacific.
14. Regulate and reduce the use of heavy freight vehicles from other regions in the Aburrá Valley.

For management:

1. Create mechanisms for the coordination and cooperation between public and private entities.
2. Education programs for mobility and the disciplined use of urban space.
3. Strengthen planning and mobility information systems.
4. Promote the use of Intelligent Transportation Systems (ITS).
5. Implement environmental analysis on mobility programs and projects.
6. Implement mobility analysis on construction programs and projects.

7. Promote effective citizen participation considering proposals and expectations.
8. Regulate the flow of the transportation of hazardous substances.
9. Establish a program to control the weight per axle of freight vehicles.

The Metro and urban transformation

The most significant event in the mobility of the Aburrá Valley in the period was the establishment of the Metro in 1995. With 31 km of track it is, together with the Metro of Santiago de Chile, one of the most efficient in Latin America. However, its capacity contrasts with its initially moderate use which in 2004 was 230 000 trips/day (only 6.76% of motorized trips in the Aburrá Valley). In December 2007 it was 460 000 trips per day. Thus, in 2009 began the acquisition of an additional fleet of twelve trains (each with three carriages) available in 2011 to meet the growth in demand due to the operational start of the extension of Line A (2.7 additional kms up to Sabaneta) and for its integration with the *Metroplús*.

The Metro's commercial speed is 37 km/h, while the *Metrocable's* is 18 km/h and about 15 km/h for city buses.

In 2006, the Metro conducted the Master Plan 2006-2020: "Trust in the Future." Several expansion projects were subsequently evaluated including new cable-car systems, trams along the 80th Avenue,¹⁶ and Ayacucho Street,¹⁷ and the extension of Line B to the east.

The growth in demand for the Metro (apart from the economy growth) is due to projects such as:

- *Metrocable* Santo Domingo (Line J): 2 km, 90 cabins, opened in 2004, integrated to line A; it moves about 27 000 people per day.
- *Metrocable* "New West" (Line K): 2.8 km, 119 cabins, opened in 2008, integrated to Line B from San Javier Station to Pajarito Station.

The densification in the environment of Metro stations has been a request that was made in the last Land Use Plan of Medellín, but due to its travel course and the environmental destruction which goes along with the permanence of the traditional routes in the city center, the expansion of the city has taken place (and continues taking place) in areas of high slope, such as "Pajarito", where it was necessary to build a *Metrocable* to address its accessibility, additionally aiding depressed city areas such as John XXIII and Vallejuelos.

- Arví Park *Metrocable* (Line L): 4.6 km, 27 cabins, opened in 2010. Integrated to Santo Domingo

¹⁶ In Colombia "carreras" (avenues) run from south to north (TN).

¹⁷ In Colombia "calles" (streets) run from east to west. (TN)

Metrocable but with additional fees, it has the purpose of communicating the city with Arví Natural Park.

- Integrated Route System: between 2004 and 2010 integrated routes increased by 35%, from 80 to 111. Designed to achieve greater origin-destination coverage, they have integrated tariffs for user comfort and savings.¹⁸ Medellín went from having 2 to 44 routes and some of them operate using the oversupply of buses that previously traveled with low occupancy in the traditional neighborhood-city, center-neighborhood routes. This program increased the number of Metro passengers and helped to decongest the city center. Nevertheless, when the Metro is fed by more bus routes, it loses on the average revenue per passenger, because some users who used to pay full fare start paying integrated ticket fare, from which the Metro will only receive a percentage.
- Sabaneta-Extension and the South centrality: being 2.7 km in length, it travels up to the stations of Sabaneta and La Estrella, part of the new South Centrality.

100% of the project will be executed by Colombian companies,

where activities such as mounting rails and electrical wiring, formerly executed by foreign companies, will now be performed by the Metro's professional and technical staff.

Road capacity of the metropolitan city

Power and speed in 2005's road network

The road network in the region is about 3000km (0.90 meters/capita). In Medellín it is denser than in the remaining nine municipalities, with a percentage of road strips of 19% of the total urban land area, while in the remaining municipalities it is below the desirable minimum (15%). Topography affects some areas where the primitiveness of the roads reduces mobility. In the case of the Aburrá Valley, the west-east capacity is limited by 18 bridges, 11 of which are in Medellín, with 26 lanes in each direction, for 1500 vehicles per hour/lane. This represents a capacity of 39 000 vehicles per hour in each direction. The north-south capacity is defined by the narrowest sections in an imaginary line drawn on the 33rd Street or Colombia Street. Medellín, despite having an acceptable road area, suffers from discontinuities that do not permit it to make the most of its coverage potential. The 70th Avenue is interrupted at the

¹⁸ One of the ticket modalities of the Metro is an integrated ticket, which includes a Metro ride and a city bus ride. (TN)

Universidad Pontificia Bolivariana and El Volador Hill, the 74th Avenue is interrupted at the Diamante Shopping Center and La Hueso Creek, the 10th street with the local airport, the 33rd Street with El Castillo housing complex, and Los Balsos Hill Street does not cross the Medellín River, so in this manner there are a great deal of gaps that limit their potential.

To solve these discontinuities some projects have been studied: in mid-2010 the construction of the 4th-South Street Bridge in El Poblado commenced, as well as 14 other projects funded by the figure of the “betterment levy”,¹⁹ which cost over 500 billion pesos and another ten with direct resources. These projects focus on solving critical intersections and connections. Although they do not extend the road section (distance between sidewalks) they do in driveways and sidewalks, occupying lands that had been reserved and improving the efficiency of the existing road network. Also in 2010 the extension of the 33rd Street Bridge will be completed, work that complements the expansion to three lanes in each direction of the highway.

Average speeds in the city decreased for 2005 due to the increasing congestion caused by road construction delays, the growth of the fleet of cars and motorcycles,

the increasing use of taxis, the increased use of buses and their interaction with other traffic. With the implementation in March 2005 of the *Pico y Placa* measure, leading to the restriction of 20% of the cars during peak hours, the average speeds in the city improved, having buses increase their commercial speeds from 14km/h to 17km/h at these hours and cars approaching speeds of 30km/h, including the average speeds on La Regional highway. These speeds are good considering that, internationally, in developed countries, buses do not exceed commercial speeds of 10-12km/h and cars do not exceed 20km/h on average during peak hours. However, it is true that the car fleet in Medellín is lower than that of developed countries and possible roads and lanes have to be built on the space available, while reserving the necessary space for the lanes of the public Bus Rapid Transport (BRT).

Construction processes bring congestion and in order to maintain the speed levels, the *Pico y Placa* measure increased to 40% in August of 2008. This way, competitive speed rates for cars (28km/h) were obtained again, with very low or very high speeds becoming less frequent, which means that the average delays at traffic lights fell.

¹⁹ The “betterment levy” or “real estate improvement tax” (In Spanish “*Impuesto de Valorización*”) is a tax that sometimes the State collects when it builds a public work that leads to an appreciation in land prices in the vicinity of the project. (TN)

Projects undertaken to expand the city's road capacity

- Reengineering of the existing road network: It has allowed better utilization of the network, especially in areas with high congestion and risk of accidents, seeking a more equitable car distribution by using support roads with the appropriate technical specifications. These interventions have

not committed considerable resources when considering their benefit, while they have achieved a reduction in terms of congestion, increasing or maintaining speeds in critical areas and reducing car jams, fuel consumption and thus environmental pollution in terms of the numbers of vehicles (Table 3.3 and fig. 3.4)

Table 3.3 Main small-scale interventions of road reengineering

CONFORMATION OF PARKWAYS	ROAD REARRANGEMENT	VIRTUAL ROUND-ABOUTS	DIRECTION CHANGES
Los Balsos Hill Road and Los González Hill Road	Naranjal Sector	35 th Street and 77 th Avenue	Castilla Sector (96 th and 97 th Streets)
Transversal ^{2o} 78 and 80 th Street, on the Cementerio Universal sector	Colombia neighborhood	35 th Street and 79 th Avenue	44 th Avenue and 40 th Street
76 th and 78 th Avenues in the Belén-Laureles sector	San Diego Sector	44 th Street and 96 th Avenue	Low Pradito Sector, San Antonio de Prado
Alejandría Hill Road and Los Parra Hill Road	Belén Industrial Citadel	78B Avenue and 3C Street	
	Vizcaya Sector	79 th Avenue and 1south street	
	Hospital General Sector, among others	96 th Avenue and 38 th Street	

Source: STT (2007).

²⁰ In Colombia *transversales* run from south to north (similar to “*carreras*” or “*avenues*”), but unlike “*carreras*” they are not totally perpendicular to “*calles*” or “*streets*”. (TN)

REENGINEERING - SMALL-SCALE INTERVENTIONS BIG PROJECTS

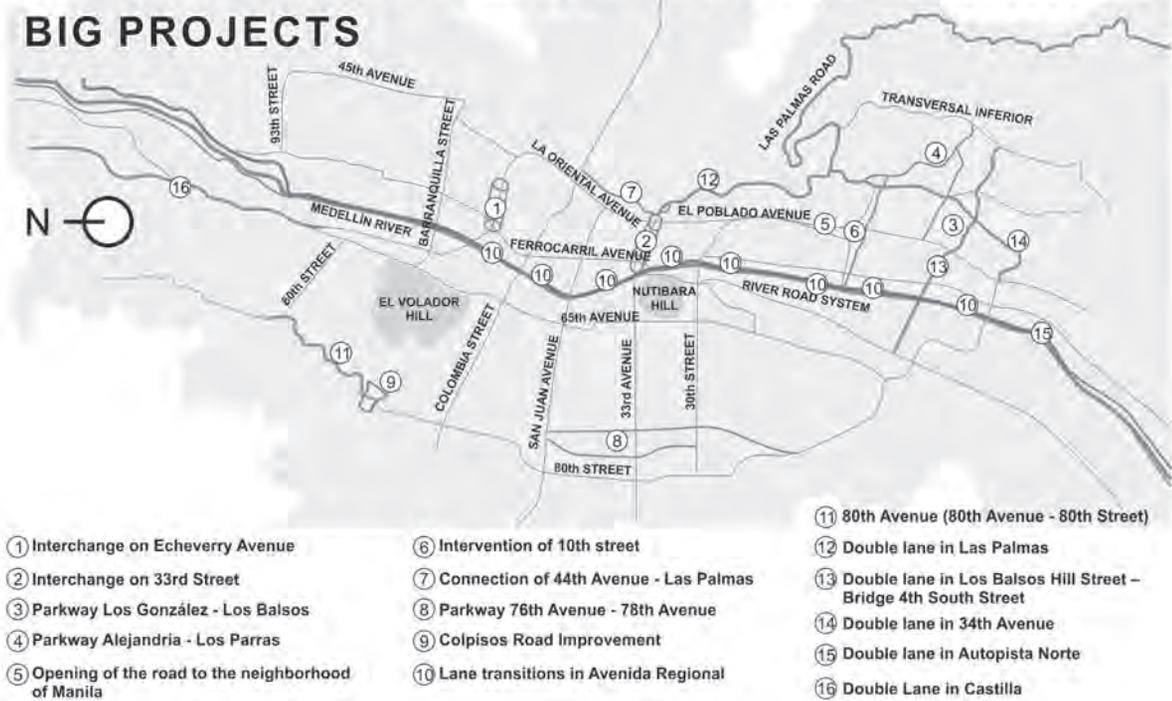


Figure 3.4
Reengineering and specific projects
Source: Plot made by Exaedro Arquitectura y Urbanismo

Medium-sized projects such as interchanges and intersections

- Interchange on Oriental - Echeverri Avenue, complemented with Cuba and La Paz streets, from Prado Metro station to the Fatelares roundabout.
- Interchange on 33rd Street, on the 37th Avenue sector, complemented by 36th and 38th streets, between the Exposiciones and San Diego roundabouts.

Projects that intervened networking, separators, sidewalks and public space, managed to recover underutilized roads adjacent to informal auto repair shops

and parking. They support routes such as 33rd Street and Oriental Avenue, with a high degree of saturation, alleviating two of the most congested areas in key locations to access the city center.

Adjacent roads were used between roundabouts that were modified to serve as primary intersections to the three roads simultaneously, increasing two lanes each way for effective transit between them. In the case of 33rd Street, these interventions increased speeds from 14km/h to 35km/h and decreased delays from 1.91 to 0.83 min/vehicle.

- The interchange of the *Transversal Inferior* and El Tesoro road: traffic flows were reorganized, the turning radii were improved to ensure higher safety, eliminating conflicts and speeding up deliveries.
- The interchange between 80th Avenue and 65th Street or “Colpisos”: it was one of the city’s crossings with the highest de-

gree of saturation due to all the necessary maneuvers for the four traffic light phases, with high waiting times and long traffic lines. Traffic light phases were reduced, achieving a better performance at the intersection.

- Extension of the road network, one of the objectives of the city is to obtain a system of efficient mobility which can also be used for mixed transit, a comprehensive and articulated road network that allows travel needs to be met in an agile, comfortable and safe way.

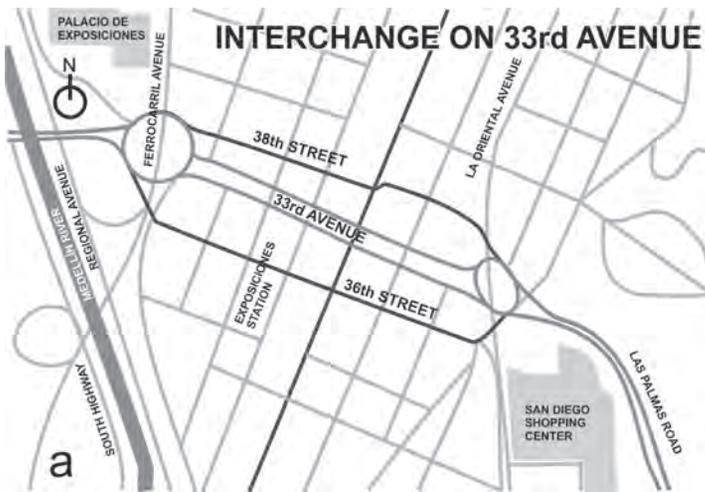
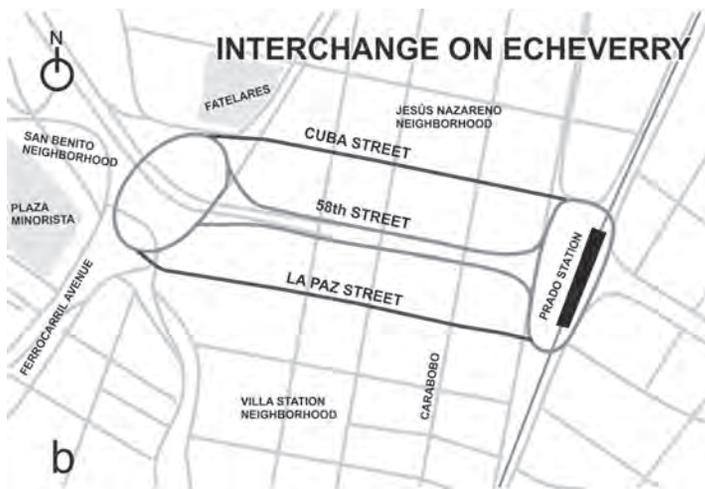


Figure 3.5
33rd Street Interchange between Exposiciones and San Diego
Oriental - Echeverri Avenue Interchange between Prado and Fatelares
Source: Plot made by Exaedro Arquitectura y Urbanismo



Relevant Examples:

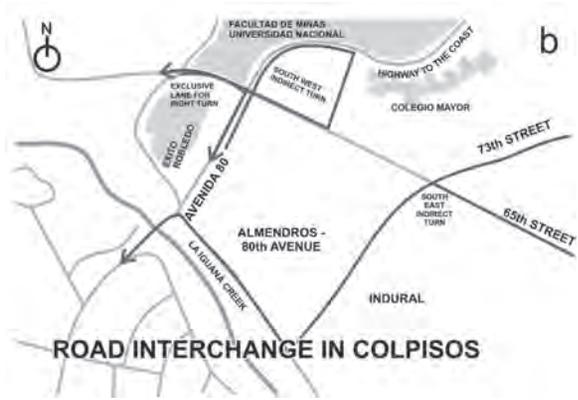
34th Avenue: high-impact project for mobility in El Poblado, providing connectivity between La Aguacatala zone and Las Palmas Road, distributing the loads on El Poblado Avenue, *Transversal Inferior* and *Transversal Superior*.

The extension of Girardot Avenue: It improved the connectivity from the center to the southeast, from the old San Lorenzo Cemetery towards Los Huesos Street, continuing into the sector of San Diego with a viaduct towards Las Palmas Road.

The third lane of 33rd Street: Extends from the Bulerías roundabout to the Santa Gema roundabout (80th Avenue). It increased the road’s capacity and decreased its saturation, while providing more security for pedestrians with specific traffic lights. Parking is available in off-peak hours and at night, avoiding parking on public space.



Figure 3.6
 Traversal Inferior and El Tesoro road interchange
 Source: STT (2007)



b) 80th Avenue and 65th Street “Colpisos”
 Source: Plot made by Exaedro Arquitectura y Urbanismo



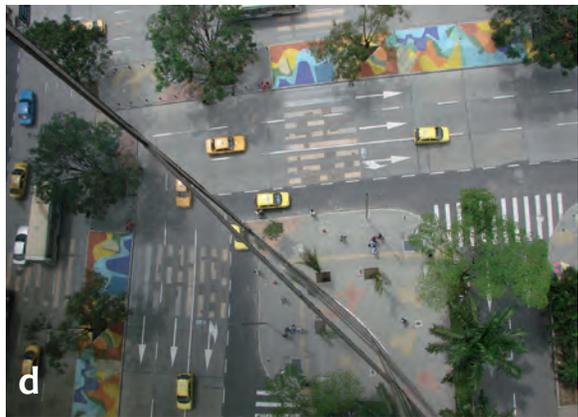
a) Metroplús on 70th Avenue



b) Urban Furnishings for the city



c) A footpath on 106th Street



d) Oriental Avenue. Signaling on crosswalks.
 Pyramid-shaped separator.

Figure 3.7
 Other improvement works in the municipality of Medellín. Source: Andrea González

A double lane in Las Palmas: improved communication with the airport in Rionegro.

The expansion of the 80th Avenue: the segments between 65th and 78th streets and between 65th Street and Doña Maria, respectively.

The expansion of 76th Avenue: a double lane in the section between 20thA Street and La Inmaculada School.

A double lane on 65th Avenue, between 93rd and 101st Streets: This public work was also complemented by the bridge over the North highway to bring about direct communication between the neighborhood of Castilla with the neighborhood of Tricentenario and the Metro, facilitating the connection to the south through routes different to that of the river system.

A double lane in Los Balsos Hill Street: axis that connected Las Vegas Avenue with the *transversales* in El Poblado, increasing road capacity in the sector.

A river road system. The construction of a distributor road: new road from the limits with Envigado in “Carrefour” with the northbound 30th Street to complement the main regional road axis.

Urban passageways and public space on roads

Urban and population growth require policies that allow less car-dependent societies and encourage the use of public transportation, encouraging travel by foot and by bicycle, by integrating different

modes towards a continuous system structured by high quality throughout the city. The pathways reduce pollution, congestion and accidents, raising the quality of life and achieving a sustainable environment.

Medellin is no stranger to this trend and this is why it has implemented projects to recover public space, creating corridors with furnishings and improvements in landscaping such as roofed bus stops, wider sidewalks suitable for pedestrians and Persons with Reduced Mobility (PRM), as a way of looking for continuity and security to encourage pedestrians. This is intended to articulate a comfortable and safe road and sidewalk network in all the areas of the city, connecting the different neighborhood meeting places to serve in the integration of different transportation modes. This can be complemented with the modernization of traffic lights to improve road efficiency, including some intersection sensors for automatic change depending on demand. Zebra crossings and traffic lights with phases and call buttons were also incorporated in order to enable safe pedestrian crossing in places where the high accident rate made it a necessity.

The most important public works in this regard are (Figure 3.8):

- The renovation of 107th Street, Northwest Integral Urban Project.
- The construction of the Castilla Boulevards: on 40th Avenue, between 48th and 49th streets, and 70th Avenue.



b) 70th Avenue Urban Passageway
Source: Mauricio Mendoza



c) 10th Street Urban Passageway
Source: Andrea González

Figure 3.8
Downtown Carabobo Urban Passageway
Source: Alcaldía de Medellín. Diana Moreno

- The intervention of La Oriental Avenue, Palace Avenue in Prado neighborhood, El Poblado Avenue, San Juan Street, 10th Street and 33rd Street.
- The control of parking on front yards and sidewalks on streets with high pedestrian traffic.
- The urban transformation of the Carabobo urban passageway.
- The opening of public spaces along the path of *Metroplús*.

Motorized mobility in the city

Taxis

70% of trips per person in the region are by motorized means with taxis making up 11% of these, a high

percentage internationally speaking (the rate is usually between 5% and 7%). More than 27 000 taxis are an oversized fleet for the city. Studies made by the *Universidad Nacional* for Medellín's *Secretaría de Transportes y Tránsito*²¹ (2006) and the AMVA in 2008 show that taxis which circulate daily without the *Pico y Placa* measure are used mostly by passengers from Socioeconomic Levels 2 and 3. Among 58 cities of the world, the region of the Aburrá Valley has the most taxis per capita after Lima, Peru (Figure 3.9).

If measures such as raising fares and forming a compensation fund for taxis were put in place, the Aburrá Valley, in a few years, could operate with about 24 000 taxis, maintaining the *Pico y Placa* mea-

²¹ Department of Transport of Medellín (TN)

sure as a day off without losing jobs, because the percentage of double-shift taxis could increase and thus overcome the shortage of service in the evening rush hours; deficit caused not by a lack of taxis, but by the custom of many drivers-owners (50% of taxi drivers own their taxi) to terminate their taxi service before the evening rush hour to avoid congestion.

Public Transport System

The traditional system in Colombia allocates state roads to private companies that affiliate bus owners. These, in turn, “hire” drivers who obtain their remuneration per passenger mobilized. This system lends itself to the overlapping of

bus routes on major transport corridors, thus creating the phenomena known as the “penny war”²² (competing for a passenger), “herding”²³ (a bus is parked in the middle of the road waiting for passengers until the next one arrives), ignoring bus stops and fostering oversupply, a rudimentary and inefficient system, with impact on general mobility, causing accidents, congestion and pollution, coupled with a national decree that allows buses to be in service for up to twenty years.

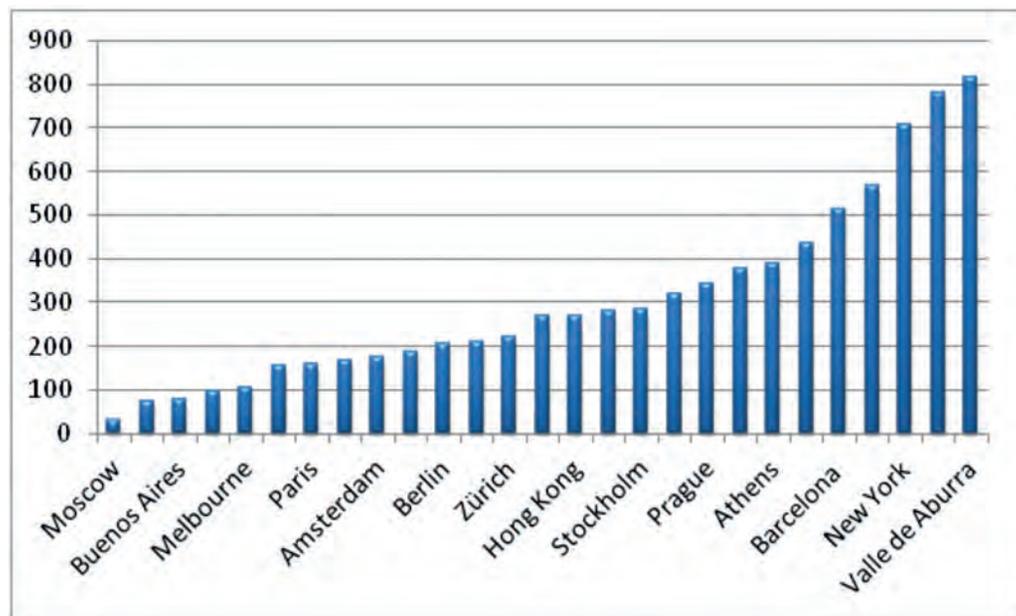
Measures taken to improve service delivery

- Defining and freezing carrying capacity for public transport enterprises (2005-2007): to achieve efficiency in the de-

²² In Spanish: *Guerra del centavo* (TN)

²³ In Spanish: *Arriería* (TN)

Figure 3.9
Rate of taxis
for individual
public trans-
portation. Taxis
per thousand
inhabitants in
60 world cities
Source: UNAL
(2009)



livery of this service, improve quality and prevent new vehicles from being incorporated into the city's car fleet. This permitted the cancellation of permits for one hundred new vehicles that were ready to be incorporated.

- Implementation of a measure known as the "Unique Fund", which makes the income earned per vehicle on each route correspond to the average number of passengers moved, thus discouraging a "penny war".
- Compensation Fund Creation: this was created in Medellín in 2004 to help solve the problem of the oversupply of public transport vehicles. Due to it being a metropolitan issue, in 2005 the AMVA assumed management of the program. At

the time, oversupply was estimated at more than 400 buses and by 2009 it was 250 (190 in Medellín and 60 in Itagüí). The reduction was due to a decrease in vehicle size (new minibuses replaced buses), an increase in demand and the creation of new Metro feeder routes. By April 2010 more than 32 000 million pesos had been collected, with which 142 vehicles (101 in Medellín and 41 in Itagüí) that were 22-year-old models on average had been disintegrated. It is expected that by the end of 2010 the goal of 250 will be reached. Projects such as *Metroplús* and the 80th Avenue and Ayacucho Trams will bring additional compensations paid by the operators of these projects.



Figure 3.10
Bus stops and urban furnishings for the city
Source: Andrea González

Apart from what is mentioned above, studies have served to identify companies with service deficits. Between 2008 and 2009, 37 vehicles were transferred from companies with surpluses to those facing a deficit.

Another side effect of the Compensation Fund was the voluntary change of old models for new ones, even before reaching the legal 20 years of service life, to avoid entering the program's priorities. This made it possible that the region passed from having a fleet with an average age of 20 to 9 years between 2004 and 2010.

Resources for this Fund were obtained over three years, from 2005 to 2007, as a component of the fare, technically proven according to the implementation of resolution 4350 of the Ministry of Transport, calculated and agreed at 15 pesos per passenger on buses and agreed with the Metro at 26 pesos per passenger mobilized with full fee (this as a historical recognition that when the Metro started operating, no compensation was offered to the Public Transport). Money was collected in six previously selected trusts. It was put in force according to the decision of the State Council, after some doubts from transporters were interposed.

- Definition of transporter frequency and capacity: based on the capacity calculations of the Universidad Nacional (AMVA, 2006). The oversupply of Public Transport in terms of routes and companies was determined. The *Secretaría de Transportes y Tránsito* of Medellín issued, in August 2007, administrative acts with the frequencies and technical capacities, which were adjusted in 2009 based on the 2008 capacity with the transfer of quotas and a methodological refinement made by the *Universidad Nacional*.

The Metropolitan Area had, between 2006 and 2007, over 7000 Public Transport vehicles and operated with about 6000; 600 on feeder routes (300 in Medellín). As a result of studies, decrees and the compensation plan put in place, the region will have the vehicles required by company and by route and with a renovated fleet.

Today the Aburrá Valley has 64 companies, of which 42 are in Medellín, where the *Corporación de Transportadores Urbanos (CTU)*²⁴ has existed for 20 years and which brings together 23 companies. In 2003, 17 informal cooperatives

²⁴ Urban Transport Corporation (TN)

were legalized. Clusters have recently been created to promote zonal projects that bring together several *comunas*²⁵ or municipalities; this is how “*Masmedellín*” (companies of the neighborhoods of Castilla and Robledo), *RIT*²⁶ alliance (northeast sector) and *MEI*²⁷ alliance (south-west) came into existence.



Figure 3.11
Integrated Transport System of the Aburrá Valley
Source: Plan made by Exaedro Arquitectura y Urbanismo

²⁵ The *comunas* (districts) are administrative subdivisions. The municipality of Medellín is divided into 16 *comunas*. (TN)

²⁶ *Red Integrada de Transporte* (Integrated Transport Network) (TN)

²⁷ *Medellín, La Estrella and Itagüí* (Transportation Companies of Medellín, La Estrella and Itagüí) (TN)

Mechanisms used to reduce oversupply or adjust capacity

- Transferring transport capacity to companies with deficits.
- Compensation Fund.
- Voluntary Termination: deal between other route owners-operators to improve efficiency of the refurbished vehicles that remain.

“Student Ticket” Program: proposed by the municipal administration in early 2004, accepted by transporters at first as a fare component (differential fare) and not as a subsidy. An administration was assembled to run it. More than 36 000 young people who live more than 1 kilometer away from the place where they study, from Socioeconomic Levels 1, 2 and 3, are transported for half price on buses and on the Metro. Although the program was suspended in 2008 due to a lack of agreement with transporters, it was revived in 2009 and it still stands.

Technical calculation of Public Transport fares: based on surveys of the staple-goods basket values, the Compensation Fund component and the student ticket were decreed to maintain the same fares in 2006. The method is now applied by the AMVA because Medellín recognized it as the general authority for public transportation.

Urban furnishings. Bus stops: a program promoted by the Municipality

of Medellín in 2006 under an advertising concession model, for positioning covered bus stops on major public transport corridors in the city. The objectives were decongesting roads, increasing user safety and generating a civic culture. That allowed the installation of more than 700 bus stops.

Pico y Placa measure: originally it only restricted circulation for two hours in the morning (6:30am - 8:30am) and two hours in the afternoon (5:30pm - 7:30pm), making it possible for people who needed their car for their daily activities to shift schedules to the remaining hours and thus avoid being affected by the measure. This program promoted the use of Public Transport, Metro, carpooling and walks. In all the surveys conducted by the newspaper *El Colombiano*, between 2005 and 2009, and *Ipsos - Napoleon Franco*, the measure (including the expansion to 40% in 2008) has been endorsed by over 70% of citizens and by 66 % of people who own cars. Meanwhile, while a true Integrated Transport System that gives people from all Socioeconomic Levels an interesting alternative in terms of travel times and costs is implemented, it will be necessary to evolve towards more restrictive measures, accompanied by differential parking fees where parking in downtown is more expensive, as it has been in Bogotá since 2009.

Towards sustainable mobility

If we analyze how the city was planned and built 20 years ago, when a city made for private cars was thought of as the ideal, it is evident how there have been changes in the project's approach, according to contemporary thinking and world trends, which aim for sustainable cities that are kind to people and the environment. However, much is yet to be done.

The first step is to advance on a technical basis and with the participation of stakeholders, supported by the tools available for modeling systems, in the definition of a comprehensive project for the city or the metropolitan region, based on a sustainable model that is suited for the majority.

Secondly, it is important to not delay further the implementation of a true Integrated Transport System in urban areas of the metropolitan city, covering the main origins/destinations, looking for a low average of transfers per travel, which is fast (commercial speeds between 20 and 30km/h) and has socially conscious fares that are possible as a product of rationality, efficiency and political will inherent in the democratic exercise of authority. It is important to make urban transport expenses lower than 10 or 15% of the lowest income level salaries so that the battle against motorcycles becoming the preferred mass transportation system can be won. Observing how these proliferate in many Colombian and third-world cities is impor-

tant to prevent this phenomenon. It creates a high impact on congestion, pollution and accidents, resulting in a detriment of urban life quality, while at the same time it is not an option for those not willing or suitable for these vehicles such as the elderly, children, adolescents and Persons with Reduced Mobility. Only with the implementation of an adequate public system, will authorities be able to discourage and restrict private motorization and in turn provide a suitable alternative in massive and integrated systems, promoting the consolidation of humanistic, compact and quality cities.

Today Medellin and the Metropolitan Area have more than 200 inhabitants per hectare in urban areas, making it on average quite dense; although the *comuna* of El Poblado only reaches 70 inhabitants per hectare, yet it is not desirable to increase this density given its precarious road system and environmental fragility. This makes it necessary to encourage public and non-motorized transportation modes in flat areas.

The challenge of sustainable mobility requires the articulation of plans, clear policies, investment, administrative efficiency, control and education, to become a model city in issues concerning mobility. It is also important to insist on clean mobility means such as bicycles, light electric motorcycles and vehicles and hybrid public transportation vehicles with low fuel consumption.

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LAND USE PLANNING AS A MECHANISM FOR SOCIAL TRANSFORMATION: A JURIDICAL AND POLITICAL APPROACH TO THE URBAN TRANSFORMATION OF MEDELLÍN*

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If we were to synthesize the urban transformations (mainly physical) the city has undergone during the last decade, inclusion and integrality are two words which would necessarily have to be used.

From the perspective of the juridical institutions, the goal of the projects of urban intervention is to advance in the public administration's commitment of guaranteeing the right to live in an organized space. Medellín's recent experience of urban interventions is an important reference point in terms of the progress, strengths and limitations of Colombia's juridical and political framework in urban planning.

This article seeks to synthesize (if possible), and analyze some of Medellín's urban experiences of transformation over the last decade in the light of the main juridical and political guidelines established by the land-use planning framework in Colombia.

Background

Medellín is the first and only city of the country that has, since 1995, a high-capacity mass transit system: the Metro. Using the axis of the Medellín River, which flows through the city from South to North, the Metro articulates two initial viaduct lines that cross the city from West

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to East and from North to South, with almost 160 million commuters per year.¹

Additionally, using the viaduct of the Metro mass transit system as an axis, the municipal administration implemented the so-called *Metrocables*, an aerial lift system that allows for the articulation of the train transit system with the peripheral areas of the city, especially in the geographical areas of low accessibility.

In the last decade, once again using the viaduct created by the mass transit system as an axis, and this time under the concept of “social urbanism”, the municipal administration, together with the private sector, citizen participation and even some institutions of the so-called “third sector”, has implemented an inclusive and integral urban intervention model. Through this model, the administration has tried to fulfill its political and juridical duties –the public function– of land use planning, under the juridical principles that propound the prevalence of the general interest, the social and ecological function of property, and the right to dignified housing, to public space and to citizen participation.

During the municipal administration of the period 2004-2007 the process was juridically and politically supported in the Development Plan: “Medellín, the commitment of all the citizenry”,

which defined five principal components: Medellín, governable and participative; Medellín, social and inclusive; Medellín, a space for the meeting of citizens; Medellín, productive, competitive and solidary; and Medellín, integrated to the region and the world.

The objective of the Development Plan was to create a city whose physical space could foster inclusion and social interchange, equality and equity through projects and actions that allowed for the physical mobility of its habitants, as well as for access to dignified housing, health services and quality education. All these objectives were to be carried out within the framework of environmental harmony and responsibility, and with the ultimate purpose of improving citizen coexistence, the security and life quality and the human development indexes of its habitants. Administratively, the Plan intended to build citizen culture, tackling the challenge of the legitimacy and strengthening of the community’s participative municipal planning system, making it co-responsible for its own actions.

Education and citizen culture were fundamental components of the Development Plan 2004-2007, especially in its second component: “Medellín, Social and Inclusive”, which in turn had an impact over the whole urban planning model. The purpose was not only to raise the already acceptable levels of

¹ Figure corresponding to the year 2008.

access to primary and secondary education, and therefore to ensure that there were more opportunities for everyone, but also to improve the quality of education according to the slogan “Medellín, the most educated”. By doing this, the idea was to resolve the serious everyday coexistence problems of the city, via the implementation of codes of citizen coexistence made with the community in a participative manner.

The third component of the Development Plan, directly associated with the urban planning of the city, centered on three essential elements: mobility, housing and public space. Nevertheless, none of these three lines or components of the Plan should be considered separately; on the contrary, it must be understood that all three components are closely related to one another.

In order for the territory to become a habitat that could dignify its habitants, this third component intended to improve the quality of life of the city’s habitants through the materialization of the right to dignified housing (creation of housing solutions) with a balanced distribution and a high quality habitat, the strengthening of the community’s sense of belonging, the intervention (premises’ regularization and legalization) of illegal settlements (disaster-risk management) and the increase of the urban population density.

These objectives of intervention were prioritized in terms of the corresponding actions: the top priority was the intervention of neighborhoods or sectors classified as Level III² in the Land-Use Plan.

It has to be acknowledged that constitutionally and legally (Art. 366 of the Political Constitution), public social spending (that which allows for an improvement in the quality of life of the people and for the general wellbeing) is a top priority, and that the distribution of financial resources across the municipal and district territories has to be done in accordance with a strict criterion of equity, population and unsatisfied basic needs. (Art. 10, Law 136 of 1994).

By doing so, the objective was “to pay” the preceding social debt, giving priority and quality standards to the interventions of those sectors that had been traditionally forgotten by the public administrations, and even by the private sector. The other components of the line: transport and mobility and environment, respectively, intended to complement the intervention model with elements of mobility (social inclusion) that allowed for the integration of the city itself (new centralities) with the region and the country and for the accessibility of the habitants to “the city” as a mechanism for reducing the levels of marginality and for the

² Areas with a critical deficit in terms of infrastructure, public space and facilities.

environmental and sustainable management of the city.³

The Integral Urban Projects and the right to dignified housing

Administratively, the different components of Medellín's Development Plan were managed under the model of strategic projects, in which the Integral Urban Projects⁴(principal urban intervention and management instrument of the city) were drawn up.

These projects and their most representative physical works, such as the Library-Parks, the urban renewal of Moravia neighborhood, the schools of quality, the passageways and lineal parks, the refurbishment of the *Jardín Botánico*,⁵ and the Explora Park, among others, are "referents of a new city that, little by little, forgets about its Norths and Souths, to begin thinking in terms of proximities".⁶ (Luján, 2009: 25).

As it was previously observed, the philosophy that supports these interventions is no other than the desire to ensure quality investments in the improvement of the life quality and human development indexes in those zones of the city that are most affected by poverty,

violence, environmental risk and a lack of opportunities. This corresponds with what is established in Article 51 of the Constitution, i.e., the right of all habitants in Colombian territory to dignified housing,⁷ and the express obligation of the State (national, departmental and municipal) to generate the necessary conditions to give effect to this right, particularly promoting public housing projects and credit facilities.

Urban interventions such as the one in Moravia, a neighborhood with serious problems of overcrowding, insalubrity, insecurity and non-recoverable environmental risk, demonstrate the administration's interest in meeting the constitutional mandate just explained, in spite of the enormous complexity of the process. The high social costs (the feeling of having been uprooted, budgetary overruns in transport, etc.) derived from the necessity of resettling almost 3600 families (most of them to residential complexes such as *Nuevo Occidente*) due to the impossibility of *in situ* relocation because of the immitigable environmental risk, have been faced by the municipal government through complex processes of participation and

³ According to Art. 5 of Law 136 of 1994, the following are the guiding principles of the municipal administration that must regulate the administrative function and the behavior of public servants: efficacy, efficiency, publicity, transparency, morality, responsibility and impartiality.

⁴ In Spanish: *Proyectos Urbanos Integrales (PUI)* (TN)

⁵ Medellín's Botanic Garden (TN)

⁶ The following is the original quoted fragment: "referentes de una nueva ciudad que poco a poco se olvida de nortes y sures para pensar en cercanías". (TN)

⁷ See the article "Dignified housing" on page 229 of this book.

agreement, taking into account the prevalence of the collective interest and environmental risk management.

In the same direction, the project of the recovery of Juan Bobo Creek and of the sector of La Herrera stand as examples of the construction of a new habitat within the community (*in situ* relocation), which have benefited more than 120 families with new housing and another 116 with the improvement of their housing (2009: 35).

This project facilitated access to dignified housing to more than 1260 people informally settled in situations of marginality, high environmental and health risk and illegality in terms of the tenancy of property, allowing them access to public services and spaces in legal premises, with structural security, green areas and salubrity.

It is important to highlight that the right to dignified housing is not only established in Colombia's Constitution, but also in the International Covenant on Civil and Political Rights (ICCPR),⁸ which in Article 11 establishes the right of every person to adequate housing and the responsibility of the State (such as the Colombian

to adopt the necessary measures, both internal and through cooperation between States, to obtain the maximum available resources, taking into account its level of development, in order to progressively and according to the internal legislation, achieve the full effect of the rights established in this instrument.

The Constitutional Court⁹ has adopted in its judgments the statements of the United Nations Committee on Economic, Social and Cultural Rights,¹⁰ in order to integrate the substantive content of the right to dignified housing,¹¹ concluding that it implies not only the tenancy or property of a shelter; on the contrary, it says that dignified housing must be understood as a place that offers security against environmental or climatic contingencies and a place from which the citizen can project his/her private and social life.

Moreover, adequate housing must meet certain elements so that it can be habitable: minimum hygienic, quality and space conditions required for the person and his/her family to be able to occupy it without endangering their health or physical integrity.¹²

⁸ Pacto Internacional de Derechos Civiles y Políticos (PIDESC) (TN)

⁹ In this regard, see judgments such as: C - 955 of 2000, C- 936 of 2003, SU- 813 of 2007.

¹⁰ Comité de Derechos Económicos, Sociales y Culturales de las Naciones Unidas (CDESC) (TN)

¹¹ According to Article 93 of the Political Constitution, the substantive content of the right to dignified housing can and shall be analyzed not only based on the international agreement mentioned above, but on the statements of its legitimate interpreter: the United Nations Committee on Economic, Social and Cultural Rights.

¹² In this regard, see Health Principles of Housing - World Health Organization.

The wellbeing and quality of life of the people, a consequence of the constitutional principle of the Welfare State, imply the responsibility of the State to guarantee the access to goods and services such as public services, emergency services and even adequate food. This implies that the national, regional or municipal housing projects must be in accordance with the corresponding urban and rural development plans,¹³ which must not only consider the physical location of the housing, but also the real possibilities of access to employment, health, education, environmental and natural resources, social services, culture and recreation, all of them within a responsible context in terms of the environmental risks and the rational use of the resources.

Housing policies and programs should also consider the respect for diversity and cultural expression in the development of these type of projects.

Finally, it is important to point out that dignity has to do with aspects such as the access to (offer and reasonable financing) and the juridical protection of the property.

The 1991 Constitution and Land-Use Planning

The 1991 Political Constitution laid down the foundations of a real

juridical and political framework, not only for issues associated with housing, but also to land-use planning in general. (Art. 288)

Under the new State model (Social State based on the rule of law¹⁴ the protection of private property (Art. 58) and its access (Art. 60) have exceeded the strict guidelines of the individualistic economic and juridical systems that protect private freedom and initiative. Under this new model, property is closely linked to its social and ecological function, which explicitly implies the assignment of duties in exchange for rights, as well as the need for giving up particular interests in the case of more general and justifiable demands (public or social interest), especially when issues such as sustainability for development, risk management and natural resource conservation are at stake.

Additionally, the Constitution has serious considerations with regard to the importance of public space (Art. 82), natural resources, goods for public use and cultural, historical and communitarian interest (Art. 8, 63, 70 and 80), national and cultural patrimony (Art. 72) and a healthy environment (Art. 78).

Juridical and political background of land-use planning

Before the Constitution of 1991 there existed important juridical

¹³ This ideal is not easy to pursue if one takes into account that the planning and execution are out of step in the different territorial entities.

¹⁴ In Spanish: *Estado Social de Derecho* (TN)

institutions related to urban planning, such as Law 188 of 1947, Law 61 of 1978 (organic law of urban development) and its Regulatory Decree 1306 of 1980, the Health Code – Law 9 of 1986, Municipal Code (Decree 1333). Law 9 of 1989 is probably the most important normative land use planning precedent that existed prior to the Constitution of 1991; it regulated issues such as the plans and regulations for land use, reserves for building lands and environmental protected lands, the management of furnishings considered constitutive of public space, zones for future, progressive, restricted and concerted development, the renewal and re-development of zones affected by economic, social and physical deterioration.

Other important regulations related to environmental management and the rational use of resources were the Decree 2278 of 1953, Law 2 of 1959 and Decrees 2811 of 1974, 622 of 1977, 1608 of 1978, 1974 of 1989, 1541 of 1978, 1681 of 1978, 1715 of 1978, 622 of 1977 and 2857 of 1981.

Finally, there were some regulations concerning the use and appropriation of agricultural lands, such as Law 135 of 1961 (Land Reform) or Law 10 of 1978 (Law of the Sea).

The Political Constitution of 1991 established a renewal of

the political and administrative land structure, creating new institutions and competences (for economic, political, social and urban development, among others) led by each of the territorial administrative structures (Nation, Region, Metropolitan Areas and Municipalities) (Art. 288, 297, 306, 317, 319 y 329) all belonging to a unitary Republic. Therefore, territorial decentralization implies a certain degree of liberty in the decision-making processes (autonomy), while the assignment of competences continues to be the responsibility of the constitutional and legal systems.

These powers must be exerted according to the principles of coordination, concurrence and subsidiarity.¹⁵ It is important to bear in mind that the national legislation on the management of urban land was in the hands of the nation until 1986 when the Legislative Act No. 1 was issued, after which the country began a process of political, administrative and fiscal decentralization.

In spite of the existence of this new but ambiguous constitutional framework, the lack of an organic law on land use (Art. 288, Political Constitution) that distributes, in detail, the competences of land use planning between the nation and the local authorities is still evident. This issue will be addressed in the final part of this article.

¹⁵ Article 4, Law 136 of 1994.

More specifically with regard to municipal land use planning, Articles 311 and 313 (paragraphs 2 and 7) of the Political Constitution assigned to the municipalities and municipal councils respectively, the faculties of “leading the development of their territories (...) adopting the corresponding plans of economic and social development and public works (...) as well as the regulation of land use”¹⁶

These competences, along with others, were regulated by Law 136 of 1994, which gives municipalities (Article 3) the responsibility over the land use planning of their territories; (...) the planning of the economic, social and environmental development of their territory, the attention of unsatisfied needs in terms of health, education, environmental sanitation, drinking water, public services, housing, recreation and sports (...) the safeguard over the proper management of natural and environmental resources (...) and the improvement of the economic and social development of their habitants.

The environment (which is a transversal element of public action, particularly in terms of land use planning and physical interventions on the territory) is included in the constitutional fra-

mework via the State’s obligation to regulate the management and exploitation of natural resources (Art. 8), the consecration of the ecological function of property (Art. 58) and the collective right to a healthy environment (Art. 79); the sustainable use of natural resources, the establishment of limits of property rights through land use regulation (Art. 313) and the possibility of State intervention in the markets for environmental matters (Art. 334) with the aim of improving the quality of life of the people via a model of coordination of competences (Art. 288) and harmonious regional development (Art. 334).

Law 99 of 1993 introduced a decentralized, democratic and participatory form of managing environmental issues, although it also designated those Metropolitan Areas with more than one million inhabitants as being the highest environmental authorities (within their jurisdictions). In addition to their legal functions, this power enables them to act as Regional Autonomous Corporations,¹⁷ granting environmental licenses, collecting taxes, etc., within what is known as the National Environmental System;¹⁸ leaving them surpassed hierarchically by the

¹⁶ In addition, Law 136 of 1994 gave Municipal Councils the function of safeguarding cultural heritage (Article 32, paragraph 8).

¹⁷ In Spanish: *Corporaciones Autónomas Regionales* (CAR). They are the highest regional environmental authorities in Colombia (TN)

¹⁸ In Spanish: *Sistema Nacional Ambiental* (SINA)

Ministry of Environment, Housing and Territorial Development alone.¹⁹

Additionally, the regulation develops some of the categories of environmental management found in the Code of Natural Renewable Resources²⁰ as well as introducing important elements in terms of the environmental dimension of land use, such as: land use zoning for appropriate environmental management, watershed management and the use of areas of natural national parks.

It is also important to note that with Law 388 of 1997, Article 9, the standards of environmental and cultural conservation, national and regional transport infrastructure, as well as the land use planning components of the Metropolitan Development Plans²¹ (as far as they relate to metropolitan issues) are regulations of a higher hierarchy and therefore, they become mandatory guidelines for the formulation of the municipal development plans.

Afterwards, in 1994, the Metropolitan Area Organic Law (Law 128) created the basis for metropolitan land use planning through the harmonious and integrated development of the territory, the regulation of the use of urban and rural metropolitan land and the metropolitan plan

for the protection of natural resources and defense of the environment. According to this regulation, the Metropolitan Areas are: administrative institutions formed by a group of two or more municipalities, integrated around an urban core (city or metropolis), linked among themselves by strong physical, economic and social relationships, requiring a coordinated management for the planning and coordination of their development and for the rational supply of public services.

To execute these functions the Metropolitan Areas, through their Metropolitan Boards,²² have the faculties of planning (adopting the Integral Metropolitan Development Plan,²³ which prevails above the Metropolitan Development Plans), establishing general regulations (a regulatory framework) for the Municipal Councils that belong to the Area in terms of the adoption of the Integral Municipal Development Plans,²⁴ the urban and rural land uses and the mechanisms of land use control; the adoption of the road plan and the master plans of municipal public works and services, definition of the urban, suburban and sanitary perimeters of the municipalities, declaring the public interest or modification of urban,

¹⁹ In Spanish: *Ministerio del Medio Ambiente, Vivienda y Desarrollo Territorial* (TN)

²⁰ In Spanish: *Código de Recursos Naturales Renovables* (TN)

²¹ In Spanish: *Planes de Desarrollo Metropolitano (PDM)* (TN)

²² In Spanish: *Juntas Metropoiltanas* (TN)

²³ In Spanish: *Plan Integral de Desarrollo Metropolitano* (TN)

²⁴ In Spanish: *Plan Integral de Desarrollo Municipal* (TN)

suburban and rural properties and expropriation processes.

Furthermore, these administrative units are in charge of coordinating the national system of social housing in their territories, adopting (if there are no Regional Autonomous Corporations in their jurisdiction) the metropolitan plans for the protection of natural resources and the defense of the environment, and establishing the General Statute of Metropolitan Valuation.²⁵

The department²⁶ of Antioquia established the *Área Metropolitana del Valle de Aburrá* through the local ordinance of 1981, in accordance with the parameters of Law 61 of 1978. However, there are still many challenges in terms of its role as the region's environmental authority, especially in areas such as mobility, garbage and waste management and public services.

In terms of culture, identity and cultural diversity, legal norms such as Law 21 of 1991 and Law 70 of 1993 recognize and protect the values and social, cultural, religious and spiritual practices of indigenous and Afro-Colombian²⁷ people. Law 397 of 1997 (Law of Culture) defines the cultural heritage of the Nation and establishes the obligation of the State and its citizens to value, protect and promote that heritage.

The adequate provision of public services (in terms of access and quality) as a fundamental element of the planning and development of the territory and of the mandate of improving the quality of life of the people, has been regulated by legal norms such as Law 60 of 1993, which assigns the municipalities the faculty to ensure the provision of potable water, sewage, water treatment solutions, waste disposal, basic urban and rural sanitation, as well as the control of marketplaces, storage centers, public and private slaughterhouses and the intervention of urban and rural areas in high risk of disasters from natural hazards.

Subsequently, Law 142 of 1994 regulated the provision of public services: water supply, sewerage, waste management, energy, electricity, public landline telephone network, mobile telephone and gas distribution.

Access to education and culture

It is important to bear in mind that one of the foundational elements of dignified housing is the access to education and culture. Articles such as 27 and 70 of the Political Constitution highlight the importance of access to these services within a Welfare State. Integral Urban Projects such as the Library-Parks reflect this con-

²⁵ In Spanish: *Estatuto General de Valorización Metropolitana*. “Valorización” refers to the valuation or appreciation of land prices. (TN)

²⁶ Departments are country administrative subdivisions, formed by a grouping of municipalities. Colombia is formed by thirty-two “departamentos” (departments or provinces). (TN)

²⁷ In Spanish: *negritudes* (TN)

cern: they not only articulate a new symbolism of space, the neighborhood and “the corner block”, designed with a structural and aesthetic quality associated with socially productive values, but they also articulate the municipal administration political machine, at the service of underprivileged communities. In each Library- Park there are not only all kinds of books and documents, there are areas for toy libraries, computer rooms, facilities for the development and presentation of all kinds of artistic activities and zonal centers for entrepreneurship.

Citizen Participation

The Political Constitution of 1991 strengthened the system of citizen participation (Art. 40), particularly in matters of general interest and decisions that affect the quality of life of people, as established in Law 134 of 1994 of Citizen Participation Mechanisms.²⁸

At the territorial level and concerning land use, Law 136 of 1994 established that when “the development of projects of a touristic, mining or any other nature become a threat in terms of generating a significant change in the land use, leading to a transformation of the traditional activities of a municipality, a process

of popular consultation must be undertaken in accordance with the law”.

Additionally, all the decisions concerning land use must be approved by the Municipal Councils, who must hold open town meetings for that purpose.

Urban reform, planning system and land use

For the development of the constitutional framework mentioned above, the Organic Law of the Development Plan (Law 152 of 1994) established, on the one hand, the specific Municipal Development Plans and the programs and projects of the municipal government (supported by and in coordination with the departments and the Nation) and on the other hand, the mandatory adoption of the Land Use Plans²⁹ as a tool for territorial planning.

The first development plan in which a scheme of urban organization is proposed is found in “The four strategies of the period 1970-1974”, where Professor Lauchlin Currie (who had been studying the transition from a rural to an urban country from the beginnings of the *Frente Nacional*³⁰ in 1957), proposing the “Operación Colombia” in one of the strategies outlined.

²⁸ In Spanish: *Mecanismos de Participación Ciudadana* (TN)

²⁹ In Spanish: *Planes de Ordenamiento Territorial* (POT) (TN)

³⁰ The *Frente Nacional* lasted for 16 years, from 1958 to 1974, and was marked by a bipartisan political pact in which the two main Colombian political parties (Liberal and Conservative) agreed to rotate the presidency for a period of four presidential terms. (TN)



Figure 4.1

Panoramic view of El Poblado neighborhood Improper regulation on land use, as well as high densities, promoted an exaggerated increase in human population in areas such as the southeast of the city, generating not only environmental risks, but also problems in terms of mobility and public space deficit.

Source: Camilo Piedrahita Vargas.

Through its components (general, urban and rural – Art. 11, Law 388 of 1997) and its short, medium and long term objectives, Land Use Plans becomes the principal institution for planning and management of the territory (Art. 9, Law 388 of 1997) including elements for the classification of land use,

public space, the environment and the financing of civil works, as well as the development of partial plans and urban development units.³¹

The objective is basically to determine spatial aspects of the territory (settlement, interaction, economic development, competitiveness, environmental reserves,

³¹ According to Article 39 of Law 388 of 1997, “the urban development units are the areas comprising one or more properties, explicitly delimited in the regulations developed by the land use plan, which have to be urbanized or built as planning units in order to promote rational land use, guarantee compliance with planning regulations and help to provide - charged against the owner - the infrastructure for transportation, public services and collective facilities through the equitable distribution of costs and benefits”.

risk and protection of the landscape and of the historical, cultural and architectural heritage) and models of intervention and management of the land and the territory.

Law 388 of 1997 regarding Territorial Development (amended by Law 507 of 1999), established the conceptual and instrumental framework to formulate and implement municipal and district land use plans. However, Medellín has an important background in terms of land use planning instruments, such as those contained in the Master Plan for Medellín which, in the 1940s, hired the architects Paul Wiener and Jose Luis Sert via the Valuation Board;³² or the Municipal Agreement No. 38 of 1980, “Municipal Planning Statute, land uses, urbanism and construction”, through which many inappropriate building licenses were given, which were clearly inconvenient because of their high rates of construction, especially in the southeast of the city and which were in full force until the beginnings of the first decade of this century.

This problem was exacerbated once again with the Land Use Plans contained in the agreements No. 62 of 1999 and No. 23 of 2000, which, reflecting the economic crisis of the late twentieth century, found in construction the economic engine necessary to escape the crisis. This brought a substantial improvement

in the use of land, generating new urban densities. Nevertheless, the municipal administration (2004-2007), unable to reform the Agreement 62 of 1999 before a term of six years, implemented a tax increase for construction with the Agreement 45 of 2005, seeking to discourage new construction until the revision of the Land Use Plans could be carried out.

This process culminated with the Agreement 46 of 2006, in which the capacity of the land to host the different *comunas*³³ (i.e., the real capacity to accommodate more people, with road infrastructure, facilities and public space) was the criterion to manage and control the use of land.

By 1998 a number of regulatory decrees of Law 388 of 1997 had been issued, including Decree 879 of 1998, which establishes the scope and procedures of Land Use Planning, Decree 1420 concerning valuations, Decree 1504 regarding public space, Decree 1507 concerning partial plans and Decree 1599 concerning capital gain.

Land use planning, as a competence or attribution (public function), in accordance with Law 388 of 1997, Article 5, “includes a group of concerted political, administrative and physical planning actions (...) to guide the development of the territory under its jurisdiction and regulate the use, transformation

³² In Spanish: *Junta de Valorización* (TN)

³³ The *comunas* (districts) are administrative subdivisions. The municipality of Medellín is divided into 16 *comunas*. (TN)

and occupation of space, according to socioeconomic development strategies and in harmony with the environment and with the historical and cultural traditions”. Therefore, the territory, in terms of its regulation and management is considered the appropriate medium to perform the ultimate function of the Welfare State in terms of land use planning: to progressively improve the quality of life of its habitants, taking into account economic, social, cultural, political and environmental elements, in order “to achieve dignified living conditions for the present and future population” (Art. 6, Law 388 of 1997).

With regard to the Integral Urban Projects mentioned above, it is important to remember that Article 1 of the mentioned Law provides in part 5 as one of its objectives: “To facilitate the implementation of integral urban projects in which the municipal initiative, organization and management converge in a coordinated manner with the *national* urban policy and with the efforts and resources of the institutions in charge of the development of that policy”.

Additionally, in its second article it reiterates the constitutional guidelines inherent to a Social State based on the rule of law, which are replicable to land use planning: the ecological and social function of property, the prevalence of the general interest and the equitable distribution of costs and benefits.

More specifically, the purpose of the public function of urbanism

is, among others, the management of land use for common interest purposes (...) and the improvement of the quality of life of people (Article 3, Law 388 of 1997). These principles have been developed by the same norm that regulates expropriation or forced transfer, once the public or social interest of the acquisition (Art. 58) has been declared.

As far as the principle of participation is concerned, the mentioned law establishes the importance of promoting the harmonization of social, economic and urban development interests through the participation of local residents and their organizations, in charge of the municipal, district and metropolitan administrations (Art. 4).

It is these legal and political institutions (in spite of their limitations, especially in terms of instruments), along with the political will and the participation of the community, which have allowed for the physical transformation of the city, despite the myriad of interests in conflict.

One of the principal achievements (and challenges) of Law 388 of 1997 is the management of the phenomenon of forced displacement in Colombia, as a result of the internal conflict. Institutions such as the social function of property, established in the constitution and in the law, have been very important in terms of providing special protection to displaced people: their right to housing has been protected, even

judicially, in opposition to private property rights.³⁴

Land Use Challenges

Organic Law of Land Use

The apparent lack of development of the legal and political institutions in terms of land use is usually attributed to the lack of an Organic Law of Land Use,³⁵ despite the supposed mandate established in Article 288 of the Political Constitution and in more than a dozen bills proposed on this matter.

Nonetheless, Colombia has had a relevant institutional, legal and political framework in terms of land use, not only in the Political Constitution of 1991, but also in regulations such as Law 9 of 1989 and Law 388 of 1997 both of which refer to the spatial and physical aspects of the planning processes, and laws such as Law 715 of 2001 and Law 124 of 1998 (Metropolitan Areas), which refer to territorial competences (of planning and control).

However, the diffuse model of competences established in the Political Constitution, the complexity of the process of determining the limits of the competences and authorities concerning land use planning, the lack of regulation and instruments of some institutions and the conflicts of interest, all end up reducing the actual levels of

governance and the possibility of having integral urban and regional planning processes, imposing instead an atomized form of planning.

The lack of an Organic Law of Land Use is not only due to the lack of political will of the Congress and the multiplicity of the conflicts of interests at the moment of defining a legal instrument of this magnitude; there is also a certain degree of consensus in affirming the lack of clarity of the State (administrative) model which was established by the Constituent Assembly of 1991. The constitutional provisions concerning land use, the environment, public services and territorial institutions, among others, seem to relate, at times, more strongly to the administrative and central planning models with a certain degree of autonomy in the regions and municipalities, or to (most of the time) strong models of decentralization in scenarios of programmatic and executive regional and national coordination. The concept of the municipal faculty over urban issues as “exclusive and decisory (...)” is not an obstacle to understand that this competence can also be shared and, in this case, be the subject of coordination in its planning and implementation with other levels of the administration “(Sanclemente, 2005: 332), especially when it involves environmental issues.

³⁴ Judgement T 068 of 2010.

³⁵ In Spanish: *Ley Orgánica de Ordenamiento Territorial (LOOT)* (TN)

It goes without saying that cultural pluralism, an important social value of the Colombian State, geographically represented in its regions, seem to reflect the lack of a social imaginary and a holistic form of planning for the city, region and even the country; in other words, there is a constant lack of coordination when it comes to land use planning.

Instruments

The legal framework for land use has made significant advances in terms of planning and land management instruments, in accordance with the purposes and interests of the Welfare State established in the Constitution. However, there is still a long way to go in this field.

Particularly, it is important to undertake a revision of the ins-

truments laid out to operationalize the given faculties: police powers emanating from the public function of planning, especially those associated with the procedures for expropriation and forced transfer (and the issuance of statements of public or social interest of the acquisitions); compensation for conservation treatments and the public transfer of building rights; financial instruments for public works such as special contributions for valuation or capital gain; instruments for citizen participation and consultation, as well as all types of appraisals that can help to reduce the bilateral (and inefficient) monopoly necessarily created and exacerbated by, on the one hand, the pure, libertarian and individualistic ideas about property, and on the other hand, the social and communitarian conceptions of it.

Figure 4.2
Public works made with betterment levies. Los Balsos Hill Road – 34th Avenue. It was planned to be financed by the tax instrument of betterment levy.
Source: Camilo Piedrahita Vargas.



In spite of the fact that instruments such as the betterment levy³⁶ have ancient origins in norms such as Law 25 of 1921 (by which the direct betterment levy was established, “consisting of a tax on real estate properties that benefit from the execution of works of local public interest”), it has not been adopted in most of the municipalities of the country (the same applies to the instrument of local property tax). In the case of Medellín, although its implementation allowed for an acceptable rhythm in the execution of public works, especially during the second half of last century, it was only reestablished recently through the Municipal Agreement No. 46 of 2006. Nevertheless, there is still an ongoing debate about the serious effects it brings in terms of equity and redistribution, since the public works are usually located in high-income areas.

The challenge is to harmonize individual and collective interests through the regulation of land use and the management instruments in order to eliminate the perverse incentives of the regulations that protect private property (without destroying its economic incentives), and therefore permit an efficient use of the restriction mechanisms,

preventing the excessive use of land (overexploitation) as an element of the goods produced by the state, and internalizing effectively the marginal social costs of this use.

Growth management

Because of its geography, Medellín and the Aburrá Valley have very limited space available for a safe and organized growth.³⁷ However, they host 56% of the population of the department of Antioquia. Therefore, the challenge is not only to handle the current problem of informal settlement, but also to think in terms of a form of regional development that includes, in addition to the municipalities of the Aburrá Valley, the valleys of San Nicolás and the Cauca River, and to grow “towards the interior”, with the additional problem of having serious incentives for domestic migration.³⁸

The overflowing growth of irregular settlements in the city has been notorious ever since the late sixties;³⁹ Medellín went from having little more than 165 000 inhabitants in 1950 to 1 400 000 in the early eighties.

This kind of growth implies the need for the further development

³⁶ The “betterment levy” or “real estate improvement tax” (In Spanish “*Impuesto de Valorización*”) is a tax that the State sometimes collects when it builds a public work that leads to an appreciation in land prices in the vicinity of the project.

³⁷ Around 5% of the urban area of Medellín is in environmental risk areas.

³⁸ Medellín has been considered one of the cities of Colombia that has demonstrated a higher level of quality in terms of compliance with the attention it provides to displaced people, but it is the second largest recipient in the country of such victims of the internal conflict.

³⁹ On this regard see Law 66 of 1968.

(adoption and implementation) of land use planning instruments, such as Partial Plans, in order to redefine (renew or re-develop) land use in certain areas of the city, with the participation of the owners, the citizens and the private building sector, taking into account the individual rights⁴⁰ and collective interests⁴¹ (environment, culture, etc.), and in coordination with regional and national policies.⁴²

This will allow the region to meet the constant housing and commercial demands⁴³ through a balanced distribution of costs and benefits (State and public and private markets), and to continue the responsible management of civil works associated with public space and mobility in order to facilitate the process of the region's integration within the country and the world.

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⁴⁰ Reorganizing the city could imply important changes in fundamental individual rights such as employment, access to education, health, etc.

⁴¹ The generation of public works can put at risk certain conservation areas; the *Metrocable* of Arví Park is a good example.

⁴² See Partial Plans such as the one for Argos and Simesa (in *Ciudad del Río*) and the ongoing project in the Naranjal sector.

⁴³ 7000 housing units were built in the city in the period 2004-2007. The goal is to build 15 000 more in the present administration. However, the development of housing macro-projects (especially social interest housing) could be affected by the decision of the Constitutional Court, which declared unconstitutional Article No. 79 of Law 1157 of 2007 (Development Plan), since it involved an alleged usurpation of the municipal power by the national executive branch.

DIGNIFIED HOUSING*

Ana Elvira Vélez Villa

Ximena Covalada Beltrán

This article intends to review the construction of dignified housing in Medellín's housing production over the last 10 years. The concept of dignified housing is approached from the declaration of Human Rights and its incorporation as a Fundamental Constitutional Right and its application in Colombian Law, comparing the management models with those of Spain and Chile.

Five public and private projects of housing development are compared during the periods 1950-2000 and 2000-2010, and the role of dignified housing in the urban transformation of the city

is evaluated for each period. The projects are assessed according to four categories: Normative + Society + City + Architecture, in order to identify the real parameters of housing production in terms of the regulations, the habitants, the urban environment and the formal and spatial quality.

Historical background of housing development and its policies in the local context between 1910 and 1950

The Villa de Medellín was founded in 1675 and reached its urban character by the end of the 19th Century,

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Leonel Alvarez Quintero – Student of Architecture.
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Juan Carlos Gutierrez – Architect of Comfama.
Carlos Alberto Montoya Correa – Architect, Director of Housing at the *EDU*.
Camilo Piedrahíta Vargas – Lawyer. Head of the Law Program at the *Universidad EAFIT*.
Juliana Portillo – Architect, Urban Integral Improvement at the *EDU*.
Quarto Ficticio. Photography.

combining the grid plan¹ and an urban growth towards the east side of the valley.²

During the first decades of the 20th century, housing solutions in Medellín were private; therefore, the national government stimulated the development of social housing with Law 46 of 1918, regulating the destination of 2% of the municipal rents for the building of houses for workers. This law must be understood in the context of what is known as the Hygienist Phase (1918-1942) (Saldarriaga, 1996: 35).

This generated a building process for workers, providing plots of land in the east side of the city. In 1928 the Municipal Council and a Commission of Social Affairs conferred, through raffles, the neighborhoods of Aranjuez and Manrique to “poor families with good behavior, with not less than five persons” (Botero, 1996). Once the fulfillment of the requirements were verified, the families had to commit themselves to keeping the houses in good conditions and paying the corresponding municipal public treasury (1996) until they reached the total value of the house, giving the tenant the entitlement of ownership.

In the thirties, the Colombian State was in the midst of a political

and economic transitional stage. It was an entrepreneur State that created the *Banco Central Hipotecario* (BCH)³ with Law 170 of 1936 and the *Instituto de Crédito Territorial* (ICT)⁴ with Law 46 of 1939, in order to decree and promote the building of housing for the low and median income population of the country, as a response to the large-scale migrations from the countryside to the cities, stimulated by industrial growth.

The policies of the ICT had the following objectives:

- To contribute to the solution of the housing problem, especially in low socioeconomic levels.
- To collaborate with an organized urban development, with an emphasis on uncontrolled settlements.
- To reduce the production costs of social interest housing.
- To foster the industrialization of the building sector to increase the productivity indexes and reach the goals of mass production of housing, according to the needs of the country. (Pineda, cited by Hardoy, 1972.
- To stimulate the formation of national capital directed to social interest housing, avoiding, if possible, foreign capital.

In the thirties, the city continued growing on the eastern slope of

¹ The grid plan is a type of city in which streets run at right angles to each other, forming a grid. (TN)

² For more information on the configuration and evolution of the Aburrá Valley, see Chapter 2 “Human Impact” on page 51 of this book.

³ Central Mortgage Bank (TN)

the valley, which was already on the marked boundaries of the Regulatory Map. The Medellín River was straightened and the connection with the other bank was consolidated with the tramcar. As a result, the west side started to be taken into account as a future zone of expansion, especially for housing and industrial growth.

“Otrabanda”, which was the local name for the west slope of the valley, was defined as a zone with great potential for construction of different uses: factories, housing, infrastructure and equipment; the Olaya Herrera Airport (1931), the Libertadores Soccer Stadium and the new site of the Catholic University (Universidad Pontificia Bolivariana), determined a development pole for a new urban housing dynamic.

In 1938, trying to respond to the lack of social housing, the Municipal Council began the construction of “collective housing buildings”, given to widows, teachers, workers and public employees. In 1940 the council stimulated the construction of the popular neighborhood model and the creation of family farms on the west side of the city which, together with the initiative of the State, determined the urban development of “Otrabanda”, on the other bank of the river.

Some projects of social housing for the workers and the middle class commenced, such as La Floresta (1935), Antioquia (1935), San Joaquín (1937), as an initiative of the ICT, which also started the housing project next to the *Universidad Pontificia Bolivariana*. The neighborhood of Laureles (1939), of the *Cooperativa de Habitaciones*,⁵ bought an important amount of land next to the university between the neighborhoods of La América and Belén; the urban design of the university impelled the need of a great circular street that determined the development of that part of the city. The neighborhood of San Joaquín (1937-ICT) is the first urban residential area based on the circular design of the university.

The *Cooperativa de Habitaciones* wanted to project “the city of the employees” and chose the architect Pedro Nel Gómez for the urban design of the neighborhood; Gómez, who was working as an architect in the Municipal Planning Office at that time, was also a well-known painter and sculptor of the city. As a supporter of the cooperative system to generate housing and increase the agricultural production and food supply, he devised the neighborhood as “...a cooperative neighborhood that must build each house with a small garden on its three sides, separating it from

⁴ Institute of Territorial Credit (TN)

⁵ Housing Cooperative (TN)

the other houses, so that they can have appropriate aeration... the room should not be analyzed on its own, but in relation to the life of the individual that lives there..." (El Colombiano, 1945). In 1940 the urban design for the neighborhood of Laureles and the building of the first houses commenced; it was an urban design that interprets the philosophy of the garden city, an urban milestone of the city that triggered the urbanization of the central-western part of the valley.

The neighborhood of La Floresta was built through the programs of workers' housing since 1935, developing afterwards a housing model based on inexpensive houses of the *GATCPAC*⁶ around the year of 1953.

From the fifties, the *BCH* and *ICT* policies, together with the urban plans of Winner and Sert,⁷ developed housing models with an urban and social logic, making an important breakthrough in the architectonic and urban environment; these are still considered referents and models to follow: the multi-family residential complex of the neighborhood of Las Playas, near the Olaya Herrera Airport, and the neighborhood of La Palma, in Belén, enhanced the urban development of the southwest of the city.

Carlos E. Restrepo in the area of Otrabanda, a multifamily hous-

ing project, close to the *Universidad Nacional* and Colombia Street, introduced a very important industrial and commercial development in the area. The neighborhood of Provenza, a single-family housing project of the *BCH*, in the area of El Poblado, strengthened an architectonic project with green areas that continues being important for the city today. The towers of Marco Fidel Suarez in the city center, a project that followed the guidelines of the Modern Movement of architecture, by the *ICT*, proposed a new style of housing in the consolidated city center.

Dignified Housing

In 1948 the General Assembly of the United Nations proclaimed the Universal Declaration of Human Rights, which contains 30 articles that, although not legally compulsory, have great moral power because of the acceptance they have had among the member states.

Nowadays this Universal Declaration has been so broadly accepted by different countries worldwide, that it is considered an international guideline to evaluate the behavior of nations. In terms of Human Rights, this document is the cornerstone of International Law of the 20th century. (Naciones Unidas, 1987).

⁶ Grup d'Arquitectes i Tècnics Catalans per al Progrés de l'Arquitectura Contemporània (Group of Architects and Technicians of Cataluña for the Progres of Contemporary Architecture) (TN)

⁷ See the Pilot Plan map in the article "The Publicity of the Public", page 157 of this book.

The Universal Declaration of Human Rights, in its article 25 states: “Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, *housing* and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control”. (1987)

The International Covenant on Economic, Social and Cultural Rights (ICESCR)⁸ in article 11 of 2006, states: “1. The States Parties to the present Covenant recognize the right of everyone to an adequate standard of living for himself and his family, including adequate food, clothing and *housing*, and to the continuous improvement of living conditions. The States Parties will take appropriate steps to ensure the realization of this right, recognizing to this effect the essential importance of international co-operation based on free consent”. (Oficina del Alto Comisionado de las Naciones Unidas para los Derechos Humanos, 2006).

The nations have taken the Universal Declaration of Human Rights and the International Covenant on Economic, Social and Cultural Rights as a basis to set their laws on the issue of housing.

In order to analyze Colombian Law, we took two other nations: Spain and Chile, to be able to make an objective comparison of the implications of these guidelines and their application in the territory.

Spain has been chosen because it is a developed country, with strong cultural ties with our country. When the Spanish Civil War was over, housing became an important political issue in Spain, including policies for the reconstruction and protection of houses for low-income families.

Chile was chosen because it is a Latin American country with a strong building activity based on social housing; the stability of its laws is notorious and many of the housing solutions developed by the State nowadays are still based on the first attempts to build houses for the low-income population. (Hidalgo, 1999).

We established a comparison of the legislation of the three countries (table 5.1) in which the following three important aspects of housing are analyzed:

1. The Constitution: We revise whether housing is declared as a constitutional right or not.
2. Articles: Which articles of the constitution are related to housing?
3. Regulations: Which laws or decrees regulate the management or application of these articles in each country?

⁸ In Spanish: *Pacto Internacional de Derechos Económicos, Sociales y Culturales (PIDESC)* (TN)

Table 5.1 Legislative comparison

COUNTRY	CONSTITUTION	ARTICLE	REGULATIONS																				
Colombia	Colombian Political Constitution 1886	It does not have any specific articles concerning housing	<p>Law 46, 1918. It established resources for building “hygienic” housing for “the proletariat”. Municipalities with more than 15 000 inhabitants should assign 2% of their budget to housing programs for the working class; it also defined lease contracts for those housing programs.</p> <p>Decree 1579, 1942. It created the section of Urban Housing in the ICT. This section assumed similar functions to those of the BCH in terms of making loans to municipalities or directly to workers for undertaking housing programs. The faculty of the ICT of building “model popular neighbors” to be sold to the working class was also established with this decree.</p> <table border="1"> <thead> <tr> <th>Legislation</th> <th>Minimum Plot of Land</th> <th>Minimum Front Size</th> <th>Housing type</th> </tr> </thead> <tbody> <tr> <td>1942</td> <td>120 m²</td> <td>8,00 m²</td> <td>Single-family</td> </tr> <tr> <td>1972</td> <td>72 m²</td> <td>6,00 m²</td> <td></td> </tr> <tr> <td>1983</td> <td>36 m²</td> <td>6,00 m²</td> <td></td> </tr> <tr> <td>1987</td> <td>60 m²</td> <td></td> <td></td> </tr> </tbody> </table> <p>Law 71 of 1946. It determines that building activity is a “social interest” priority issue, and it defines the importance of promoting the development of housing projects to relocate families in high natural risk zones of any kind.</p> <p>Law 41 of 1948. It authorizes municipalities to make use of common public lands (held in reserve since the Spanish Colonial age) to resolve problems of popular housing in big cities.</p> <p>Decree 1132 of 1953. It authorized the BCH to buy real estate and plots of land for housing, and to build housing projects directly or by contract.</p> <p>Decree 2462 of 1953. It established a family subsidy for housing, settling an amount for each beneficiary child (Saldarriaga, 1996:35-40).</p>	Legislation	Minimum Plot of Land	Minimum Front Size	Housing type	1942	120 m ²	8,00 m ²	Single-family	1972	72 m ²	6,00 m ²		1983	36 m ²	6,00 m ²		1987	60 m ²		
	Legislation	Minimum Plot of Land	Minimum Front Size	Housing type																			
1942	120 m ²	8,00 m ²	Single-family																				
1972	72 m ²	6,00 m ²																					
1983	36 m ²	6,00 m ²																					
1987	60 m ²																						
	Colombian Political Constitution determines in the article 51 of 1991	Article 51, 1991: “All Colombians have the right to dignified housing. The Government will create the necessary conditions to make this right effective and	<p>Law 388 of 1997 - Article 91 Concept of social interest housing</p> <p>Article 44 of Law 9 of 1989: “Social interest housing is the one developed to guarantee the right of housing in low-income households. In all the National Development Plans the National Government will set the type and maximum price of the housing solutions for these households, taking into account, among other aspects, the characteristics of the housing deficit, the access possibilities to financing programs, the offer conditions, the credit monetary resources available by the financial sector and the sum of State funds assigned to the housing programs”.</p> <p>Article 13. Urban Component of the Land Use Plan. This component is an instrument for the management of the development and occupation of the physical space classified as urban and urban expansion lands; this instrument integrates mid and short-term policies, management procedures and instruments and urban regulations.</p>																				

COUNTRY	CONSTITUTION	ARTICLE	REGULATIONS																
Colombia	Colombian Political Constitution determines in the article 51 of 1991	<i>will promote social interest housing plans, adequate long term financing systems for housing and associative forms of executing these housing programs.”</i>	<p>Decree 2083 of 2004 (June 28) Article 1. Paragraph 1 of article 1, Decree 2060 of 2004, establishes: Minimum land plot area for social interest housing types 1 and 2:</p> <table border="1"> <thead> <tr> <th>Housing type</th> <th>Minimum Plot Land</th> <th>Minimum Front Size</th> <th>Buffer Zone</th> </tr> </thead> <tbody> <tr> <td>Single-family</td> <td>35 m²</td> <td>3,50 m</td> <td>2,00 m</td> </tr> <tr> <td>Two families</td> <td>70 m²</td> <td>7,00 m</td> <td>2,00 m</td> </tr> <tr> <td>Multi-family</td> <td>120 m²</td> <td>-</td> <td>-</td> </tr> </tbody> </table>	Housing type	Minimum Plot Land	Minimum Front Size	Buffer Zone	Single-family	35 m ²	3,50 m	2,00 m	Two families	70 m ²	7,00 m	2,00 m	Multi-family	120 m ²	-	-
Housing type	Minimum Plot Land	Minimum Front Size	Buffer Zone																
Single-family	35 m ²	3,50 m	2,00 m																
Two families	70 m ²	7,00 m	2,00 m																
Multi-family	120 m ²	-	-																
Chile	Chilean Constitution does not recognize housing as a social right.	The right of housing is established, and this can be seen in the institutions that the Government has created for this matter. In addition to the international instruments that acknowledge this right, the principal rights are subscribed, but there is no explicit recognition in the Political Constitution.	<p>Decree –law 2 of 1959. Housing Plan. Article 9. “Economical Housing”, individual or collective, will have a <i>minimum built surface of 35 square meters</i>, and in its program will be considered, at least, the following: living room, kitchen, hygienic services (toilet, sink and shower) and two bedrooms. Article 10. The maximum area of “economical housing”, whichever its program might be, will be calculated on the basis of 17.5 square meters of built area per habitant, determining the number of habitants with the amount of beds of a given house. In the calculation, only the beds located on the floor will be considered. In any case, the maximum acceptable area cannot exceed a built area of 140 square meters. Therefore, according to the capacity of each house, the following maximum areas will be allowed:</p> <table border="1"> <thead> <tr> <th>Number of habitants per house</th> <th>Maximum Area m2</th> </tr> </thead> <tbody> <tr> <td>4 habitants</td> <td>70 m²</td> </tr> <tr> <td>5 habitants</td> <td>87,5 m²</td> </tr> <tr> <td>6 habitants</td> <td>105 m²</td> </tr> <tr> <td>7 habitants</td> <td>122,5 m²</td> </tr> <tr> <td>8 or more habitants</td> <td>140 m²</td> </tr> </tbody> </table>	Number of habitants per house	Maximum Area m2	4 habitants	70 m ²	5 habitants	87,5 m ²	6 habitants	105 m ²	7 habitants	122,5 m ²	8 or more habitants	140 m ²				
	Number of habitants per house	Maximum Area m2																	
4 habitants	70 m ²																		
5 habitants	87,5 m ²																		
6 habitants	105 m ²																		
7 habitants	122,5 m ²																		
8 or more habitants	140 m ²																		
		Nowadays, it would only be possible to propose an approach to the laws that include housing and other basic services, such as <i>the right to an adequate life.</i>																	

COUNTRY	CONSTITUTION	ARTICLE	REGULATIONS															
Spain	Spanish Constitution, in article 47 of 1978	Article 47 of 1978: <i>“All Spanish citizens have the right to enjoy dignified and adequate housing. Public powers will promote the necessary conditions and will establish the pertinent regulations to make effective this right, regulating the use of land according to the general interest to avoid speculation. The community will participate in the capital gain generated by the urbanistic actions of the public institutions”.</i>	<p>National Housing regulations of Official Protection of 1969. Article 9. Housing composition, program and bedrooms. Family housing will have a minimum of one room in which one can stay, eat and cook; a bedroom and a bathroom with a shower, sink and toilet. Houses with four rooms will have a minimum of two bathrooms, one of them complete and the other one with sink and toilet. The useful areas for each type of housing, according to the number of bedrooms, will be as follows: housing with a minimum useful area (m²).</p> <table border="1"> <thead> <tr> <th>Maximum Useful Surface (m²)</th> <th>Minimum</th> <th>Maximum</th> </tr> </thead> <tbody> <tr> <td>One bedroom</td> <td>40 m²</td> <td>70m²</td> </tr> <tr> <td>Two bedrooms</td> <td>50 m²</td> <td>70 m²</td> </tr> <tr> <td>Three bedrooms</td> <td>60 m²</td> <td>90 m²</td> </tr> <tr> <td>Four bedrooms</td> <td>70 m²</td> <td>90 m²</td> </tr> </tbody> </table> <p>All the bedrooms, as well as the kitchen, will have light sources from external open space or from internal patios. The living room will have view and will receive light from the external open space or from the internal patios, regardless of whether they are public or private.</p>	Maximum Useful Surface (m ²)	Minimum	Maximum	One bedroom	40 m ²	70m ²	Two bedrooms	50 m ²	70 m ²	Three bedrooms	60 m ²	90 m ²	Four bedrooms	70 m ²	90 m ²
Maximum Useful Surface (m ²)	Minimum	Maximum																
One bedroom	40 m ²	70m ²																
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Four bedrooms	70 m ²	90 m ²																

Source: A. Vélez – X. Covaleda

The Colombian Constitution establishes the right to dignified housing, but the corresponding regulations do not allow for the fulfillment of truly dignified housing, since the parameters are ambiguous, as they set a minimum area and front size, restricting the diversity of types, but they only say that they are for one or more inhabitants, not specifying the number of inhabitants per area in order to

live in a dignified way. Furthermore, the concept of dignified housing of the Constitution is modified by the concept of “Social Interest Housing”,⁹ within the framework of the conditions established by the Colombian State: “Social Interest Housing” is the housing solution whose maximum value is 135 current minimum wages,¹⁰ while “Priority Interest Housing”¹¹ is the housing solution whose maximum value is 70 current minimum wages (Decree 4259 of 2007).

⁹ In Spanish: *Vivienda de Interés Social (VIS)* (TN)

¹⁰ The Colombian monthly minimum wage (*Salario Mínimo Legal Vigente (SMLV)*) for 2011 was 536.600 pesos (Aprox. 300 US\$) (TN)

¹¹ In Spanish: *Vivienda de Interés Prioritario (VIP)* (TN)

According to the Quality of Life surveys of 2009, the quantitative deficit for housing in Medellín in 2009 came to 48 078 housing units (“Medellín cómo vamos”, 2010). The Metropolitan Area of the Aburrá Valley¹² has a quantitative deficit, according to the census of 2005, of 50 201 housing units. This panorama obliges the institutions of the State to take measures.

The *Empresa de Desarrollo Urbano (EDU)*,¹³ a public enterprise for the development of urban projects that improve the quality of life of the citizens in the area of housing, is focused on the development of management models “to build Social Interest Houses type 1, 2, and 2 Plus, with costs of 50, 65 and 80 minimum wages respectively. The projects are framed within the different urban interventions of expansion, renewal and improvement, in which the *EDU* acts as promoter and operator. In the period 2004-2007, 7 thousand housing solutions were built, and for the period 2008-2011 the goal is to build another 15 thousand” (*EDU*). This institution develops Housing Projects on land for urban expansion (Ciudadela Nuevo Occidente– La Huerta), housing management, housing consolidation (Juan Bobo), among others.

In January 2009, the Mayor’s Office of Medellín created the *Instituto Social de Vivienda y Hábitat de Medellín (ISVIMED)*,¹⁴ whose institutional mission is: “to guarantee the conditions to make effective the social right to dignified housing, especially in the poor and vulnerable human settlements and family groups, coordinating the housing system and implementing the Public Municipal Policy for housing. This is done through the management of processes with public, private and community actors, in order to satisfy the housing needs based on integral and coordinated interventions that lead to social and territorial equity, socio-spatial integration, solidarity, participation, co-responsibility and territorial sustainability with a metropolitan vision and awareness” (*ISVIMED*). The lines of work of this institution are: 1) The building of new housing in urban and rural areas, for socioeconomic levels¹⁵ 1, 2, and 3, with basic services of water and sewage, 2) Improvement of urban social interest housing, 3) Improvement of rural social interest housing, 4) Accompanying the families that benefit from the housing programs, 5) Legalization of housing, and 6) Entitlement of lands. The work

¹² The Metropolitan Area of the Aburrá Valley (or Metropolitan Area of Medellín) is a region made up of the following 10 municipalities: Barbosa, Bello, Caldas, Copacabana, Envigado, Girardota, Itagüí, La Estrella, Medellín and Sabaneta. (TN)

¹³ Urban Development Enterprise (TN)

¹⁴ Social Institute of Housing and Habitat of Medellín (TN)

¹⁵ In Colombia there are 6 socioeconomic levels, called “*estratos socioeconómicos*”, 1 is the lowest and 6 is the highest. Socioeconomic stratification is used in Colombia to classify residential households, taking into account the income level, public utilities, location of the household, etc. (TN)

developed by the institution, since its creation, is focused on the accomplishment of the goal of the current administration of the city of building 15 000 houses.

Currently, the municipal administration is developing the Housing Plan 2020,¹⁶ which is a public policy instrument to guide and foster changes and actions that improve the quality of life of the inhabitants in urban and rural areas of Medellín. The plan is developing the second of the three stages that compose it and defines the following strategic lines of work: 1) Coverage and quality, 2) Land use management, 3) Financing and affordability, 4) Institutional development and knowledge management, and 5) Learning, and social innovation. Additionally, it is developing a Housing System that includes the actors, actions, strategies, the projects and the initiatives; all these agreements are determinants for the development of the living conditions. (Medellín's Strategic Housing Plan 2020)

The *Área Metropolitana del Valle de Aburrá (AMVA)*¹⁷ is an institution that groups together ten municipalities of the Aburrá Valley. In 2007 it defined some metropolitan guidelines in which housing was established as a Metropolitan Issue. The AMVA has

been developing management and financing instruments, and has advanced in the prioritization of neighborhoods for the development of improvement projects. The AMVA is currently designing the Integral Housing Improvement Program for Neighborhoods in the Aburrá Valley,¹⁸ since some municipalities did not define the lands for expansion in their Land Use Plan,¹⁹ limiting the construction of Social Interest Housing.

In Chile, a country where the fundamental human rights: health, education, work, living in environments free of pollution, among others, are recognized by the Government and are protected by the Constitution. Nevertheless, housing is not recognized as a fundamental right "in spite of being guaranteed by international covenants subscribed by Chile, where the State agrees to guarantee 'adequate housing', to improve it permanently and to adopt the necessary measures to protect this right" (International Covenant of Economic, Social and Cultural Rights) (Blanco and Silva, 2009). The Chilean government established subsidies for housing and the Ministry of Housing regulates them via two institutions: the *Servicios de Vivienda y Urbanismo (SERVIU)*,²⁰ an entity in charge of

¹⁶ In Spanish: *Plan Habitacional 2020* (TN)

¹⁷ Aburrá Valley's Metropolitan Area (TN)

¹⁸ In Spanish: *Programa Habitacional de Mejoramiento Integral de Barrios en el Valle de Aburrá* (TN)

¹⁹ In Spanish: *Plan de Ordenamiento Territorial (POT)* (TN)

²⁰ Services of Housing and Urbanism (TN)

the execution of the policies, plans and programs according to the guidelines of the Ministry, although it does not have planning tasks (Supreme Decree 355 on Housing and Urbanism of 1976; articles 2, 3, and 4), and the *Secretarías Regionales Ministeriales de Vivienda y Urbanismo (SEREMI)*,²¹ which are decentralized organisms of the Ministry of Housing, with presence in the whole country, in charge of making possible the national policies of housing, urbanism and facilities, urban-regional and inter-community planning, among others (Supreme Decree 397 on Housing and Urbanism of 1976, articles 2 and 3). One of the housing programs carried out in Chile is the initiative of *ELEMENTAL*, an affiliate of the *Compañía de Petróleos de Chile (COPEC)*²² and the *Pontificia Universidad Católica de Chile*,²³ since 2000, which develops single-family and subsidized housing projects. They have organized national and international housing project contests, and they are an international referent for the solutions and building systems they propose.

The Spanish regulation establishes general national guidelines for housing and each autonomous community defines its line of

work based on the housing plans established in the national legal framework: “The National Housing regulations of Official Protection²⁴ of 1969 contain general regulations in terms of minimum dimensions, ventilation, courtyards, relations between the spaces of the house, etc. In other words, they establish the minimum parameters, which all the other regulations must follow. The National Regulation of Design and Quality of Social Houses²⁵ (proposed in 1976 and reviewed in 1977) proposes to improve the quality of subsidized housing with a general character, suggesting concepts ambiguous enough so as to give the possibility of interpreting them from different perspectives and, therefore, avoiding unique solutions” (Muxi, 2010). Each community, in accordance with the legal and autonomous management frame, designs a housing plan for subsidized housing, as well as the municipal plans.

The community of Madrid has the *Empresa Municipal de la Vivienda y el Suelo (EMVS)*²⁶ which, as one of the objectives of the Housing Municipal Plan, defines that it should facilitate the access to affordable housing, respond to the needs of diverse family groups with new types of housing, lead

²¹ Regional Ministerial Secretaries of Housing and Urbanism (TN)

²² Chilean Petroleum Company (TN)

²³ Pontifical Catholic University of Chile (TN)

²⁴ In Spanish: *Normativa Nacional de Viviendas de Protección Oficial* (TN)

²⁵ In Spanish: *Normativa Nacional de Diseño y Calidad de las viviendas sociales* (TN)

²⁶ Municipal Housing and Land Enterprise (TN)

processes of technology innovation, material and energy saving, and coordinate these processes with well-known national and international architects (EMVS). The *Generalitat de Catalunya*²⁷ and the *Instituto Catalán del Suelo (INCASOL)*²⁸ develop four big lines of work: development for economic activities and services, development of residential land for housing, building protected social housing and urban and historic heritage rehabilitation and renewal (INCASOL).

Housing management in the three countries has the same objective: to guarantee access to dignified housing. In the Colombian case, the regulation and its legal framework is defined by decree (Law 388 of 1997, Decree 2190 of 2008, Decree 2083 of 2004), the location of housing in the city, the minimum areas for plots of land and the economic subsidies to access housing.

Since the *minimum area* per habitant or per family nuclei is not regulated (maximum four persons), the house acquires an economic value, weakening the concept of dignified housing and its application in housing production.

Moreover, the expansion zone of the residential complex “Ciudadela Nuevo Occidente” lacks the necessary infrastructure and

facilities to generate a dignified environment. In spite of the fact that the infrastructure and facilities are contemplated in the Housing Plan and in the consolidation areas, as they are in the projects Naranjal and Sevilla, the purchase of lands that are regulated by the partial plans and the procedures for their acquisition makes the process of generating new housing very complex. The work of the *EDU* during the period 2004-2008 is outstanding because of the generation of new housing in consolidated environments incorporated into the Integral Urban Project,²⁹ such as the one carried out in Juan Bobo,³⁰ being defined as a very valuable management model.

The Chilean housing plan defines the management institutions from an organic legal framework, with regional presence in the whole country. *ELEMENTAL* proposes an interesting plan in terms of housing units, offering a minimum sized house with the possibility of expansion, but located exclusively in suburban lands, generating a diffuse urban growth model with high costs in terms of mobility, infrastructure and facilities. In Decree-law 2 of 1959 a minimum built area of 17.5 m² per inhabitant is specified, establishing with dignified criteria the habitable space per number of persons.

²⁷ Government of Catalonia (TN)

²⁸ Catalan Land Institute (TN)

²⁹ In Spanish: *Proyecto Urbano Integral (PUI)* (TN)

³⁰ See the article “Informality and Social Urbanism”, page 132 of this book

Finally, the Spanish housing plan and its autonomous communities intend to have a bank of lands in consolidated environments and to build housing for a diversity of family groups in sustainable (environment) and affordable (for people with different income levels) terms. The State entities that work in the housing production create announcements for national and international architecture contests in order to have public housing production with a high qualitative and quantitative level, building and dignifying the city.

Conceptual Values to Assess Dignified Housing

Five projects in two chronological periods 1950-2000 and 2000-2010 are reviewed based on four analytical categories: normative, society, city and architecture. The purpose of analyzing each work is to cover the issue of housing from a broad and integral perspective and to visualize the state of the art in Medellin, in order to review the will to build *dignified housing* in Colombia.

Normative

To understand the operational framework of the project and the normative context that regulates it:

- Location of the plot: the projects located in expansion or consolidated areas that are integrated into the city are favored.
- Housing area: the adequate area per inhabitant is evaluated.

- Number of houses per stairways: the ability to generate neighborhood atmosphere is evaluated, verifying that there are not more than 36 units per stairways.
- Density and location of the plot: the proportional relation of the occupation of the plot, the height of the buildings and the number of units is evaluated.

Society

The capacity of the project to accommodate different family groups is determined; the designs without spatial hierarchies and with spaces that facilitate productive activities are favored. (Montaner and Muxi, 2006)

- Adequate for family groups: projects that can house diverse family groups in adequate spaces are favored.
- Access: the capacity of the project to generate spaces without architectural or psychological barriers is evaluated.
- Spaces without hierarchies: to save space by promoting the maximum possibility of simultaneous uses. Nonexclusive spaces such as integral kitchens, nonexclusive bathrooms with separated functions are favored.
- Working and storage spaces: storage spaces are valued according to their location and purposes, where a productive activity can be carried out.

City

The projects that best adapt to their location and contribute to the urban context are favored (2006).

- Urban location: it shows the urban fabric where the project is; buildings that foster integration are favored, understanding housing as an urban project.
- Proximity: the proximity to facilities, to commercial areas and to the transport system via pedestrian paths, no more than 500 m away is evaluated.
- Relation to public space: the relation of the building to public space (visual, commercial activities, facilities on the first floor, and public space proposal) is evaluated.
- Intermediate spaces: spaces that are between private and public spheres (courtyards, stairways, fixed-points, terraces, balconies).

Architecture

The plasticity of the building and its ability to consolidate a place via an architectural proposal are evaluated.

- A new place: proposals that build or consolidate new places, leaving a footprint on the city are favored.
- Architectural quality: the aesthetic quality of the projects in terms of composition and proportion are evaluated.

- Structure: designs that build structures with spatial qualities that can be refurbished by the user are favored.
- Materials: the use of adequate materials in the formalization of the project and its sustainability are evaluated.

Analysis of the regulation 1950-2000

Public housing production in Colombia is analyzed in the first period of 1950-2000, with the purpose of comparing, according to the corresponding law at the time, its application in the housing building process of Medellín.

Land uses, location in the city (1950-2000)

In 1950 the application of the urban plans of Winner and Sert was beginning, redefining the city and its zones of expansion through four functions delimited by the International Congresses of Modern Architecture (*CIAM*):³¹ living, working, recreation and circulation. "Housing was considered the fundamental function of every city, evidencing the critical situation of contemporary cities. This situation was characterized by the high population density, the lack of public areas, the arbitrary distribution of community services, and poor location in terms of hygiene. In contrast, they considered that it was fundamental for the residen-

³¹ Congrès internationaux d'architecture moderne (*CIAM*) (TN)

tial areas to choose the best urban places, to have a rational population distribution, to establish densities and to forbid their location in high traffic areas. They expected that these requirements could lead, in the future, to the formulation of a law in order to get better housing quality". (Schnitter, 2006). The laws of the time regarding social housing are classified in what is known as "the Institutional Phase": the purpose of the laws and decrees was to consolidate the financial facilities of the housing institutions of the State: the *BCH* and *ICT*, the *Sociedad de San Vicente de Paul*³² and the *Sociedad de Mejoras Públicas*.³³ Single-family or two-family housing units were built in the zones of expansion defined in the plan.

Public actors 1950-2000

The institutions that develop housing production are: the *ICT*, the *BCH*, the *Cooperativas de Vivienda*,³⁴ and the *Corporación de Vivienda y Desarrollo Social (CORVIDE)*.³⁵ Since the 1980s, the saving and housing corporations are *CONAVI*³⁶ and *COLMENA*,³⁷ among others.

Case studies

The case studies selected are public (4) and private (1) housing projects

built in Medellin, diverse in their location and topography, in terms of the management/production model with which they were built and in terms of the consolidation/construction of the city over time.

- Carlos E. Restrepo: Project of the *ICT* of 1970, located in the area of expansion of "Otrabanda", defined by the Pilot Plan (Table 5.2)
- Marco Fidel Suarez Towers: Project of the *ICT* of 1977, located in the city center, following the model of high-rise housing (*CIAM*) (Table 5.3)
- Tricentenario: Project of the *ICT* of 1978, located between the river bank and the northern Highway, in a zone that was originally industrial and hosted the Olympic Village for the South American Games in 1978 (Table 5.4)
- Nueva Villa de Aburrá:³⁸ Project of the *BCH* of 1983, located on the west side of the city, consolidating a residential area defined by the Pilot Plan (Table 5.5)
- Cañaveral: Private project of 1998, located in the urban periphery on the side of the city, with a model of housing for slopes. (Table 5.6)

³² Foundation created in 1882, devoted to social work (TN)

³³ Society for Public Improvements, created at the end of the 19th century. (TN)

³⁴ Housing Cooperatives (TN)

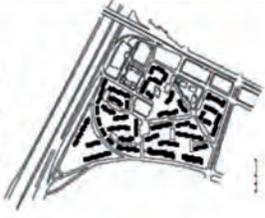
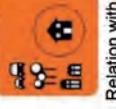
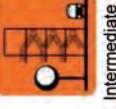
³⁵ Housing and Social Development Corporation (TN)

³⁶ Corporación Nacional de Ahorro y Vivienda Conavi (Conavi National Saving and Housing Corporation) (TN)

³⁷ Corporación Social de Ahorro y Vivienda Colmena (Colmena Saving and Housing Social Corporation) (TN)

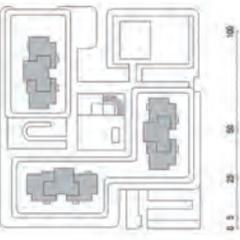
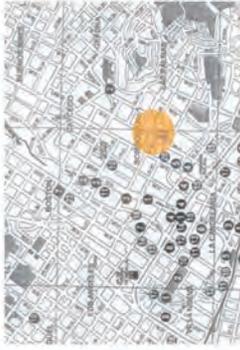
³⁸ Aburrá's New Village (TN)

Table 5.2 Residential complex Carlos E. Restrepo

PROJECT Carlos E. Restrepo. Technical specifications: Instituto de Crédito Territorial 1970	REGULATION 	SOCIETY 	CITY 	ARCHITECTURE 
<p>ARCHITECTS:</p> <ul style="list-style-type: none"> • Guillermo García • Guillermo Beltrán • Laureano Forero • Horacio Navarro  	<p>Location </p> <p>Area: 120m² </p> <p>N° of apartments: 640 Apartment/ fixed point: 8 </p> <p>Density: 54 h/hectare Area of the plot: 119644 m² </p> <p>Area between the Autopista sur, 50th Street, La Iguaná Creek and Transversal 53ª. Expansion zone in the outskirts of the traditional city center. Today it is a consolidated area.</p>	<p>Capacity for family groups </p> <p>Access </p> <p>Spaces without hierarchies </p> <p>Working and storage spaces </p>	<p>Urban location </p>  <p>Proximity values </p> <p>Relation with public space </p> <p>Intermediate spaces </p>	<p>A new place </p> <p>Architectonic quality </p>  <p>Structure </p>  <p>Materials </p>

Source: A. Vélez – X. Covaleda

Table 5.3 Torres de Marco Fidel Suárez

PROJECT Torres Marco Fidel Suárez Technical specifications: Instituto de Crédito Territorial 1977	REGULATION 	SOCIETY 	CITY 	ARCHITECTURE 
<p>ARCHITECT:</p> <ul style="list-style-type: none"> Eduardo Arango Arango  	<p>Location </p> <p>Area: 156 - 162m² </p> <p>Nº of apartments: 315 Apartment/fixed points: 105 </p> <p>Density: 286 h/ hectare Area of the plot: 10.999m² </p> <p>Between 47th and 48th Streets (Pichincha) and 42nd and 43rd Avenues</p>	<p>Capacity for family groups </p> <p>Access </p> <p>Spaces without hierarchies </p> <p>Working and storage spaces </p>	<p>Urban location </p>  <p>Proximity values </p> <p>Relation with public space </p> <p>Intermediate spaces </p>	<p>A new place </p> <p>Architectonic quality </p> <p>Structure </p> <p>Materials </p> 

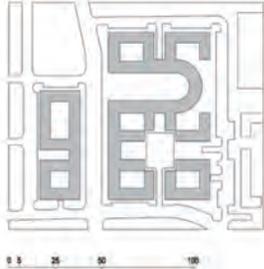
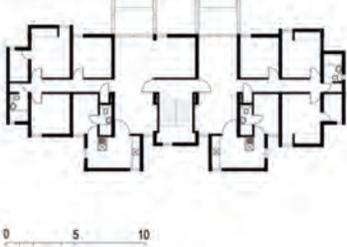
Source: A. Vélez – X. Covaleda

Table 5.4 Residential complex Tricentenario

PROJECT: Tricentenario Technical specifications: Instituto de Crédito Terrestrial 1978	REGULATION	SOCIETY	CITY	ARCHITECTURE
<p>ARCHITECT: Ligia Tobón</p> 	<p>Location of the plot</p>  <p>Area: 76m²</p>  <p>Nº of apartments: 1800 Apartment/ fixed point: 20</p>  <p>Density: 94 h/hectárea Area of the plot: 190 000m²</p>  <p>Between the Vía Regional, Medellín River el Río Medellín and La Morena Creek and Minitas</p>	<p>Capacity for family groups</p>  <p>Access</p>  <p>Spaces without hierarchies</p>  <p>Working and storage spaces</p>  	<p>Urban location</p>   <p>Proximity values</p>  <p>Relation with public space</p>  <p>Intermediate spaces</p> 	<p>A new place</p>  <p>Architectonic quality</p>   <p>Structure</p>  <p>Materials</p>  

Source: A. Vélez – X. Covaleda

Table 5.5 Nueva Villa de Aburrá

<p>PROJECT: Nueva Villa del Aburra Technical specifications: 1983 - BCH</p>	<p>REGULATION</p> 	<p>SOCIETY</p> 	<p>CITY</p> 	<p>ARCHITECTURE</p> 
<p>ARCHITECTS: Nagui Sabet Jorge Mario Gómez</p>  	<p>Location</p>  <p>Area: 43.68 to 125.51m²</p>  <p>Nº of Apartments: 238 Apartment/ fixed point: N/A</p>  <p>Density: N/A Area of the plot: N/A</p>  <p>32nd Street and 81st Avenue</p>	<p>Capacity for family groups</p>  <p>Access</p>  <p>Spaces without hierarchies</p>  <p>Working and storage spaces</p>  	<p>Urban location</p>   <p>Proximity values</p>  <p>Relation with public space</p>  <p>Intermediate spaces</p> 	<p>A new place</p>  <p>Architectonic quality</p>  <p>Structure</p>  <p>Materials</p>  

Source: A. Vélez – X. Covaleda

Conclusions of the case studies 1950-2000

Carlos E. Restrepo

Its location, considered in the regulatory plan, has consolidated a garden city housing model, with a collective appropriation of public space that is important for the neighborhood and for the city, with facilities, infrastructure and services in the same centrality.

The generous area of its housing units allows for a diversity of family groups, spaces without hierarchies and enough space to develop working activities and storage without usage restrictions. Additionally, the materials, composition and proportions of the houses dignify them. It is one of the city's social housing projects that use a brick finish as an important element of the facades.

Marco Fidel Suárez

It is located in a consolidated zone of the city center, with access to the facilities, infrastructure and services of the zone. As a modern housing model (CIAM), the high-rise housing has little relation to the platform of services, which is more for its surroundings.

The area of its housing units allows for a diversity of family groups, spaces without hierarchies and spaces to develop working activities and storage without usage restrictions. Because of its structure as a high-rise building,

the distribution inside the housing units is complex. With the passing of time the materials have deteriorated, resulting in high cost in maintenance.

Tricentenario

Its location between two barriers has left it isolated from facilities, infrastructure and services, which have been developed within the housing project.

The typology is efficient, concentrating wet areas and proposing a multiple bathroom and spaces without hierarchies, but lacking spaces for storage. The materials, composition and proportion do not lead to a good formal result.

Nueva Villa del Aburra

The project is located in a residential area offering the complementary services of the zone. The project involves a diversity of typologies for multiple family groups. At the same time, its materials, composition and proportion dignify the housing with a solution in terms of its space and facade. Its structure was carefully designed to make part of the facade.

Cañaveral

It is located in the urban periphery, far from facilities, infrastructure and services. The project proposes stairways, front yards, terraces, a viewpoint, intermediate spaces between the private and public spheres, with materials and a composition of the facade that show its architecture.

Analysis of the Regulation 2000-2010

Social interest housing is reviewed in Medellin in terms of the current law and its application in construction.

Land use, location in the city

Law 388 of 1997 states that each Colombian municipality must design a Land Use Plan in which all the dispositions regarding the territory must be established: "Locate and evaluate lands to build social interest housing" (Article 8, number 7, law 388/1997). These lands are defined as urban and rural zones of expansion: "The medium term strategy to develop social interest housing programs, including those of integral improvement, which includes guidelines and parameters to locate in urban zones and urban areas of expansion the necessary lands to meet the demand of social interest housing and the identification of the correspondent management tools. The strategy also includes the mechanisms to relocate the human settlements located in high risk zones for the health and integrity of their inhabitants, as well as the strategy for their transformation in order to avoid the re-occupation of these lands" (Article 13, number 5, Law 388/1997). In practice, the lands that were required to meet the housing demand of Medellin were the ones of the central-western area, in Robledo Pajarito, where the Ciudadela Nueva Occidente is presently being built.

Minimum standards for housing areas

According to Decree 2083 of 2004, (June 28), Article 1, the minimum areas for the plots of land for social interest housing are defined (types 1 and 2) in terms of the typology:

- Single-family housing: minimum area of the plot of 35m², minimum front of 3.50m and buffer zone 2.00 m.
- Two-family housing: minimum area of the plot of 70m², minimum front of 7.00 m and buffer zone is not defined.
- Multi-family housing: minimum area of the plot of 120m², minimum front and buffer zone are not defined.

The areas of the housing regulate the type of Social Interest Housing and the family subsidies.

- Housing basic unity: minimum area 28.50m², with a multiple-use space, kitchen, bathroom and laundry zone.
- Minimum housing: minimum area: 39.00m², with a living/dining room, a bedroom, kitchen and bathroom.

The current areas of high-rise social interest housing are classified according to the Socioeconomic Level: low-low: 47m²; low: 52m²; medium-low: 57m² (DANE 2010)

Public Actors 2000-2010

– Corporaciones de Ahorro y Vivienda³⁹ – Cajas de Compensación

³⁹ Saving and Housing Corporations (TN)

Familiar⁴⁰ – the *Instituto Social de Vivienda y Hábitat de Medellín (ISVIMED)*⁴¹ – *Viviendas de Antioquia (VIVA)*.⁴²

Case studies 2000-2010

The case study selection corresponds to public (4) and private (1) housing projects built in Medellín according to the current legal framework, in zones of expansion, consolidation and urban re-qualification.

- Torres de San Sebastián: project carried out by both the private and public sectors, located in a zone in consolidation (Table 5.7)
- Apartamentos La Playa: private project, located in a consolidated zone and urban re-qualification. (Table 5.8)
- La Huerta: project of the *EDU*, located in a zone of expansion defined by the Land Use Plan of 1998 (Table 5.9)
- Juan Bobo: Integral Urban Improvement project of the *EDU*, located on the shore of Juan Bobo Creek: risk mitigation, housing relocation, housing improvement and generation of public space (Table 5.10)
- Villa Suramericana: Project of *COMFAMA*,⁴³ located in a zone of expansion defined by

the Land Use Plan of 1998. It hosted the Olympic Village of the IX South American Games, Medellín, 2010 (Table 5.11)

Conclusions of the case studies 2000-2010

Torres San Sebastián

It is located in a consolidation zone of the city center, with access to facilities, infrastructure and services of the zone.

The area of the housing units is very limited, accepting a minimum of family groups. Its structure does not give possibility for refurbishments by the user. Their materials, composition and proportion led to a poor formal and architectural result.

La Playa Apartments

Located in a consolidated zone of the city center, with access to facilities, infrastructure and services.

The area of the housing units permits a diversity of family groups, diversity on space usage and spaces without hierarchies. The structural design allows for an open and flexible space with good results in terms of composition and proportion.

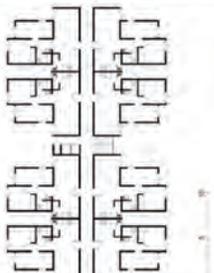
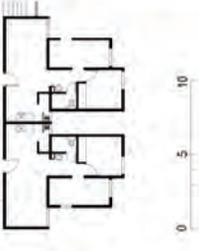
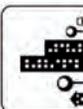
⁴⁰ Compensation Funds (TN)

⁴¹ Social Institute of Housing and Habitat of Medellín (TN)

⁴² Antioquia's Housing (TN)

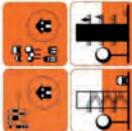
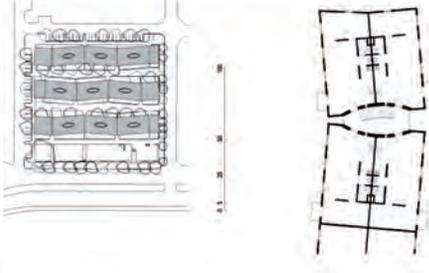
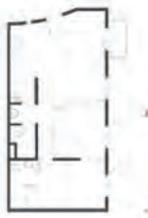
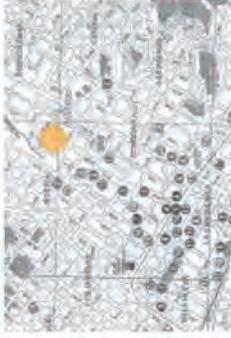
⁴³ *Caja de Compensación Familiar de Antioquia Comfama* (Antioquia's Family Benefit Fund Comfama) (TN)

Table 5.7 Torres de San Sebastián

<p>PROJECT Unidad Torres de San Sebastián Technical specifications: AIA S.A. 2001</p>	<p>REGULATION</p> 	<p>SOCIETY</p> 	<p>CITY</p> 	<p>ARCHITECTURE</p> 
<p>Arquitectos e Ingenieros Asociados</p>  	<p>Location  m²</p> <p>Area: 42m² </p> <p>Nº of apartments : 640 Apartment/ fixed point : 160 </p> <p>Density: 1503 h/hectare Area of the plot: 4256m² </p> <p>Colón neighborhood</p>	<p>Capacity for family groups </p> <p>Access </p> <p>Spaces without hierarchies </p> <p>Working and storage spaces </p> 	<p>Urban location  </p> <p>Proximity values </p> <p>Relation with public space </p> <p>Intermediate spaces </p>	<p>A new place </p> <p>Architectonic quality </p> <p>Structure </p> <p>Materials </p> 

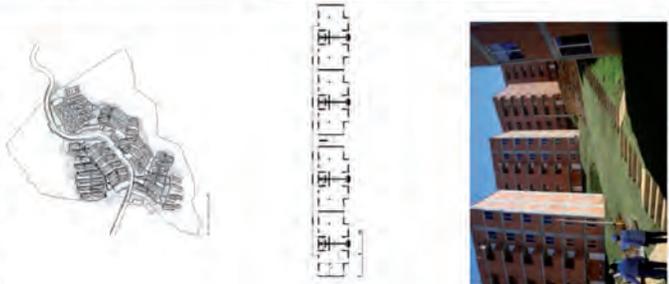
Source: A. Vélez – X. Covaleda

Table 5.8 Apartamentos La Playa

<p>PROJECT La Playa Apartamentos Technical specifications: 2004 - ConCreto</p>	<p>REGULATION</p> 	<p>SOCIETY</p> 	<p>CITY</p> 	<p>ARCHITECTURE</p> 
<p>ARCHITECTS:</p> <ul style="list-style-type: none"> Ana Elvira Vélez Juan B. Echeverri 	<p>Location </p> <p>Area: 55.28 m² </p> <p>Nº of apartments : 254 Apartment/ fixed point : 22 </p> <p>Density: 291 h/hectárea Area of the plot: 8700m² </p> <p>Between La Playa Avenue, 50^a Street and 38th and 37th Avenues.</p>	<p>Capacity for family groups </p> <p>Access </p> <p>Spaces without hierarchies </p> <p>Working and storage spaces </p> 	<p>Urban location </p>  <p>Proximity values </p> <p>Relation with public space </p> <p>Intermediate spaces </p>	<p>A new place </p> <p>Architectonic quality </p>  <p>Structure </p>  <p>Materials </p>

Source: A. Vélez – X. Covaleda

Table 5-9 La Huerta

PROJECT La Huerta Technical specifications: Empresa de Desarrollo Urbano – EDU – 2007	REGULATION 	SOCIETY 	CITY 	ARCHITECTURE
<p>ARCHITECTS:</p> <ul style="list-style-type: none"> Taller de vivienda EDU 	<p>Location </p> <p>Area: 47.07m² </p> <p>N° of apartments: 1236 Apartment/ fixed point: 48 </p> <p>Density: 113 h/hectare Area of the plot: 108 809 m² </p>	<p>Capacity for family groups </p> <p>Access </p> <p>Spaces without hierarchies </p> <p>Working and storage spaces </p> 	<p>Urban location </p>  <p>Proximity values </p> <p>Relation with public space </p> <p>Intermediate spaces </p>	<p>A new place </p> <p>Architectonic quality </p>  <p>Structure </p> <p>Materials </p> 

Source: A. Vélez – X. Covaleda

Table 5.10 Juan Bobo

<p>PROJECT Juan Bobo Technical specifications: Empresa de Desarrollo Urbano –EDU 2007</p>	<p>REGULATION</p>	<p>SOCIETY</p>	<p>CITY</p>	<p>ARCHITECTURE</p>
<p>ARCHITECTS</p> <ul style="list-style-type: none"> Taller de vivienda EDU 	<p>Location</p> <p>Area: 42 m²</p> <p>Nº of apartments: 120 Apartment/ fixed point: 10</p> <p>Density: 68v/hectárea Área of the plot: 17 500m²</p>	<p>Capacity for family groups</p> <p>Access</p> <p>Spaces without hierarchies</p> <p>Working and storage spaces</p>	<p>Urban location</p> <p>Proximity values</p> <p>Relation with public space</p> <p>Intermediate spaces</p>	<p>A new place</p> <p>Architectonic quality</p> <p>Structure</p> <p>Materials</p>

Source: A. Vélez – X. Covaleda

Table 5.11 Villa Suramericana

PROJECT Villas Suramericana Technical specifications: Comfama 2010	REGULATION 	SOCIETY 	CITY 	ARCHITECTURE 
<p>ARCHITECTS: Arquitectos e Ingenieros Asociados Northwest of Medellin.</p>  	<p>Location </p> <p>Area: 45.45 and 54.13 m² </p> <p>N° of apartments: 620 Apartment/fixed point: 60 </p> <p>Density: Area of the plot: </p>	<p>Capacity for family groups </p> <p>Access </p> <p>Spaces without hierarchies </p> <p>Working and storage spaces </p> 	<p>Urban location </p>  <p>Proximity values </p> <p>Relation with public space </p> <p>Intermediate spaces </p>	<p>A new place </p> <p>Architectonic quality </p> <p>Structure </p> <p>Materials </p> 

Source: A. Vélez – X. Covaleda

La Huerta

Located in the zone of expansion of Pajarito, currently lacking the necessary infrastructure and facilities to generate a dignified environment. The unity has a space with services to be finished by the users, with not very favorable intermediate spaces. The materials, composition and proportion of the facades achieve a good formal result that could be improved in future projects.

Juan Bobo

Located in a risk zone, the project relocated the inhabitants in the same sector, so that they could continue enjoying the same infrastructure, facilities and services.

Because of the limited area of the housing units, the project does not permit the diversity of family groups, but it has a series of intermediate spaces such as common balconies and terraces that relieve this situation. The materials, composition and proportion of the façades achieve an acceptable result because of their diversity.

Villa Suramericana

Located in a zone of expansion of Pajarito, currently lacking the necessary infrastructure and facilities to generate a dignified environment.

The area of the housing units is generous, accepting a diversity of family groups, but the structure of the project does not give the possibility of refurbishments by the

user. The materials, composition and proportion led to a poor formal and architectural result.

Final conclusions

The Colombian legislation for the first half of the 20th century and the institutions in charge of housing production had the mission of building and consolidating the city through the formulation of housing policies in the period 1950-2000. Some of the most significant characteristics of this process were:

- The design plans came under the control of well-known architects of the city.
- The housing projects had a social and urban character, developing neighborhoods with social and community facilities, green and recreational areas, efficient road networks and other services.
- The projects aimed to have commercial activities on their first floor or on small squares.
- They had a diversity of typologies, so much as to establish norms to regulate the range of possibilities.
- They favored the idea of a neighborhood based on small buildings of 15 to 36 housing units.
- The architectonic quality transmitted a pleasant image, in spite of the fact that they used common materials such as adobe bricks and concrete.

The legal framework of the period 2000-2010 and its application in housing production, as well as the necessity of generating repetitive solutions using building systems that are not very pleasant but are profitable for the builders, led to housing projects with the following characteristics:

- They lack neighborhood bonds, since most of them are located in the urban periphery, away from the urban fabric (except for the projects located in consolidation zones).
- The architectonic quality is questionable. Facades seem to be the least important element of the buildings.
- Their first floors lack commercial activity (this is not sufficiently considered in the conception of most of the projects); when they do have spaces for commercial activities, they have not been built yet. Something similar happens with the facilities and services.
- There is a minimum level of typological diversity: they are very plain and repetitive (like a plant, repeated “n” times), although there is some effort to refine them.
- The area is so small (as established in the national regulations) for the family groups that occupy it that it is not dignifying to inhabit.
- The effort made by the most recent administrations and

municipal institutions in order to build a Housing Plan for Medellin is highly valuable: the active participation of the AMVA is very important, so that all the municipalities of the Metropolitan Area can include Social Interest Housing in their Land Use Plans.

Challenges

Legal framework - Management

- Some adjustments must be undertaken within the legal framework, specifically in the Organic Laws that regulate the location of the housing, the minimum areas, the relation between the economic and the social value of the housing. Similarly, it is important to define “What kind of city we want”.
- Cutting the deficit of housing in Medellin and the Metropolitan Area should be a top priority for the citizen and metropolitan agenda: institutions must have the same objectives in order to generate dignified housing projects in the city and the territories of the Aburrá Valley. At the same time, other strategies must be adopted, such as fostering architecture contests of housing production and strengthening the participation of the citizenry in terms of housing and dignified environments.
- The legislation should regulate the minimum area per habitant

or per family nuclei (maximum four persons).

- There should be a bank of consolidated (rather than expansion) lands. The public sector must get urban lands of expansion within the urban core⁴⁴ of the city, and look for mechanisms to rethink and reorganize the density of the city and not its expansion, since this latter is very expensive.
- The design of the housing projects should be led by well-known architects, and the design should be managed via public contests, looking for high architectural quality in the designs. These contests could be organized by typologies and location, supported by research projects.
- Accessibility should be included as a priority in the regulations of the housing projects, as well as the possibility of atypical typologies, with spaces adapted to people with different abilities or impairments in terms of mobility, sight and hearing, among others.

Dignified Housing

- Housing is one of the most important and visible formal elements of a city. It is important not only in a quantitative sense, but also in a qualitative one, in

terms of the architectonic quality required to gain value over time.

- More than a shelter, dignified housing has a series of characteristics such as privacy, enough space, physical and tenancy security and a basic infrastructure that embraces the availability and quality of public services such as water supply, electricity, sewage and garbage collection. (Medellín cómo vamos, 2010).
- The 21st century presents new challenges, generated to a great extent by the limitations and failures of the policies of the last century. The evaluation of the relationship between housing, public space, different land uses and mobility constitutes one of the cornerstones of building cities with quality of life.
- Big changes in family structure, the concepts of neighborhood and collectivity, and, of course, a growing awareness of citizens about the importance of sustainability and conservation of the natural resources are generating new social needs (Habraken and Mignucci, 2009).

The Colombian Constitution establishes the right to dignified housing, but the corresponding regulations do not allow for the

⁴⁴ In Spanish: *casco urbano* (TN)

fulfillment of truly dignified housing, since the parameters are ambiguous, as they set a minimum area and front size, restricting the diversity of types, but they only say that they are for one or more inhabitants, not specifying the number of inhabitants per area in order to live in a dignified way. Furthermore, the concept of dignified housing of the Constitution is modified by the concept of “Social Interest Housing”,⁴⁵ within the framework of the conditions established by the Colombian State: “Social Interest Housing” is the housing solution whose maximum value is 135 current minimum wages,⁴⁶ while “Priority Interest Housing”⁴⁷ is the housing solution whose maximum value is 70 current minimum wages (Decree 4259 of 2007).

According to the Quality of Life surveys of 2007, the quantitative deficit for housing in Medellín in 2009 came to 48 078 housing units (“Medellín cómo vamos”, 2010). The Metropolitan Area of the Aburrá Valley⁴⁸ has a quantitative deficit, according to the census of 2005, of 50 201 housing units. This panorama obliges the institutions of the State to take measures.

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⁴⁵ In Spanish: *Vivienda de Interés Social (VIS)* (TN)

⁴⁶ The Colombian monthly minimum wage (*Salario Mínimo Legal Vigente (SMLV)*) for 2011 was 536.600 pesos (Aprox. 300 US\$) (TN)

⁴⁷ In Spanish: *Vivienda de Interés Prioritario (VIP)* (TN)

⁴⁸ The Metropolitan Area of the Aburrá Valley (or Metropolitan Area of Medellín) is a region made up of the following 10 municipalities: Barbosa, Bello, Caldas, Copacabana, Envigado, Girardota, Itagüí, La Estrella, Medellín and Sabaneta. (TN)

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O C I E T Y

CITIES AND THE POVERTY TRAP

Jorge Iván González Borrero

The data given by MESEP¹ (2009)² on poverty, extreme poverty and income distribution are an excellent point of departure in order to discuss the living conditions in the main cities of Colombia, and the asymmetry between urban and rural dynamics.

I shall start with a reflection on income as a proxy of happiness and of living standards. Then I will proceed to analyzing the dynamics of poverty and extreme poverty. Later, I will examine the main features of the labor market and, finally, I will finish with a discussion on pro-poor growth, showing that the only way out of the poverty trap is through the combination of growth and distributive policies.

Within the context of cities, Medellín is not doing well. Its levels of poverty and extreme poverty are relatively high.

Income and happiness

The poverty measured by the Poverty Line (PL) has a more restrictive reach than that of other indicators such as *living conditions*, which attempts to be more comprehensive than only measuring income.³ Since the approximation through income is restrictive, the Living Conditions Index (LCI) proposes a more integral approach. It even leaves income aside, highlighting the relevance of other variables, thus allowing us to perceive effective realizations. This

¹ *Misión para el Empalme de las Series de Empleo, Pobreza y Desigualdad* (Mission for the Convergence of the Series of Employment, Poverty and Inequity) (TN)

² The cited document has information until 2008. The data corresponding to 2009 were presented in a press conference on May 30, 2010 (MESEP, 2010)

³ On the Living Conditions Index (LCI) see, for instance, Acosta (1997), Acosta and Alonso (1998), Castaño (2000), Gamboa, Cortés, Casas and Pérez (2001), Gamboa, González and Cortés (2000), González, Martínez, Sarmiento, Espinosa, Lasso, Oviedo, Fresneda, Castro and Angulo (2006), Misión Social and DANE (2002), Moreno (1997), Sarmiento and González (1998), Sarmiento and Ramírez (1997, 1998, 1998b), Sarmiento, Ramírez, Alonso and Acosta (1997), Sarmiento, Ramírez, Molina and Castaño (1996), Veeduría Distrital (2006).

choice aims at going beyond utilitarian monism.

The Quality of Life Index (QLI) has been regularly estimated in Medellín (“Medellín cómo vamos”, 2009). The *Secretaría de Bienestar Social*⁴ together with *Proantioquia*⁵ and *EAFIT*, have advanced towards the creation of a *living conditions* indicator that includes more dimensions.⁶ In 2009 the value of this new indicator came to 25.8 for the whole city; 7.8 for stratum 1, and 79.4 for stratum 6. The difference between *comunas*⁷ is quite notable: Poblado (74.7), Laureles (55.9), Popular (11.5), Santa Cruz (11.9), Manrique (13.6), Villa Hermosa (14.3), San Javier (14.4) (“Medellín Como vamos”, 2009). The most distressing datum in terms of *quality of life*, or *living conditions*, is the rise in the homicide rate in the city. For every 100 000 inhabitants, the rates have been: 57 (2004), 35 (2005), 36 (2006), 34 (2007), 45 (2008), 94.5 (2009) (“Medellín cómo vamos”, 2009).

This information on *living conditions* (or *quality of life*) is complementary to that of the indicators related with income. Notwithstanding the difficulties posed by income, it is inevitable to keep using it as a

proxy of well-being, or of happiness, as Bentham (1789, 1793) would say, as he assimilates *portions of wealth* to *portions of happiness*. The author accepts that wealth is not a synonym of happiness, but he cannot find a closer variable to happiness than that of income. At the time of decision making in the field of public policy, society still resorts to income, which is today a necessary point of reference. Wealth, says Bentham, is a condition that is *necessary though not sufficient in order to achieve happiness*. In the Socratic language, good living comes from the conjunction of *wealth and virtuosity*.⁸ In order to be happy, it is necessary to be wealthy. But wealth alone is not enough; it must be accompanied by virtuosity.

Nevertheless, all the problems that the measurements associated with income may have are very important in the design of public policy. A careful revision of the poverty, extreme poverty and distribution figures offers a very complete idea of the social processes developing within the cities and the country as a whole. Although no information is complete, the data offered by *MESEP* are helpful in order to understand crucial dynamics.

⁴ The Secretary of Social Well-being (TN)

⁵ *Fundación Privada para el Progreso de Antioquia* (Private Foundation for the Progress of Antioquia) (TN)

⁶ The difference between the Living Conditions Index (LCI) and the Quality of Life index (QLI) is not usually clarified, and it is frequent to see these two categories used indistinctly in studies, without determining the meaning of each. “Medellín cómo vamos” (2009), for instance, preferably refers to *quality of life*, rather than to *living conditions*.

⁷ The *comunas* (districts) are administrative subdivisions. The municipality of Medellín is divided into 16 *comunas*. The *barrios* (neighborhoods) make up the *comunas*. (TN)

⁸ “As for the wealthy, carrying heavily the burden of old age, this reasoning should fit them like a glove, since the wealthy man would not easily stand old age amidst poverty, nor would the non virtuous one, loaded with wealth, manage to find satisfaction in it.” (Platón, 1992:12)

In the pages to come, the measurements related with income are emphasized. These indicators allow for a reasonable perception of the dynamics of poverty and living conditions of the population.

Cities, Poverty and the Urban-Rural Breach

Table 1.1 Incidence of poverty by Poverty Line. Thirteen metropolitan areas, the remaining areas, total-country (2002-2005, 2008-2009)

MUNICIPALITY	2002	2003	2004	2005	2008	2009
Bucaramanga	39.9	39.3	36.7	39.2	24.7	18.5
Bogotá	35.7	35.5	32.5	31.2	22.5	22.0
Villavicencio	36.5	36.2	32.3	37.8	29.2	31.2
Ibagué	40.2	40.8	43.6	43.7	34.4	31.6
Cali	33.3	33.8	31.7	32.7	30.1	32.6
Cúcuta	45.8	48.7	47.4	49.0	32.2	33.6
Cartagena	43.2	35.4	34.2	31.5	35.8	36.0
Medellín	49.7	46.9	43.3	45.1	38.5	38.4
Pasto	42.3	42.9	41.5	43.7	35.8	39.8
Montería	47.1	49.9	48.7	47.8	41.7	40.6
Barranquilla	41.6	46.6	40.9	41.3	40.8	40.7
Pereira	44.1	42.1	39.7	42.1	40.3	42.8
Manizales	54.8	54.7	56.1	55.6	44.7	45.4
13 areas	40.3	40.0	37.2	37.4	30.7	30.6
Remaining cities	69.3	65.5	68.2	67.0	65.2	64.3
Colombia	53.7	51.2	51.0	50.3	46.0	45.5

* Cities have been organized in an increasing order, bearing as criterion the incidence of poverty in 2009.

Source: MESEP (2009, 2010).

Table 1.1 shows the incidence of poverty in thirteen cities, the remaining areas, and the national average. The series 2002-2009 is not complete because, as clarified by *MESEP* (2009), it was impossible to enable the convergence of the Continuous Household Survey⁹ and the Great Integrated Household Survey¹⁰ for the years 2006 and 2007.

⁹ In Spanish: *Encuesta Continua de Hogares* (ECH) (TN)

¹⁰ In Spanish: *Gran Encuesta Integrada De Hogares* (GEIH) (TN)

I will start the analysis of the table by the lower rows. The incidence of poverty in Colombia decreased from 53.7%, in 2002, to 45.5%, in 2009. Of course it is good that the percentage of the poor fell, but one should be cautious when interpreting this trend. First, because the fall has been relatively slow if compared to what has happened in the rest of Latin America (CEPAL,¹¹ 2009). In Colombia, the poverty reduction rhythm between 2002 and 2008 was weak (7.7 points), if it is kept in mind that the poverty reduction throughout the region was 11 points. It went from 44% to 33%. Second, because the growth rate of the GDP in 2007 was relatively high (7.5%), without it being reflected in a meaningful degree of poverty reduction. And third, because the absolute number of poor is still very high. In 2009, there were 19 886 006 poor people, and it is worrying that the figure has increased in relation with 2008, when the poor were 19 870 341. Whichever way you look at it, the figure is scandalous, and unacceptable in a liberal society. Given these conditions, it is irresponsible to think we are out of the woods yet. The three points mentioned indicate that there is a poverty trap in Colombia.

Table 1.1 also outlines the *agglomeration effect*, or the privileged

advantage that cities have in terms of the struggle against the poverty trap. Within the thirteen metropolitan areas, the incidence of poverty decreased from 40.3% in 2002, to 30.6% in 2009 (9.7 points less). Both the level and the rhythm of reduction are better than the results observed at a national level. The growing returns (Marshall, 1920) generated by the city, contribute to the struggle against poverty. The message given by the cities gives cause for a certain amount of optimism.¹²

It is worth noting the development of poverty in the countryside (the remaining areas). It went from 69.3% to 64.3% (a decrease of five points). The level of incidence is very high and, above all, the rhythm of reduction has been slower than the national average. This reflects in a deepening of the city/countryside breach. In 2002, the difference of the incidence of poverty between the national average and the remaining areas was 15.6 points (69.3 – 53.7 = 15.6). In 2009, the breach increased to 18.8 (64.3 – 45.5 = 18.8). The difference is more notorious when poverty in the rest of the country is compared to that in the thirteen cities. The difference in 2002 was 29 points (69.3 – 40.3 = 29), and in 2009 it was 33.7 points (64.3 – 30.6 = 33.7). This increase

¹¹ Comisión Económica para América Latina y el Caribe de Naciones Unidas (United Nations Economic Commission for Latin America and the Caribbean) (TN)

¹² The Human Development Report for Bogota considers the achievements in Bogota to be “A bet on Colombia” (IDHB, 2008). On Medellín, see Bernal and Álvarez (2005), Cardona and Cano (2005), Castaño (1986). Bogota, for instance, has a higher average income than that of the rest of the cities. The differentials are even kept according to the kind of occupation. In other words, the same job is better paid in Bogota than in the rest of the country.

in the difference between the city/countryside shows that *there is no convergence* in Colombia.

For Bonet and Meisel (2007:36) the divergence is not only evident between municipalities and the remaining areas; a progressive distancing is also observed between cities, and they verify that "...throughout the years, [Bogota] is moving further away from the national average". Decentralization is supposed to favor convergence. Facts prove that the contrary has occurred, and that is why it is necessary to take up structural transformations that should encourage regional integration.¹³ The integration between the city and the countryside could be achieved through the strengthening of endogenous processes associated with the *city region*. Agricultural and livestock development, says Krugman (1991), is at the service of cities. The countryside responds to the gravitational forces of big cities. From this point of view, a region should be thought of according to urban processes. The city is the integrating axis of the region. The big capitals of the country modify their regional environment and impose their conditions. Hence, it is important to search for ways to integrate the cities and their neighboring municipalities. Colombia has made the mistake of placing excessive trust in the potential of foreign

trade, leaving the consolidation of its internal market aside.

The growing breach between the city and the countryside is also the expression of the failure of the agricultural and livestock production model. Colombia renounced its food security and allowed huge land extensions to be destined exclusively to the raising of livestock. Land concentration increased and the Gini coefficient, for land ownership, is above 0.8 (Machado, 2003). From the viewpoint of public policy, central importance should be given to the solution of the problem of land. Different actions could be taken in this regard. The first is the rise of real property taxes. The second is the enforcement of land use legislation that should allow for the regulation of urban settlements and the improvement of the association between municipalities. The third is the improvement of agricultural productivity that aims at breaking three structural barriers (roads, credit and lands). The fourth is the consolidation of a domestic market, departing from urban demands. In order to correct the urban/rural difference, it is necessary to learn from cities. Regional development should lead to a decrease in the variances between cities, and between the city and the countryside.

Agglomeration furthers the struggle against poverty, but this

¹³ Galvis and Meisel (2007) propose the creation of a *regional compensation fund* that should help reduce the breach. Angulo and Espinoza (2002:1) reach the following conclusion: "... throughout the nineties, a process of regional divergence took place that coincides with the implementation of the economic opening and with a change in the composition of GDP that benefited the tertiary sector". The authors associate the lack of convergence with the way in which the model of development has led to a process of growth of the service sector in economic activity.

does not imply that the larger the city the lower the incidence of poverty. There is not a direct relation between the city size and the incidence of poverty. In spite of the contribution of agglomeration in the struggle against poverty, the impact is neither direct nor proportional. It is naïve to claim that the city intrinsically leads to an improvement in the levels of poverty.

In table 1.1 cities have been organized in terms of the incidence of poverty. In the first place is Bucaramanga, with the lowest percentage of poverty (18.5%). Bogotá comes second (22%). Medellín comes in at eighth place with an incidence of 38.4%. Manizales shows the worst situation (45.4%) but, even in this case, the percentage is below the one at the national level (45.5%). Both extremes (Bucaramanga and Manizales) show that the potential of cities in the struggle against poverty must be properly channeled. There is not a straight line between the growth of agglomeration and the decrease of poverty. The size of the city is not a direct expression of income. The “magic” of agglomeration, as Marshall would say, is expressed differently in each city.

The perspective of cities in relation with poverty is very heterogeneous. The variables explaining these differences are not clear; among other reasons, because the agglomeration effect is immersed in covariant phenomena, which do not depend solely on the local adminis-

tration.¹⁴ Although there is a limited margin for the local government to maneuver, it is broader than what public finance theory used to think. In specialized literature, authors such as Musgrave (1959) have been relatively pessimistic about the potential of local administrations. Musgrave used to warn that local government should play the role of assignation, but not the ones of stabilization and distribution. In reality, cities show it is likely to modify the living conditions of population in an important way, and that their roles go beyond those considered by Musgrave.

The importance agglomeration may have in the transformations of poverty should be more carefully studied. It is crucial to explore the transmission mechanisms ranging from the constitution of vicinities up until the improvement in the living conditions of the population. The Human Development Index for Bogotá (IDHB, 2008) proposes some: 1) Growing returns that should be reflected in a higher average income. Vicinities help to improve productivity. 2) Employment generation. Employment is the main instrument in the struggle against poverty. The appropriate management of urban space favors investment and private profitability. Besides, cities can directly stimulate employment by means of large-scale urban renovation and infrastructure projects. 3) Reduction of socio-economic segregation within

¹⁴ The authorities of Manizales argue that the situation of poverty is delicate because there are difficulties with coffee production and the revaluation of the Colombian peso.

urban space. Big cities in Colombia are very segregated. Land management and urbanism should be done in such a way that segregation decreases, and that the rich and the poor blend in space. 4) Alleviation in some of the household expenses, thanks to: gratuity programs (e.g. educational), improvement in food

distribution, fee reduction (transportation and public utilities), land pricing regulation, etc. Although cities cannot reduce the price of *all* the components in the consumption structure of families, they do have a great ability to have an incidence on the weight each good has in household expenses (2008).

Cities and Extreme Poverty

Table 1.2 Incidence of extreme poverty. Thirteen cities, the remaining cities, total-country (2002-2005, 2008-2009)

MUNICIPALITY	2002	2003	2004	2005	2008	2009
Bucaramanga	6.5	6.0	5.4	6.3	3.3	2.2
Bogotá	8.6	8.0	7.1	5.5	3.9	4.1
Villavicencio	7.6	7.4	5.3	7.5	6.0	6.5
Pasto	7.7	7.6	7.7	9.3	6.9	7.1
Ibagué	10.6	11.3	12.7	11.8	9.0	7.2
Cúcuta	11.0	12.9	12.6	11.2	6.7	7.7
Montería	12.8	13.9	11.3	12.0	8.8	8.3
Pereira	7.1	6.4	5.7	6.8	7.9	8.7
Cartagena	11.7	8.0	8.6	5.6	8.9	8.9
Cali	7.6	7.3	6.7	7.1	8.9	9.8
Barranquilla	10.0	12.0	9.4	9.2	10.5	9.9
Medellín	12.3	11.6	9.4	9.0	9.2	10.2
Manizales	12.1	12.8	14.2	13.3	12.7	11.7
13 areas	9.4	9.1	8.1	7.4	6.8	7.1
Remaining cities	32.5	27.0	28.9	27.4	32.6	32.6
Colombia	19.7	17.0	17.0	15.7	17.8	16.4

* Cities have been organized in an increasing order, bearing as criterion the incidence of extreme poverty in 2009.

Source: MESEP (2009, 2010).

The situation of extreme poverty can be observed in table 1.2. Several facts call our attention. Throughout the period, the percentage of homeless people (or in extreme poverty conditions) decreased in the national

total, in the thirteen areas and in the remaining cities. At the national level, it went from 19.7% to 16.4%. In thirteen areas it decreased from 9.4% to 7.1% and in the remaining cities from 32.5% to 29.1%. These trends are positive but, as is usually the case with the analysis of poverty dynamics, optimism should be moderate. The table also shows the distance between the countryside and the city. It is worrying that this breach is so broad.

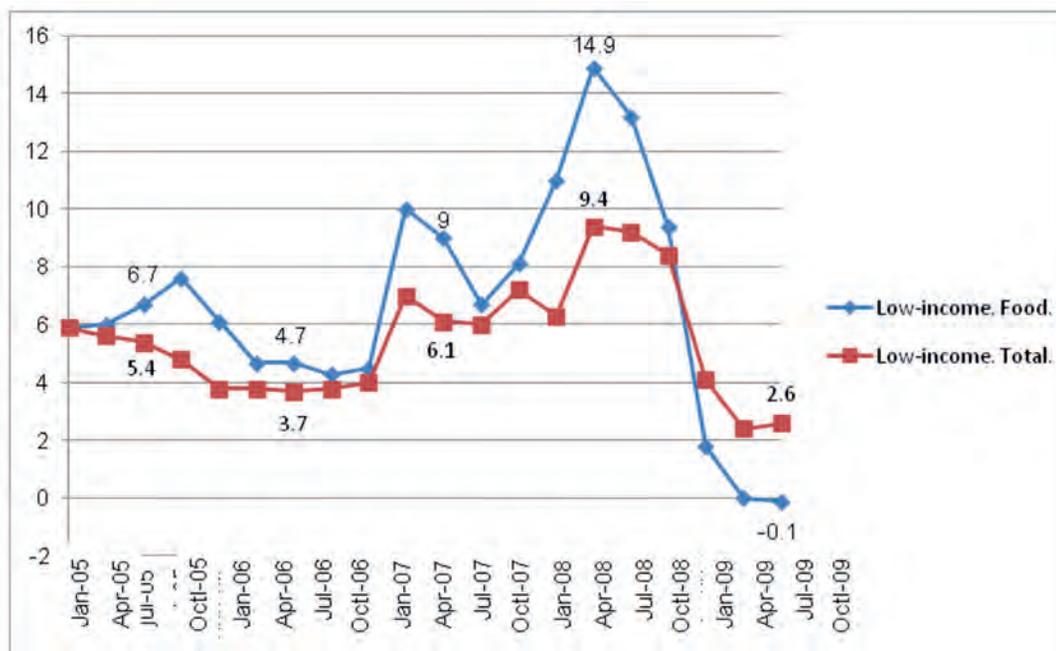
Medellin and Manizales have the highest levels of extreme poverty. In Medellin, the percentage is 10.2%, and in Manizales, 11.7%. In Medellin, as in the thirteen areas taken as a whole, extreme poverty increased between 2008 and 2009. It went from 9.2% to 10.2%.

It is unacceptable that extreme poverty has grown in the thirteen areas between 2008 and 2009. It

went from 6.8% to 7.1%, so that the people in conditions of extreme poverty increased from 1 326 102 to 1 394 776. The rise in extreme poverty in 2009 could be related to displacement. The amount of displaced people has grown in a very meaningful way. In the country as a whole extreme poverty decreased in 500 000 people; it went from 7 693 238 to 7 159 172.

The growth of extreme poverty in cities must be examined carefully, because this trend does not fit the expectations, given the drop in food prices between 2008 and 2009 (figure 1.1). The value of the extreme poverty line decreases with that of food, so the reduction in food prices is a covariant factor that should be expressed in lower extreme poverty. In reality, the opposite is what has occurred. This means that the income loss of the

Figure 1.1
Evolution of food inflation in the low-income group
Source: MESEP(2010).



poorest could not be compensated for by the reduction in value of the market basket. The percentage of extreme poverty would have been a lot higher had prices not fallen. The higher unemployment rate (in the last months it has been above 12%) is expressed in a lower income. The impact of unemployment is higher on the most vulnerable people, and this reflects in a higher level of extreme poverty.

The news of the rise of extreme poverty in cities should be cause for alarm. First, because it is an expression of a kind of development that does not result in better living conditions for the population. And second, because agglomerations count on the necessary instruments to avoid this phenomenon from occurring.

Employment

Table 1.3 Main variables of the labor market. Comparison of the thirteen metropolitan areas group with the Metropolitan Area of Medellín

VARIABLES		2002	2003	2004	2005	2006	2007	2008	2009
THIRTEEN METROPOLITAN AREAS	GPR	64.8	65.0	63.6	63.3	62.0	61.8	62.6	64.6
	ER	53.4	54.2	53.8	54.5	54.0	54.8	55.3	56.2
	UR	17.6	16.6	15.3	13.9	12.9	11.4	11.5	13.0
	Population	17 806	18 082	18 356	18 628	18 895	19 162	19 428	19 694
	Unemployed	1579	1520	1398	1290	1196	1069	1119	1323
MEDELLÍN - ABURRÁ VALLEY	GPR	61.9	62.6	61.8	59.6	57.8	59.4	60.8	63.6
	ER	51.4	52.8	52.4	51.4	50.0	52.3	52.5	53.7
	UR	17.0	15.7	15.1	13.8	13.4	12.1	13.6	15.7
	Population	2970	3024	3076	3126	3173	3221	3269	3316
	Unemployed	252	240	233	209	202	190	223	274

GRP is the Global Participation Rate of (%), ER is the Employment Rate (%), UR is the Unemployment Rate (%), Population is the total population (in thousands of people), Unemployed is the number of unemployed people (in thousands of people).

Source: DANE,¹⁵ DNP,¹⁶ series joined by MESEP.

¹⁵ Departamento Administrativo Nacional de Estadística (National Administrative Department of Statistics of Colombia) (TN)

¹⁶ Departamento Nacional de Planeación (National Planning Department) (TN)

The struggle against poverty succeeds if employment rises and income increases. The table 1.3 synthesizes the principal indicators of the labor market. Let us compare the situation within the Metropolitan Area of Medellín with those of the thirteen metropolitan areas. I will start with the unemployment rate: between 2006 and 2009, the unemployment rate in Medellín has been higher. In 2009, unemployment reached 15.7%. The number of unemployed people peaked at a record figure (274 000 people). It is only logical that the percentage of poor people increase with unemployment. It is worrying that the Global Participation Rate (GPR) has increased from 57.8% in 2006 to 63.6% in 2009. GPR is equal to the relation between the Economically Active Population (EAP) and the Working-Age Population (WAP), so $GPR = EAP/WAP$. During times of crises EAP usually rises because the need to improve income forces a lot of people who were not economically active (e.g. students) to join the labor market. It is not convenient for young people to quit high school when their family income drops.

Employment generation has to be the result of articulated policies between the local and national governments. The national government has emphasized programs such as “*Familias en Acción*”,¹⁷ leaving behind aggressive employment generation dynamics inspired by Keynesian

logics (infrastructure, public works, urban renewal, etc.). “*Familias en Acción*” is a modern version of the “English Poor Laws”. At the beginning of the 20th century, Marshall, Keynes and Hicks were always critical of the “Poor Laws”, which worried more about the distribution of alms than about creating stable jobs and improving income. From a Keynesian perspective, cities like Medellín should encourage big projects of infrastructure, urban renewal, consolidation of the city region, etc., which generate employment of a structural nature. Cities play a crucial role because land management and the good design of urbanistic actions should be the fundamental support of endogenous development.

Income Distribution

MESEP also presented the convergence of the series of income distribution (figure 1.2). The figure shows the evolution this distribution has had. It is important to remark that the concentration of the Gini Coefficient refers only to income deriving from the labor market. Household surveys say very little about wealth distribution. Gini coefficients are much higher when looked at from the perspective of assets.

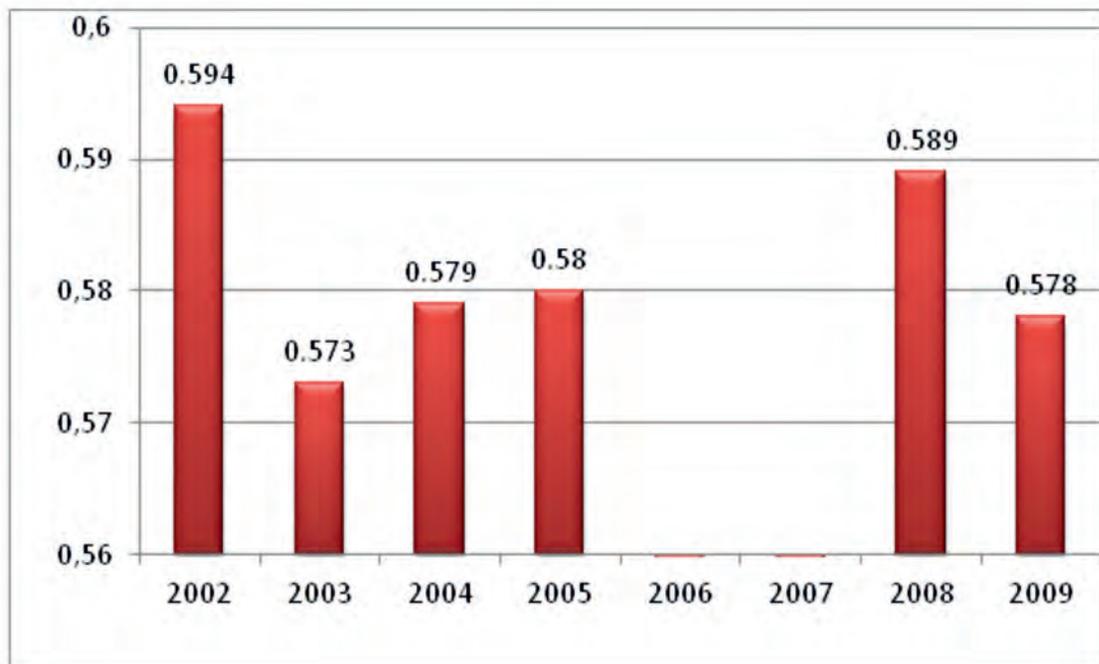
The trend in the figure shows that income distribution has not changed significantly. Neither the national government nor the cities

¹⁷ Families in action. (TN)

have achieved major transformations. In other words, measures have not been taken in the country to help reduce income concentration. Colombian society is not very hostile to inequity. It does not care about the bad distribution of income.¹⁸ The facts prove that growth has not been enough to struggle against poverty. The clearest situation occurred in 2007, when the increase of GDP was 7.5% without any significant changes in the poverty levels. The issue of distribution is relevant because the poverty trap can only be overcome if growth is accompanied by better income and wealth distribution. Growth is pro-poor only if there is an advance in a distributive agenda.¹⁹

Policies favorable to income and opportunity distribution have not been implemented either in Colombia, or in the cities, or, particularly, in Medellín. Initial data on LCI and QLI evidence the breaches between *comunas* in Medellín. The differences are notorious. Such an unequal society as Colombia's cannot overcome the poverty trap.

Figure 1.2
National Gini
Coefficient Index
(2002-2005,
2008-2009)
Source: MESEP
(2009, 2010).



¹⁸ Wealth and income concentration is against classic liberalism. Mill (1848), for instance, considered that better distribution stimulates the construction of a more inclusive society.

¹⁹ See, for instance, Kakwani, Khander and Son (2004), Sarmiento, González, Alonso, Angulo and Espinosa (2005), Ravallion (2004).

Colombian development has been based on mining and finance. Apart from being unsustainable, this process has concentrated wealth. Industrial dynamics have not been a priority for the government. It seems as if Kaldor's (1957) main statement "Development is sustainable if and only if it is based on industrial activity" had not been accepted. Moncayo (2007) examines the observance of Kaldor's laws²⁰ and reaches this conclusion: "... Colombian economy has experienced, as of the 1970s, a process of deindustrialization that has affected its global growth rates".²¹

Conclusion: Industrial Development, Internal Market and Distribution

The perspective presented by MESEP is an invitation to rethink the kind of development desired. In the Colombian case, the foundational principles of sustainable development should be three: industry, internal market, and income and wealth distribution.

The participation of the industry in GDP does not increase (between 2000 and 2007, it has been around 16%, without any relevant changes occurring), and growth in 2007 had a lot to do with the mining sector (especially coal and oil)

and financial speculation. Now, the beginning of the gold mining boom has been announced. An extractive economy is not sustainable. It is essential to think of alternatives that will allow the abundance of resources generated by these booms to be turned into sustainable development. Again, as occurred in the 1990s, it is being proposed that the mining surplus be taken abroad in order to avoid an even bigger revaluation of the peso. This kind of solution is inadequate since it does not allow the mining surplus to be used in sustainable processes that generate added value.

The internal market should be consolidated. The first condition is Colombian integration. The expansion of means of communication (river, train and divided dual highways) must be a priority. It is also important to stimulate the production of food and basic consumption products. Stimulating city regions is a central element to this strategy. Cities like Bogotá, Medellín, Cali and Barranquilla must strengthen the endogenous dynamics within the region-region.

Finally, distribution is a crucial condition for growth to be pro-poor. Distributive measures must exploit the potential of land taxing (urban and rural).

²⁰ Kaldor's first law establishes a positive relation between the growth of industrial productivity and the increase of GDP. His second law, which is also known as Verdoorn's law, emphasizes the relation between the growth of industrial productivity and the growth of the industrial sector. The third one considers that the general productivity is positively related to the growth of the manufacturing sector.

²¹ The trends per region have been different. Moncayo finds Bogotá and Antioquia to clearly follow the national trend towards deindustrialization. But in Valle, Cundinamarca, Santander, Bolívar and Cauca manufacturing activity showed an "ascending trajectory".

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THE PROCESS OF LOCAL STATENESS CONSTRUCTION (1998-2009): THE KEY TO UNDERSTANDING CHANGE IN MEDELLÍN?¹

Santiago Leyva Botero²

This chapter focuses on the *state*³ as an explanatory concept of the transformation of Medellín during the last decade. The *state* is a concept that Colombian political science has somehow overlooked, since in the last twenty years political science has focused on studying topics such as the conflict, the crisis of the political parties, decentralization and social movements. In the theorization of social change, the *state* appears only

occasionally and, when it does, it is in terms of its weaknesses vis-à-vis other actors (armed or not), or against political clientelism or the markets themselves. The purpose of the following pages is to rescue the study of the concept of the *state* as one of the elements necessary for examining the transformation of Colombia, and more specifically, the transformation of Medellín.

This text aims to explore, in the case of Medellín, three major

¹ The article was prepared with the collaboration of Carlos Fernando Timaná and Juliana Tabares in the recollection of data and the initial analysis of the development plans.

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³ We will not capitalize the word “state” in this article on purpose, since we do not want to transmit the idea of the state as something coherent and organized. “Stateness”, on the contrary, is a fragmented assortment, a mixture of institutions of very different origins which, as a group, are perceived as the “State”. The use of lower case refers precisely to this fragmented institutional assemblage, and not to the perception of unity.

topics that refer to the state. *First*, it studies the way in which the institutional capabilities of the local state have been changing through the development of specific programs and instruments, in charge of public bureaucracies and social actors that work in cooperation with the state. In particular, the chapter will show not only how the spending power of the Mayor's Office has increased (tenfold since 1990, and threefold since 2000), but also how this has permitted the advance towards a higher scale of interventions and instruments, entirely different from the ones of previous decades.

Second, it examines whether those capabilities, which are clearly distinctive of the municipal administration, have gained more importance within the institutional context. This implies the need to explore the central role of this institutional assemblage in a broader context of regulatory structures, which can include forces like informality, self-organized social actors and the market. This will show that between 1990 and 1998, the intervention capabilities were not built by the bureaucracy of the Mayor's Office, but by external agencies or social actors. Therefore, the period examined in this article (1999-2009) shows a break with the previous trend, because the Mayor's

Office and the development plan acquired a more central role.

Third, we examine how the powers and capabilities that the Mayor's Office has been developing are not attributes completely isolated from society or from other forms of state (such as the institutions of the nation and the department). In this sense, these bureaucracies and capabilities of the Mayor's Office cannot exert power without the social forces that define, organize, negotiate, execute and manage these instruments. With this we are saying that the process that gives a more central role to the Mayor's Office has two important moments, which help to visualize in a historical perspective the process of the construction of *stateness* in Medellín, and to illustrate the importance of this concept in the transformation of the city.

The state as a conceptual variable

In order to explore the *three points* mentioned above, this essay will review the concept of *stateness*⁴ (which is different from *statehood*, since *stateness* refers to the central role of the state in society, while *statehood* is just the quality of being a state).⁵ The interest in the concept of *stateness* comes from

⁴ In Spanish: "estatalidad" (TN)

⁵ The author explains that the translation of "stateness" as "estatalidad" is problematic, since this word can also correspond to the translation of "statehood", which is a different concept. (TN)

the interest of Nettl (1968) to understand the role of *stateness* within a broader group of regulatory structures analyzed in political and sociological sciences, and therefore giving importance to the study of the state as an independent conceptual variable.

In general, the concept of *stateness* seeks to examine the institutionalization of the state or, as Pfister points out, to make explicit “the procedural character of what seems to be a stable social phenomenon” (2004: 22). In this way, the concept of *stateness* demands for the historization of the state and the study of the significant variations of its institutional forms throughout time and space (Jessop, 2001: 13), transcending the legal conception which presents the state as a stable entity, always present (the *State*), and placing an emphasis on its institutional forms: “emerging, partial, unstable and variable [...]” (Jessop, 2001: 15), which develop in conjunction with society.

This initial interest of this literature is related to the process of institutionalization of the state as a preponderant form of social relation, or as Evans points out (1995:62), “the central role of the state” within a broader group of actors. It is important to highlight that this central role is not created exclusively from the legal framework, but also from the historical process of formation of: specialized skills, specific know-how, and administrative bodies for the implementation, which is

what really permits the state “to penetrate, control, monitor, and discipline modern societies through their specialized skills” (Jessop, 2001: 5). Therefore, in different societies the state may have a more or less central role, which will develop with the consolidation of a group of “government practices that can really be perceived as the state” (Pfister, 2004: 22), and with the imposition of its forces over other regulatory instruments or powers.

In this way, the role of the state in society is a historical process that varies greatly between different societies (Jessop, 1990, Dean, 1994), and even between cities of the same country under the same regulations. Therefore, it is necessary to examine the institutionalized processes that turn into specific skills, and to what extent they become entrenched in the institutions of the state. This shows that in the process of building *stateness* there is a very fine line between the state and society, and this is important to understand because this is what builds the process of “spatial and temporal organization, functional specificity, monitoring and surveillance, creating the appearance of a world divided between state and society” (Mitchell, 1991:95).

It is also possible that in this process, part of the capabilities developed by the government end up in the hands of society (governance), which implies that the possibilities of regulating social processes increase, but does not

necessarily mean that a more central statehood is being built.⁶ Therefore, it is necessary to distinguish the central role of the state in local transformation processes, from that of other forms of social agency, and to accept that “there are clear and transparent boundaries between the state apparatuses and the society” (Jessop 2001: 6).

Now, although it is true that the recent historical exploration of *stateness* as a variable that explains (in part) the transformation of Medellín can be an important analytical option, this should not imply the assumption that the state is the only variable in the process or a completely autonomous force in society, as the neo-statists believed (Evans et al., 1985). It is true indeed that as the state gains *stateness* it can also gain “the necessary autonomy and capacity to act” and to achieve its objectives (Garcia, 2009:24), i.e., that it gradually gains some strength to undertake its own projects (Nettl, 1968; Poulantzas, 1969, Skocpol, 1978). This implies that the state is becoming more central in the process of social regulation, and therefore that it is becoming more noticeable (Pfister, 2004:23), but not, as the authors of the Neo-statism believe (cf., Evans, Rueschemeyer and Skocpol, 1985), that it can be studied as an independent variable, separate from society. Along these lines, it is important not to assume that “[...]

there are clear and unambiguous boundaries between the state apparatuses and society, between the administrators of the state and the social forces, or between the power of the state and the social power” (Jessop, 2001: 6).

This essay intends to avoid an instrumental and simplistic concept of *stateness*, reduced to the legal competences and capability of the public bureaucracies; since this concept fails when trying to understand the relationships of the state with the political and social system, which ends up building and mobilizing its forces. In the first place, this implies understanding that, even if the state has a more central institutional role, a good part of its capabilities depend on the knowledge, experiences, programs and capabilities of the other actors on the side of the society. Therefore, the effective use of the capabilities of the state, even when they “are indeed perceived as the state” (Pfister, 2004: 22), and do not have to be negotiated with other actors, rely, to a great extent, on the sociopolitical actors involved at some point in their conception, coordination, consultation, definition, management or control. Thus the process of building state autonomy, which involves the construction of a higher level of *stateness*, is always dependent on the links with society, especially in processes that start from

⁶ This can occur either because the skills to be developed are not part of the functions or competences of the municipal governments, or because the society develops a political agenda that fails to be included in the priorities of building local *stateness*.

weak state bureaucracies or from accompaniments of actors that were not part of the process of building *stateness*. This is therefore the basic condition for the possibility of having a process of *relational autonomy*, in which the importance of the role of the state depends on the cooperation of a wide range of social actors that allow for the use of their capabilities through processes of cooperation and self-organization.

In the second place, this suggests that the capabilities of the state are organized as “a group of institutions that cannot, via its own structural assemblage, exert power” (Jessop, 1990: 116). Thus the state is not a “coherent or unitary actor that can be easily distinguishable from the civil society, but a decentralized and fragmented mixture made up of multiple layers of social structures deeply embedded in power relations” (Hunt, 2006 90). New capabilities of the government and a more central institutional role also mean that these powers will always be “conditioned by or in relation with” the social forces that mobilize them (Migdal, 2001, Mitchell, 1991). In this way, the construction of stronger fiscal and administrative capabilities allows the local state to provide leverage to enable government processes under different conceptions of social participation. A larger process of bureaucratization and a more central role of the state open the possibility for different modes of institutionalization in terms of their forms and meanings (Laclau

and Mouffe, 2001: 162) under broader processes of democratic participation or under more authoritarian processes. In this sense, the construction of *stateness* does not define a political trend in itself, but rather opens a new field for the configuration of political struggles through the control of the capabilities of the state.

The background (1992-1998): building *stateness* from the outside

In spite of the fact that the process of popular election of mayors commenced in 1988, one can say that, at first, the “democratic transition” did not generate a process of building local *stateness*. Although this text does not present a detailed analysis of the advances during the administrations of Juan Gomez Martinez and Omar Flórez Vélez, we can examine three major limitations that slowed down the development of *stateness*. First, by that time Medellín was going through its own “debt crisis”, which left the city with a very limited investment budget (20% of its budget between 1985 and 1990), and concentrated most of the budget expenditure on paying debt obligations (65% of the budget in 1988 and 44% in 1990) (Alcaldía de Medellín, 1990: 48). Second, the budget of the Mayor’s Office was very small in comparison to the size of the economy and the population of the city. In general, the Colombian state in 1990 only had a spending power of 8.7% of

the GDP, compared with 20.2% of Latin America (CEPAL, 2007:48). This situation was aggravated in the local sphere by the low levels of transfers and tax collection. Third, it is important to point out that until 1992 governments were completely focused on road investment, devoting most of their funds to the Public Works Department.⁷ Therefore, the real capabilities of governing the population and the territory were scarce; for example, only three thousand houses were built between 1956 and 1987 to tackle the enormous housing deficit of a population that went from 773 000 people in 1964 to 1 700 000 in 1992 (PRIMED, 1993). In turn, the lack of importance of the state was also reflected in the almost invisible efforts of the recently created Department of Communitarian Development,⁸ which was facing huge social problems with low-scale actions such as the creation of the contest of “Christmas cribs” for each Community Action Council,⁹ the “peasants’ markets”, the campaign “Write the story of your neighborhood” and the consultancies for the Community Action Councils (Alcaldía de Medellín, 1990: 4)

Together with this scenario, one of the fundamental features of Medellín up to the 1990s was the low institutional importance of the state, a reason why many of its

social and economic processes were looking for other mechanisms of regulation and conflict resolution. This implied that the process of building local *stateness* could not emerge only by way of the administrative and political reform of the state proposed by the decentralization measures and the political opening of the Political Constitution of 1991. By that time, Colombia had a small and relatively incapable state both at the local and national levels, and therefore, it was necessary to commence in Medellín a process of strengthening of *stateness* which, according to Fukuyama (2005), could be called a “borrowed” *stateness*. In this kind of process, as the same author points out, “*stateness* must be requested, borrowed, or stolen from other sources, from the multilateral agencies like the United Nations or the World Bank, in places like East Timor or Sierra Leone, up until the European powers managing the Office of the High Representative in Bosnia, or the U.S. occupying power in Iraq” (2005: 84).

These characteristics of the process of the formation of the local state generated a stage (1990-1999) of the formation of *stateness* for the city of Medellín. The need of expanding the capabilities to govern was clearly identified at this stage, but there was no clarity over the appropriate structures requi-

⁷ In Spanish: *Secretaría de Obras Públicas* (TN)

⁸ In Spanish: *Secretaría de Desarrollo Comunitario* (TN)

⁹ In Spanish: *Juntas de Acción Comunal* (TN)

red to organize those capabilities. It was somehow just a period of readjustment and reflection upon the new functions that were required, with a series of attempts to establish them in different manners. This is precisely the process that starts in the city with the creation of the Presidential Advisory Council for Medellín and the Metropolitan Area¹⁰ that operated from 1990 to 1995. This organization initiated a very broad process of expanding the capabilities to govern, which is what Miller and Rose (1992) call “governance problems”, including new “political rationalities” and new “technologies of government” to tackle specific problems. Two good examples of this were the *Corporación Paisa Joven*,¹¹ which sought to develop a youth policy with the support of the *GTZ*,¹² and the *PRIMED*,¹³ which sought to develop a policy of integral improvement of the neighborhoods, with the support of the United Nations Development Program, and the German government, through the *Kreditanstalt für Wiederaufbau* Bank.

To illustrate this point, using one of many possible examples, one can see how, in view of the previous

lack of capability of the bureaucratic apparatuses of the Mayor’s Office to meet the needs of the young population, the Presidential Advisory Council (1990-1995) recommended the creation of “*Paisa Joven*” in 1994, a mixed economy organization between the state and civil society. It is the response to a call of the *GTZ* (German Company for International Cooperation), which needed advice in setting up a program for at-risk youth. This project acknowledged that many of the necessary elements in place to take actions on this matter existed in civil society organizations, and not in the local state. For this reason, its legal nature was mixed, and its own board of directors was composed of “representatives of the Mayor’s Office, the Social Welfare Department of the Municipality of Medellín,¹⁴ the Municipal Council,¹⁵ the Church, NGOs, community-based organizations, universities and training centers, the Municipal Youth Council¹⁶ and several business associations” (*Corporación Paisa Joven*, 1998:224). In this way, the creation of new public policies on youth did not necessarily imply a more central role of the local state institutions, since they came

¹⁰ In Spanish: *Consejería Presidencial para Medellín y el Área Metropolitana*. (TN)

¹¹ (Young “*Paisa*” Corporation). See the glossary for an explanation of the word “*Paisa*”. (TN)

¹² *Deutsche Gesellschaft für Internationale Zusammenarbeit* (German Company for International Cooperation) (TN)

¹³ *Programa Integral de Mejoramiento de Barrios Subnormales* (Program for the Integral Improvement of Subnormal Neighborhoods). (TN)

¹⁴ In Spanish: *Secretaría de Bienestar Social de la Alcaldía de Medellín* (TN)

¹⁵ In Spanish: *Concejo Municipal* (TN)

¹⁶ In Spanish: *Consejo Municipal de Juventud* (TN)

more from a framework of inter-institutional cooperation and public-private alliances, in which the local state was just one more actor, with not much more weight than the Advisory Council or the international cooperation agencies such as the *GTZ*.

Something similar happened with the Economic Advisory Council for Medellín¹⁷ (1995-1999), a project that continued the path of building new capabilities initiated by the previous Advisory Council (Alcaldía de Medellín, 1998). This new Advisory Council continued with the formulation of new programs and projects, also under “the agreement of will that (brought together) the efforts of the municipality, the Municipal Council, the private sector, universities, NGOs, and other organizations of civil society” (El Colombiano: 1995: 4D).

These experiences show once more that the efforts to create *stateness* during the 1990s were the product of teamwork in which a clear-cut dividing line between the state and society could not be drawn. In other words, the new practices that were designed to penetrate, control, supervise, monitor and discipline society came from a very fuzzy border of joint decisions, which had to work “encouraging and strengthening public-private alliances, and from a public inter-institutional administration” (Alcaldía de Medellín, 1998: 18). In fact,

the roles of the Mayor’s Office and of the mayor only appeared in the plan as one among many others, and they did so in a condition of subordination.

This shows that the development of capabilities for social control took place in the 1990s through profound processes of participation and the permanent support of international actors, one reason why it is hard to establish clear distinctions between the state and civil society. Therefore, we can say that it was a process of building socio-political capabilities to govern in the broadest sense, or what Kooiman (1993) calls *governance*, instead of a creation of *stateness*. On this premise, the common factor of this decade was precisely the strong influence of international actors and civil society in the process of hybrid and transitional construction between the local and the external, and between society and the state. The development of capabilities through *governance* at that time encouraged the incorporation of new issues and instruments to the agenda and to intervention processes, but at the same time, it created a very confusing distribution of responsibilities between the local state and sociopolitical actors. In both cases, the mayor appeared only as a figure among many others, and the Development Plan (Law 152 of 1994) was just beginning to be designed as a modest mechanism to try to reach consensus, so it was

¹⁷ In Spanish: *Consejería Económica para Medellín* (TN)

necessary to formulate other kind of plans and visions to coordinate actors at a horizontal level.

The need of expanding the capabilities to govern was clearly identified at this stage, but there was still no clarity over the appropriate institutional structures to build those functions. This meant that without a clear institutional framework, in accordance with the organizational structure of the state, the processes of the 1990s would be erratic and prone to failure. For example, the second Advisory Council (1995-1999), during the mayoral periods of Naranjo and Gómez, was closed in the second year of the administration of Gómez (1999) due to the lack of support of the mayor, leaving it out of the “local political coalition” (Pineda, 1999: 10). It was evident that governance agreements were the result of political pacts and not of horizontal agreements or hybrid pacts between society and the state. As Hincapié and Mesa point out in their evaluation of decentralization in Medellín, the real construction of the city governance was taking place far from citizenry agreements; they were instead, the result of “the implementation of agreements involving the allocation of positions in important public offices of the bureaucracy, the use of the resources of contracts (including public payroll frauds) and the distribution of money from the budget to pay for political favors” (Hincapié and Mesa, 2001: 28).

In this way, while in the hybrid logic of state-society the idea was

to build a structure of governance based on the new capabilities of the state in their broader terms, in the reality there was a bureaucratic structure tied to political relations, frustrating the consolidation of these new alliances and capabilities in the internal structure of the state, precisely because it required a different form of government. Consequently, the process of this decade left important progress in terms of the definition of problems and the design of instruments for intervention, but there remained a great deal of frustration in terms of the definition of a governance framework which would allow for a real implementation of the agreements and proposals. It was clear that the clashes between the advisory councils, the public-private programs and the local and external social actors implied that there was still no clear form of government. By that time, the municipal development plan had not yet been put forward as the core of the sociopolitical intervention in the city, and the mayor appeared only as one more figure of the predicament, among many others.

The first stage: forced autonomy

This stage was based on the adaptation of the strategic context for the local state bureaucratic structures and their political relations. Therefore, one can say that it is only from 1998 onwards that the new centrality of the development plans and the higher investment

capability of the Mayor's Office began to have an impact which led to it demanding a more autonomous and central role as a major actor in the government of the city and as a body with autonomous capabilities vis-à-vis society. This produced what we could call the process of building *autonomy* of the Mayor's Office with respect to society, and of the other forms of state, including the national and international organizations that belonged to the United Nations (UN), as well as the cooperation agencies of Germany and the United States and the Inter-American Development Bank (IDB), which provided their own institutional capabilities to form a local *stateness* that was built, in part, with that support. Thus, we will suggest that the process that gave a more central role to the Mayor's Office went through two important moments or stages. First, a very problematic attempt to create a process of *forced autonomy* (1999-2003) with respect to the relationships of subordination that existed in the 1990s. This sought to consolidate both the mayor (with a strong presidentialist nature) as the key figure in the decisions of the city, and the development plan as the guideline to orient public capabilities. And then a second stage (2004-2010), in which it is finally understood that many of the public capacities emanated not only from the Mayor's Office but were shared, both in terms of their definition and implementation, with the social actors, and as a consequence, that a more central local government

should also consult and co-manage many of its interventions with the national and international social actors, initiating in this way a process of *relational autonomy*.

In this way, the process of building autonomy commences, as was already mentioned, with a stage of *forced autonomy*; a process that, although having the merit of visualizing (and relocating) the dividing lines, conceived the Mayor's Office as a clearly distinguishable actor, independent of civil society and the other forms of *stateness*. However, it failed to understand that the powers of the state (and especially with their creation process in Medellín) will always be "conditioned with or related to" the social forces that mobilize them (Migdal, 2001; Mitchell, 1991), so much so when the process of creating these capabilities had taken place in such a close relationship with civil society and international actors. In consequence, when the capabilities of the state were separated from the "structural bonds" that tied them to the organizations that had developed them, the state was left without the tools to mobilize these capabilities, and this seriously affected its technical potential.

With this separation, the Mayor's Office was left isolated from the actors that had designed and built intervention capabilities around the two advisory councils, and very promptly suspended the employment, education, housing, entrepreneurship and security programs (Veeduría al Plan de

Desarrollo de Medellín, 2001). This generated the collapse of the government of the city, visible, for example, in the construction of only “697 houses out of 3 500 that were envisaged in the plan” between 1998 and 2001 (2004: 20). Therefore, without the support of the organized social actors, and with a *borrowed stateness*, the second administration of Gómez (1998-2000) had to reassume the state-building process on the basis of those capabilities that had become entrenched in their internal bureaucracies, and which existed outside the strategic-relational environment built with the social actors (governance) and a *borrowed stateness*.¹⁸ This paradox had ten years of progress in building public capacity, and a Mayor’s Office which had transformed itself minimally in terms of its bureaucratic structures, precisely because the entire construction process had brought about a form of stateness that was borrowed. There was a paradox in the progress of ten years in terms of building public capabilities, with a Mayor’s Office that did not sufficiently transform its own bureaucratic structures, precisely because the entire construction process had taken place out of its sphere.

Consequently, when Pérez (2001-2003) took office, he received

a group of public apparatuses that were disconnected from the capabilities built in the city during the first stage. Deepening this division, Pérez continued with the idea of positioning the Mayor’s Office as the central actor in the processes of social and economic regulation. Therefore, the Municipality of Pérez strengthened the process of “building state autonomy” with the closure of programs such as the participatory budget, “Peace and Coexistence Counseling”,¹⁹ and “Citizen Coexistence with the Inter-American Development Bank”.²⁰ The closure of the participatory budget program (Bernal, 2004), which had been working since the issuance of the Agreement No. 43 of 1997, led to the “gradual loss of support and validity” (Velazquez and Gonzalez, 2003: 318) of both the zonal plans and neighborhood participation. Similarly, the closure of the program of “Peace and Coexistence Counseling”, a decision that left the city “without policies on this matter” and was considered controversial (Vélez, 2001), was critical; as was the crisis of the program “Citizen Coexistence with the IDB”, which was being implemented with a loan of fifteen million dollars from the IDB. Nonetheless, Pérez’s administration argued that the social investment

¹⁸ These bureaucracies had grown especially with the implementation of health services with the creation of the Department of Health and the *Sisbén* (since 1995), and by the end of 1990 they already represented 40% of the social investment budget.

¹⁹ In Spanish: *Asesoría de Paz y Convivencia* (TN)

²⁰ In Spanish: *Convivencia Ciudadana con el BID* (TN)

itself was its policy of security (Vélez, 2001).

In this way, the Mayor's Office was locked up in its own internal administrative reform and in the implementation of a relatively unilateral group of projects in order to stand as a leading and autonomous actor in the regulatory processes. This position was partially facilitated by the way in which the investment capability of the municipality started to improve ever since 1995, coming to 50% of the budget in 1997, doubling it in 2002, and tripling it in 2003, getting close to 80% of the budget of that year. This transformation was due, in part, to the impact of Law 617 of 2000, but it was also activated by the increase in the contribution of national transfers and the redistribution of the benefits of *EPM*.²¹ Therefore, although in constant terms the revenues of Perez's administration were almost equal to those of Gómez's, the former had a much higher percentage of unrestricted funds, given the comprehensive administrative reform of the Mayor's Office, with the pressure of Law 617.

To reinforce this process of building autonomy of the Mayor's Office, Perez presented himself as the head of the actor that had more resources, and as president of the largest economic group of the city. This was legitimized in his administration with the discourse of the mayor as "entrepreneur" in

economic and social terms. As it was pointed out by Perez himself at the end of his administration: "We have a city with a business group ... one of the largest economic groups of the country ... and therefore, I assumed the responsibility of changing *EPM*, something which no other mayor has done" (Pérez, 2003:102). This unilateral vision of the municipality was clearly reflected in the development plan of his administration: "Competitive Medellín: towards a revolution in civic culture", which stated that the municipality should solve the problems of the city "with the investment of public resources" and the direct development of "strategic projects that create employment for the city and recover its business leadership" (Alcaldía Medellín, 2001: 8). This situation differed completely from the secondary role that the Mayor's Office had had in the discourse of the advisory councils during the 1990s, transforming the strategic-relational context of the city, since it positioned the Mayor as the leading actor of the political game and placed the municipality as the dominant institutional assemblage, establishing a new political economy of the local power.

Consequently, this process of building autonomy of the state took place during the first stage in a way that left the local state: 1) without mechanisms (other than political clientelistic arrangements) to build governance with the Community

²¹ *Empresas Públicas de Medellín* (Medellin's Public Utilities Enterprises) (TN)

Action Councils, the social actors, and the society as a whole. 2) without the capability to monitor the environment of the city and interact with its organized actors based on appropriate levels of reflexivity and governance. These problems were aggravated by the crisis of the political party system (Pizarro, 2002), which had left the Liberal Party divided into fragmented groups, organized under very personal arrangements, almost as small political factions, unable to establish broad consensuses. Thus, this period was characterized by serious coordination problems (limited rationality and opportunism) and by the limitations that these problems imposed on the capabilities of the state, creating the typical problems of the bureaucracies that act in isolation from society (Coulson, 1997, Jessop, 2004), based on very narrow objectives and a lack of connection with other actors, due to the unilateral vision in terms of the role of the state.

As a result of this isolation, the Mayor's Office embarked on projects with very high budgets, but with almost unanimous rejection from social actors, such as the program of the 200 000 computers. To achieve this dream of a city with access to computers, Pérez concentrated 67% of the budget for economic issues on what he called his "Connectivity Agenda", which basically consisted of a program to create a new set of industries related with Information Technology under the umbrella of *EPM*, to take the city

to a "new era of Internet" (Alcaldía de Medellín 2001:66). These plans included the subsidization of the computers (a contract that cost the municipality 112.5 million dollars), the creation of a call center that aimed to generate 20 000 jobs, the creation of technology-based companies such as a plant to assemble computers, and software production centers that never came into being (Veeduría del Plan de Desarrollo de Medellín, 2004:164). In summary, this process of *forced autonomy* was intended to give a more central role to the local state, but it did so at the expense of separating the capabilities of society (governance) and of the other forms of local state from those of the Mayor's Office, thus constituting an effort to build a more central role of the state with profound limitations.

The second stage: relational autonomy

This stage is characterized by the way in which the changes in the role of the state led to transformations in the political organization of the actors and, subsequently, of the state itself. In fact, as Mitchell (1991) points out, the emergence of new state capabilities created the space for a political battle to organize these capabilities under different forces and different sides of the public-private division. In this sense, it was precisely the process of "building autonomy" which put the state at the center of political conflict. Therefore, as proposed

by Laclau and Mouffe (2001:162), the increasing dependence of the state on the tasks of the general reproduction of the society, put it at the center of the social conflicts. This conflict creates the need to reorganize the political forces in terms of the control of these emerging capabilities.

This trend towards the reorganization of social forces began very timidly in the mid-1990s as simple movements with political interests (Angarita, 1996). But the scale of these movements changed rapidly with the problems generated during the administrations of Gómez and Pérez (Arenas and Escobar, 2000). In this way, the disappointment of many social actors who had participated in the processes of the advisory councils led them to think about the need of competing directly for the control of the state in the local elections, as it can be seen in the following statement:

[...] the strategic plans have been losing value... because they are conceived as guidelines, but it is in the political sphere (where) the decisions of the transcendental aspects of a society are made... Because having a strategic plan is not mandatory; what is mandatory is having a Development Plan and (this) is what you prepare for

during a political campaign. (Sergio Fajardo, interview with the Veeduría al Plan de Desarrollo de Medellín, 2005: 3).

In this way, it is possible to understand how Sergio Fajardo, when he won the elections for the Mayor's Office in October 2003, started the stage of *relational autonomy* in the construction of a more central institutional role of the local state, in which the Mayor's Office continues its path towards becoming the central actor, but with much more coordination with social actors, organized society, forms of borrowed stateness and the other levels of the government. This step was partly facilitated by the characteristics of the civic movement that took him to local power, a movement called "*Compromiso Ciudadano*",²² which, in the middle of a general crisis of the traditional political parties (Pizarro, 2002), was able to build much more powerful personal and institutional ties than those of the small liberal faction of Pérez's administration. In addition to the movement itself, the new government intended to establish relationships between the Mayor's Office and society to look for solutions to the repeated failures of the participatory processes (González and Velásquez, 2003) and to break off the relationship with the forms of borrowed stateness, proposing that the development of this *relational autonomy* should

²² Citizen Commitment (TN)

be based on the construction of programmatic agreements with “the different organizations, institutions, associations, foundations, organizations, companies, etc., on the strategic planning processes of the city and the development of programs and projects within the Development Plan” (Alcaldía de Medellín, 2004: 12).

The origins of this administration led to the proposal of the “principle of co-responsibility”, which implied that “the construction of the city should be a responsibility of all its inhabitants” (2004:11). Therefore, it revalued the participatory agenda of the nineties, but through very different mechanisms and processes, because under this new vision, co-responsibility implied “a new form of ruling and integrating the actors around the Development Plan” (2004:11). This can also be

seen clearly in the plan of Salazar’s administration, who gave continuity to this logic, arguing of the need of developing “a joint effort between the administration and the society” (Alcaldía de Medellín, 2008: 14). Therefore, the Mayor’s Office (and its development plan) was the center of action, but under a logic that institutionalized in the development plan the objectives of the social actors, other government levels and other forms of stateness, putting on their agendas a common framework, deadlines and objectives established in the organizational structure of the state, and an investment plan in accordance with the investment possibilities allowed by the Annual Investment Plan.²³ In turn, these investment plans were made possible thanks to a budget that tripled between 1998 and 2009 (see figure 2.1).

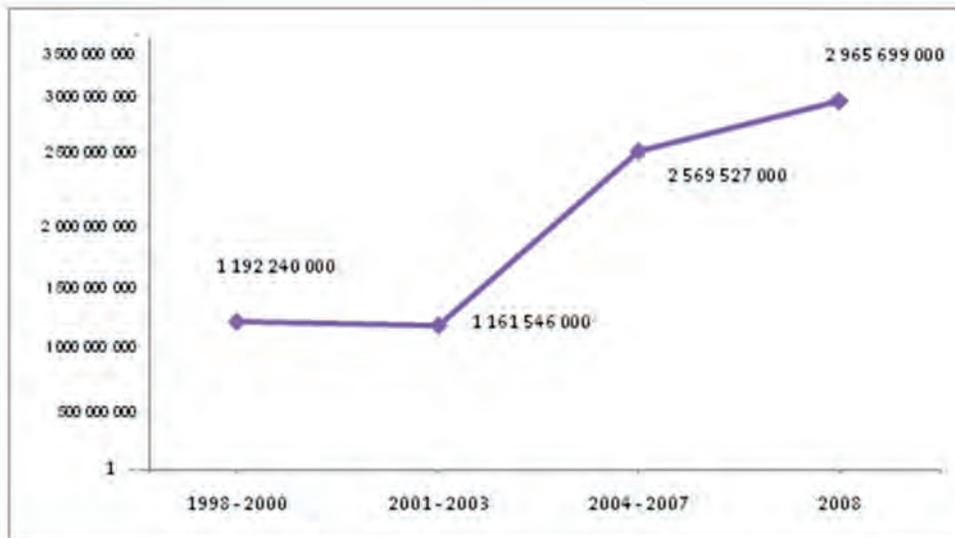


Figure 2.1
Annual income
of the Mayor’s
Office of Medellín
Source: elaborated
by the author based
on data of the deve-
lopment plans.

²³ In Spanish: *Plan Operativo Anual de Inversiones (POAI)* (TN)

All this opened a new approach, so that a state with more resources (which was already visible in Perez's administration) could be integrated with the evolution of governance. This new reality allowed the incorporation of tools that had already been tested on a smaller scale in the area of governance, and encouraged the local government to benefit from a wider range of policies and projects. Thus "the principle of co-responsibility" was not aimed at building an instrumental autonomy, but at understanding that public capabilities, even in a state with a stronger and more central role, are deeply tied to a number of actors who are part of a "decentralized and fragmented arrangement made up of multiple layers of social structures" (Hunt, 2006: 90).

Two examples of the new role of the Mayor's Office were: *first*, the greater importance given to the Regional Planning Council²⁴ (Veeduría al Plan de Desarrollo de Medellín, 2008). The effect of this was to transform the development of the plan into a very important process of participation, including the participation of the citizens within a clear regulatory framework. And *second*, the issuance of Agreement No. 043 of 2007,

which led to the formulation of the local development plans for the *comunas*²⁵ and *corregimientos*²⁶ of Medellín, and to establish, through the Community Councils²⁷ and the Neighborhood Councils,²⁸ the priorities of the investments that could help to improve the quality of life in each zone.

But to better understand the important step forward of the Mayor's Office in terms of getting a more central role in the processes of social regulation, it may be useful to examine the process in those areas in which the state plays a less important role when compared to other forms of regulation. In instrumental terms one could argue that the public budgets were three times larger than in the early 2000s, and ten times larger than in the early 1990s, creating the possibility of developing a completely different scale of actions, for which the mayoral administrations of the 1990s cannot be compared with the ones of the 2000s. For example, only in the *Comuna* 13, the Mayor's Office invested 293 601 million pesos between 2004 and 2007 (Alcaldía de Medellín, 2007: 2), which is a budget 30% smaller in constant pesos of 2008 than the one of Gómez's administration in 1998 for

²⁴ In Spanish: Consejo Territorial de Planeación (TN)

²⁵ The *comunas* (districts) are administrative subdivisions. The municipality of Medellín is divided into 16 *comunas*. (TN)

²⁶ The *corregimientos* (townships or localities) are the rural areas of the municipalities. Medellín has five *corregimientos*. (TN)

²⁷ In Spanish: Consejo Comunal. The "Consejo Comunal" (Community Council) is the directive body of the "Juntas de Acción Comunal" (Community Action Council)

²⁸ In Spanish: Asambleas Barriales (TN)

the entire city. In order to compare the mayoral administrations, one can then convert the value of the whole investment plan of the Mayor's Office of 1990 into pesos of 2008 and see the difference with the investment of the Integral Urban Project²⁹ in only one *comuna*. (*Comuna 13*).

However, this step forward was not only one measured in economic terms, since the policy of *relational autonomy* implemented through the principle of co-responsibility also served so that the Mayor's Office could fill the enormous gap of the program and of intervention capabilities left by the process of *forced autonomy* in issues such as: employment, health, housing, habitat, competitiveness, coexistence and security, etc. As

an example, one can see the large *relational* transformations that took place in the Mayor's Office for it to be able to address the process of social recovery of the *Comuna 13* after the "Operation Orion".³⁰To understand this we must remember that the process of *forced autonomy* had overlooked the capabilities that built the program "Peace and Coexistence Counseling" (closed by Gómez) and "Citizen Coexistence with the IDB" (closed by Pérez). After these measures, the process of creating a stronger local state in terms of security implied the coordination of the support of the national and international social actors for the development of a policy and a set of programs for the intervention of these spaces.

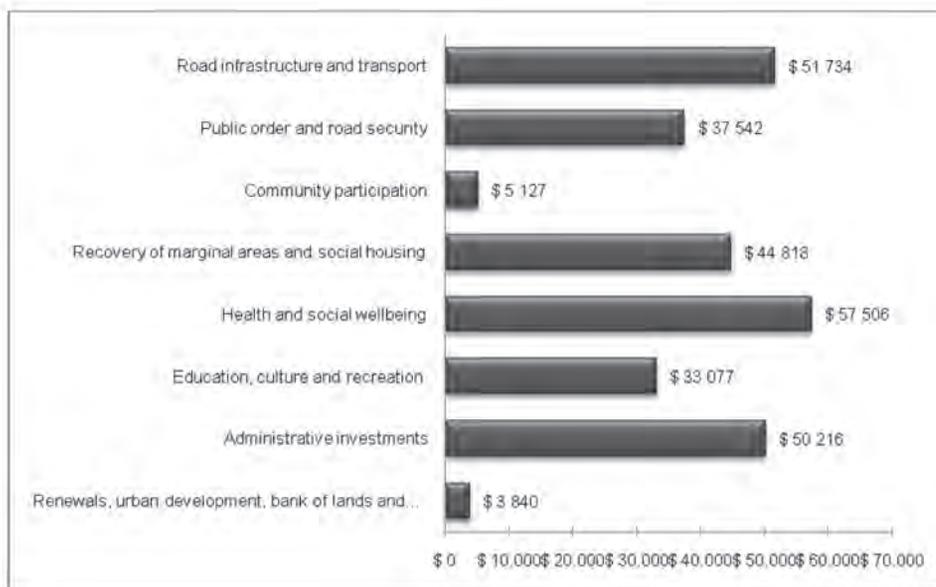


Figure 2.2
Investment plan
for 1990 (in constant
million pesos
of 2008)
Source: Alcaldía
de Medellín (1990).

²⁹ In Spanish: *Proyecto Urbano Integral (PUI)* (TN)

³⁰ In Spanish: *Operación Orión*. This was a military operation of the Army and the Police in San Javier (*Comuna 13*) between October 16 and October 20 of 2002, against the urban militias (TN)

Three cases that symbolize the way in which programs and ideas that did not come from the local state were integrated into its programs are: “Youth with a Future”,³¹ “At-Risk Youth”³² and the “Centers for Zonal Development”.³³ The first case of support came from USAID (U.S. Agency for International Development), an organization that helped the administration to implement the project of “10 000 Youth with a future” (López de Mesa, 2005) and to review the program “Bank for the Poor”³⁴ (El Tiempo, 2004), which also supported the Centers for Zonal Development. The second case came from an alliance with *Comfama*,³⁵ which supported the administration with its experience since 1998 with the completion of the program *FÉNIX* for youth at risk. The last case was based in part on the experience gained by *Actuar Famiempresas*³⁶ in the eighties giving assistance to small businesses, and which was integrated to the Centers for Zonal Development. All these efforts show how, in the decade of 2000, the local state broke with the tradition of the 1990s of participating in the processes of citizen security with weaker forms,

usually via consensus, initiating the path to change the position of the state as the principal provider of security (Alonso, Giraldo and Sierra, 2006) and forms of socialization.

To put this into perspective with some additional examples, one can see a quantitative leap in terms of housing construction and in the development of capabilities for the integral improvement of neighborhoods. In comparative terms one can see that between 1956 and 1987 a total of 3000 housing units were built, i.e. a little less than one hundred housing units per year (PRIMED, 1995). The rhythm of construction increases slightly after the tragedy of Villatina in 1987 with the construction of 2600 housing units in the project of Limonar which lasted until 1991. Nevertheless, what was achieved in the last three administrations, with a projected construction of 30 000 housing units from 2000 to 2011 (15 000 of them in Salazar’s administration), suggests the development of institutional and coordination capabilities that clearly make a difference in terms of the emergence of a more active state. In terms of the tension between the *forced* and the *relational autonomy*,

³¹ In Spanish: *Jóvenes con Futuro* (TN)

³² In Spanish: *Jóvenes en Situación de Riesgo* (TN)

³³ In Spanish: *Centros de Desarrollo Zonal (CEDEZOS)* (TN)

³⁴ In Spanish: *Banco de los Pobres* (TN)

³⁵ In Spanish: *Caja de Compensación Familiar de Antioquia* (Antioquia’s Family Benefit Fund) (TN)

³⁶ Social development corporation whose objective is to generate productive employment in order to neutralize social problems, giving support in the areas of credit and business development (TN)

one can see an important increase in the scale of the interventions, starting in the administration of Pérez. Nevertheless, the production of housing is not integrated into the technical learning process developed by the *PRIMED*, and therefore they ended up building housing without adequate living conditions and a clear articulation with the zoning plans designed by the *PRIMED* eight years earlier.³⁷

The period of *relational autonomy* for this specific case starts in 2003, when the lessons of the experience of the *PRIMED* were integrated with a clear framework into the mayor's political plan. It is worth remembering that the *PRIMED* suggested that "the urban integral rehabilitation should only be carried out when the community and the state interact with clear rules within a democratic process..." (Montoya et al. 1996: 98), calling attention, since 1995, for the need of building Zonal Intervention Plans³⁸ that integrate the participation of society with the structures of public intervention. In this way, a hybrid framework between the state and the society was built in the 1990s through the creation of the *PRIMED*, a figure that was conceptually valid but institutionally unclear, since it did not define the political res-

ponsibilities of the mayor and divided the responsibilities between various actors. Since 2003, larger investments were combined with the knowledge gained from the fieldwork of social actors and the experiences of borrowed stateness of the 1990s, making it possible to carry out a physical intervention in the city on a scale that had never been seen before, but which was fully integrated to the development plans and to the political proposal of the mayor. This change in the *relational autonomy* of the local state is evidenced in the Urban Integral Projects which, in spite of having many similarities with the former Zonal Intervention Plans of the *PRIMED*, have an enormous difference: the Urban Integral Projects stopped being part of a planning and financing program parallel to the one of the Mayor's Office; on the contrary, they were included in the political plan of the mayor and in his development plan.

Conclusions

Medellin's case suggests the importance of increasing the role of the state in societies that have gone through profound urbanization processes. As noted by Lefebvre (1991: 26) the space and the city

³⁷ According to the *Veeduría al Plan de Desarrollo de Medellín 2001* (2004:40) (Evaluating Commission of Medellín's Development Plan) the administration of Luis Pérez had delivered "9032 housing units (45% of the goal)" by June 30 of 2003. On the other hand, the administration of Sergio Fajardo, according to the public functionaries, built more than 4000 housing units for Socioeconomic Levels 1 and 2.

³⁸ In Spanish: *Planes de Intervención Zonales* (TN)

are social products and therefore, when studying the dynamics of the formation of the local state, we are really addressing the problem of the social production of space. This means that studying the city implies formulating questions about how its social forms are reproduced. This, in turn, implies acknowledging that there may be different ways of establishing the social processes, the state being just one among many other possible ways. Therefore, it is correct to ask oneself if the urban space in Medellín is produced under the rule and guidance of the public institutions, or if, on the contrary, not having a significant role, these institutions are forced to share or even to completely delegate their powers to third actors.

At this point it is worth remembering the concept of González (1990) who coined the term “*differentiated state*”, acknowledging that, in cases where the state plays a secondary role, it can hardly negotiate with other actors and powers to carry out its purposes, undermining its authority and leadership. For this reason, we examined in this essay the variation over time of the way in which Medellín’s Mayor’s Office has been defining its own territory, trying to colonize, co-opt or destroy other powers and forms of self-organization, in order to build a more central role. A process that, as we have seen in this essay, has already brought about important results, but in many ways it is only just beginning. Actually, it has

been only twenty years since the construction of local capabilities began, and ten since the process of building autonomy became more clear; therefore, the process of building stateness is only beginning.

It is easy to imagine the effects of the strengthening of *stateness* in Medellín. This somehow leaves to be answered valuable questions about the growing importance of stateness in societies in conflict and in development, which some authors have already begun exploring in recent years (Fukuyama, 2005). This, in turn, leads from the transition of democratic consolidation agendas (so popular in the 1990s) to new agendas of the construction of stateness (2005: 84); an issue that in Colombia continues to be closely tied to the study of the civil wars of the 19th century, the study of violence and the recent armed conflict, but somehow, it has overlooked the processes of the construction of the local states, allowing interpretations focused on the leaders and personalities.

Medellin’s case can also be used as a referent for Colombia, since it highlights the intense effort of the central state and the forms of borrowed stateness that were needed so that the Mayor’s Office could develop its present capabilities. This questions the way in which Colombian political science understands decentralization, in many cases defending autonomy in itself, failing to take into account that often it only reproduces the original problems, with

little progress in terms of the construction of stateness. It can also be used to build an agenda for Colombia; a process that has already been initiated in the country, since the state in Colombia went from managing 8.7% of the GDP in 1990 to 17.2% in 2004 (CEPAL, 2006: 48). However, at the national level, the central role of the state is still focused on “providing basic services and security” (Evans, 1995: 85-86), consolidating only the first step in the construction of the state (Fukuyama, 2005). One can observe that this process is still very limited when compared to international standards, since even in liberal nations (and free markets) the average size of the state exceeds 30% of the GDP.³⁹ As Evans points out (1995: 84), the triumphs of the Asian tigers in the 1990s began to reflect new ideas in terms of the real possibilities of development without state (*statelessness*); and new cases such as Medellín’s simply confirm the importance of the central institutional role of the state in the development processes.

Finally, it is necessary to qualify the vision exclusively focused on the construction of the state by saying that the increased capacity of the state to intervene creates new

conflict in terms of its control. The struggles for the state, and the way in which its capabilities are used to reproduce the political groups that live attached to its bureaucracies, or to benefit the society and its actors (who are trying to expand their own capabilities) bring about a competitive space for the state. In the last two electoral periods this competition has favored social actors, but as it has been shown, the capabilities of the state under the current local political system can also be easily co-opted by political groups. This means that the progress made in terms of the *relational* integration between social actors in the organization of the state is only partial and may have serious setbacks. In fact, as noted by Castro (2007), 42 of the 46 reforms carried out since 1986 have focused on analyzing decentralization as a fiscal issue, ignoring its political dimension. This implies that the expansion of local state and the development of stateness achieved in Medellín is still very fragile when put against the dynamics of representative democracy and the forms of political power exerted by a mayor in the local sphere, who according to the system has full presidential powers.

³⁹ It is still low if we compare it with countries such as Brazil (35.9%) and Argentina (26.3%), and much more so when compared to European countries – even the liberal ones, like England- where the historical average of the last decade is way above 40%.

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CHANGES IN INTERPRETATION, BEHAVIOR AND PUBLIC POLICIES REGARDING HOMICIDAL VIOLENCE IN MEDELLÍN

Jorge Giraldo Ramírez*

In times of the so-called risk society and in the context of the region with the world's most insecure cities, there are few doubts that the main security issue in Medellín over the last two decades has been the most primal of all: violent homicides. Such a long period –appearing as the unalterable horizon in which other evident transformations occur– can give the false impression that few things have changed in this particular aspect.

This essay seeks to demonstrate that at least four significant changes have occurred with respect to violent homicides in Medellín. Chronologically, the *first* refers to the interpretative frameworks of violence that are displaced from the

designation of the socio-economic conditions as the principal causal factor, to a focus on political-military and criminal structures. The *next two* changes refer to the phenomenology of violent homicides in terms of the structural variation in the homicide rate and to the agents who determine the bulk of this rate. *Finally*, the author suggests that the city has undergone a process of social and political learning, expressed in an essential change in security and coexistence local public policies.

These changes provide the structure of the text, which finishes with a section that brings attention to the factors that have made the advances in security in Medellín

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fragile and that, at the same time, represent challenges for the local administration, political movements, the private sector, social organizations, intellectuals and the citizenry in general.

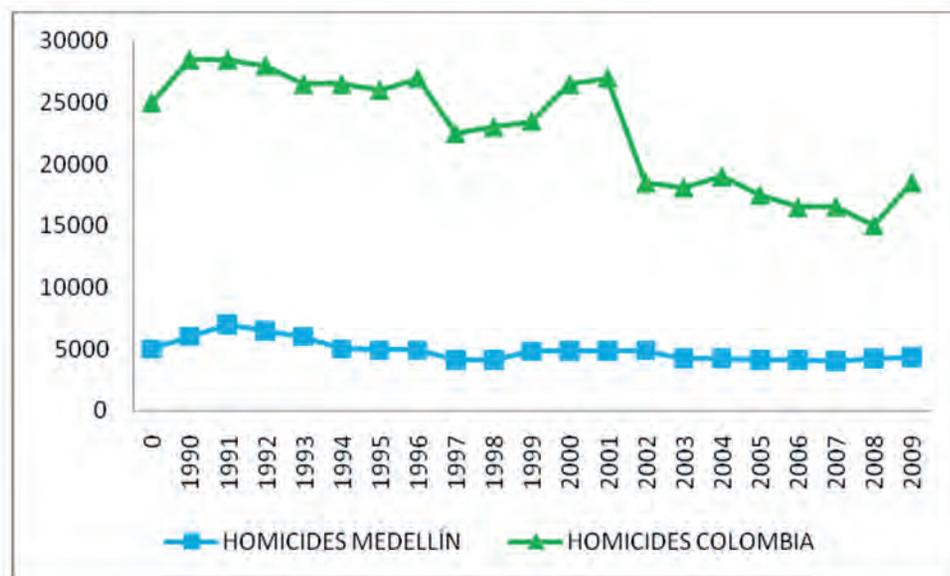
Two decades of violent homicides in Medellín and Colombia

By now it is commonplace to speak of Colombia as a violent country, especially since the second half of the 1980s (Sánchez, 2007: 25). This last specification is worthwhile because, firstly, it allows us to avoid the popularized imaginary according to which we have always been violent, and secondly, because it calls attention to a problem that sometimes appears to be ignored: in the last two decades we have been an especially violent country, with rates above the average of the

world's most violent region (Latin America and the Caribbean) and, in the second half of the last decade, only surpassed by Jamaica, El Salvador, Guatemala, Honduras and Venezuela, according to the United Nations Office on Drugs and Crime.

Despite the weight that Medellín carries in the imaginary of the country's violence, the city has clearly followed the same national homicide trends, the crime that has the highest impact and the most reliable measurements. As Figure 3.1 shows, the tendencies of Medellín and Colombia follow the same course in the last twenty years, including surges in 1991, 2002 and 2009. Medellín's preeminence stems from having been –during most of this period, as will be shown further on– the city with the highest number of homicides and homicide rate in the country (and, during some years, in the whole world).

Figure 3.1
Colombia and
Medellín: number of
homicides, 1990-
2009
Source:
CAPEAFIT-SISC



Nevertheless, it is now possible to say that this situation has changed markedly. Medellín's participation in the national total homicides has descended sharply: from 18%-22% during the 1990-1994 period, to 5%-7% in 2004-2007. If we adjust the homicide rate in Medellín according to its participation in the national total, we can calculate what we have called the *Incidence Index*. Figure 3.2 shows Medellín's Incidence Index in Colombia. The index should

be read as the city's contribution to the national homicide rate. This way, if in Medellín no one had been murdered in 1991, the Colombian rate would have shrunk by 18.2, decreasing to 62.9 deaths per 100,000 inhabitants.¹ Without Medellín, Colombia would have had a homicide rate of 34.4 in 2009. In both cases the country would continue occupying the same regional ranking.

¹ Additionally, the Incidence Index can be useful as a means of directing public policies as it helps visualize which regions or cities in a country (or *comunas*, zones and neighborhoods in a city) would a political measure impact more effectively the homicide rate. The Index was first constructed by Jorge Giraldo and Juan Pablo Durán and was later developed in a working paper (Giraldo and Fortou, 2011).



Figure 3.2 Medellín's Incidence Index in the national annual homicide rate, 1990-2009
Source: SISC – made by the author

The twist in interpretation

There are two main approaches to the explicative contexts, determining factors or causal hypotheses of insecurity in general and violent homicides in particular (Sánchez, 2007: 27-61). On one side, there is the literature that attributes them to social factors, from poverty to inequality, including unemployment; the other approach places emphasis on the activities of armed organizations and non-State armed groups involved in drug-trafficking and a domestic armed conflict of political nature, respectively. Both approaches imply State deficiencies in two distinct fronts: first, social investment and its translation into the satisfaction of the basic needs of the citizenry, and second, the functionality of State institutions charged with providing security and justice.

The syntheses elaborated by Sánchez (2007) and Beltrán and Salcedo (2007) recollect empirical evidence produced in recent years and reach converging conclusions. Sánchez found that “between 3% and 13% of the differences in

homicide rates... are explained by socioeconomic variables”, while the remaining percentage is explained “by the presence of armed actors –paramilitaries or guerrillas–, the inefficiency of justice, the intensity of drug-trafficking and by the interaction between armed actors and drug-trafficking” (Sánchez, 2007: 60-61). Similarly, Beltrán and Salcedo deny the relationship between crime and inequality or unemployment, and instead conclude that “organized delinquent activity seems to explain the behavior of homicides in Colombia”, especially drug-trafficking (Beltrán and Salcedo, 2007: 143).²

In the case of Medellín, Jaramillo, Ceballos and Villa refer the origin of the main agents of homicide and insecurity since the 1980s to the clash between two processes: “the entrenchment of drug-trafficking and the redefinition of the model of guerrilla presence in the city” (Jaramillo, Ceballos and Villa, 1998: 57). Other authors have highlighted the importance of the national government’s decision to permit *M-19* and *EPL*³ camps

² Other studies have shown that common and political homicides behaved in a similar manner during long periods, which “could ratify the catalytic role of organized crime in political violence” (Gutiérrez-Sanín, 2006: 484). Barrera observed that the “municipalities with more guerrilla attacks show more crimes” and that “the years with most attacks also present the highest rates of criminality” (Barrera, 2004: 15). Perhaps the origin of this paradigmatic change in Colombia could be referred to the work of Gaitán-Daza and Deas (1995) and, in Antioquia and Medellín, to María Teresa Uribe, who explains the generalization of violence as an exacerbation of modernization conflicts due to “the validity of prolonged states of war that had weakened state sovereignty and fractured the institutional apparatus” (Uribe, 2008: 282-283).

³ Two Colombian guerrilla groups. *M-19* is the Spanish acronym for *Movimiento 19 de abril* (April 19 Movement), a primarily urban group that became a political party after its demobilization in 1990. *EPL* stands for *Ejército Popular de Liberación* (Popular Liberation Army) (TN).

in Medellín –which were used as centers for military instruction– in the city’s early relationship with violence (Salazar, 1995: 86-87; Ace-ro, 2010).

On the other hand, we had signaled that the rising curves in homicide rates coincide with a) the escalation of the “narco-terrorist” offensive and the growth of militias in the city during the late 1980s and early 1990s; and b) the strategy of urbanization of war applied

by both guerilla and self-defen-se groups.⁴ Meanwhile, the most acute decreases in the homicide rate have precise entry points: the 1990 peace accords, the dismantling of the Medellín Cartel and the death of Pablo Escobar (December, 1993), *Operación Orión* in the city’s *Comuna*⁵ 13 (October, 2002), and the demobilization of the *Bloque Cacique Nutibara*⁶ (December, 2003) (Giraldo, 2008: 101) (see Figure 3.3).

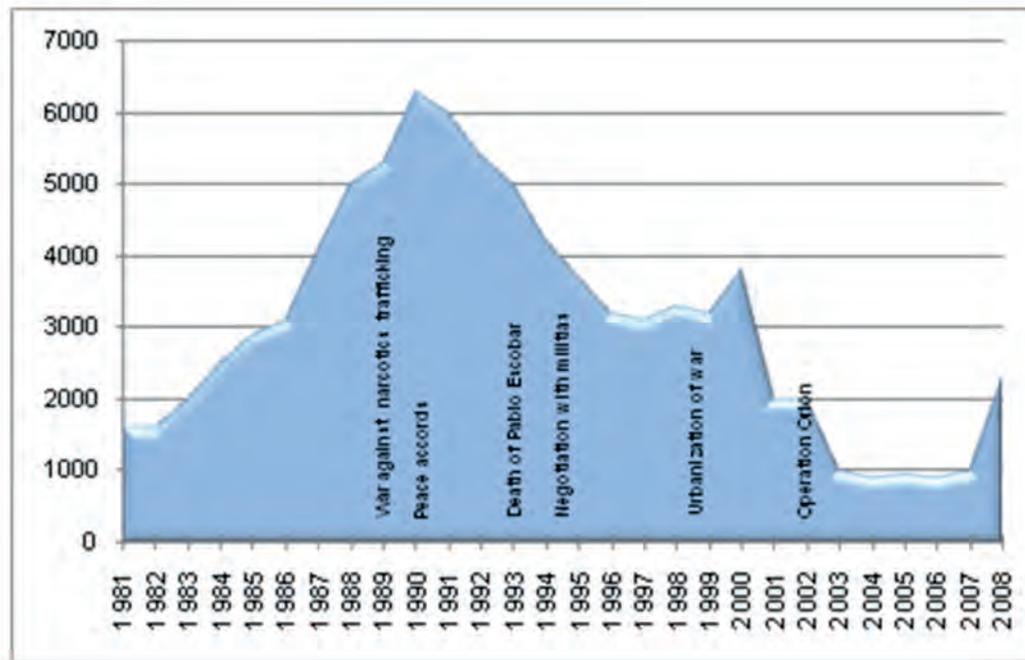


Figure 3.3 Medellín, homicides 1981-2009
Source: SISC – made by the author

⁴ This is the author’s translation for “*autodefensas*”, commonly associated with paramilitary groups in Colombia (TN).

⁵ The *comunas* (districts) are administrative subdivisions. The municipality of Medellín is divided into 16 *comunas*, composed of various *barrios* (neighborhoods). *Operación Orión* was a large military operation commanded by the central government in one of Medellín’s most insecure *comunas* (TN).

⁶ One of the main military divisions of the *Autodefensas Unidas de Colombia* (United Self-Defenses of Colombia), Colombia’s largest self-defense army. (TN)

The power of criminal organizations related to drug-trafficking groups and militia groups, guerrillas, and paramilitaries in any region or municipality is inversely related to the degree of State power. In the 1990s, María Teresa Uribe observed that the phenomenon of “the privatization of security and the leading role of armed civilians in the confrontation” was a main feature of what she termed “a significant turn in public policy” in Medellín and Antioquia (Uribe, 1997). Analyzing municipal public policies in this same decade, Juan Carlos Vélez found that local governments were dedicated to processes of mediation and the signing of pacts with armed groups that constituted an authentic “negotiation of disorder” that ensured the continuous precariousness of the local State (Vélez, 2001). In line with these hypotheses, and trying to explain the rise of paramilitarism in Medellín, we sustained that “citizen security policies in Medellín during the nineties brought about, drove and legitimized the displacement or intentional and gradual retirement of the State from the conflict’s management” (Alonso, Giraldo and Sierra, 2007: 147-148).

This conclusion –developed specifically in violence and security studies– is supported by Santia-

go Leyva’s hypothesis in this same volume. Leyva sustains that during the 1990s, the State in Medellín’s lacked the necessary levels of centrality, understood not only as the public administration’s capacity, but also as its efficiency to articulate, regulate and direct the remaining institutions and social actors. This led to the city’s local State having very little real capacity to govern the population and the territory (Leyva, 2010).⁷

2000-2009: two inflections

There are two notable inflections in the nature and behavior of security in Medellín during the first decade of the twenty-first century: a structural modification of the homicide rates and a change in the main agents or actors behind them.

Structural change in the homicide rate⁸

Figure 3.3 shows the yearly evolution of homicides in Medellín (1981-2009). Figure 3.4 shows the evolution of the monthly homicide rate for the 1990-2009 two-decade period. Here we can identify four possible structural changes in the tendency of homicides. The first lasts until 1991, when a growing tendency in the number of homicides starts. Between 1992 and 1997 we witness

⁷ One of the marks of the low level of government capacity is manifested in the efficacy of the criminal justice system. Historical-comparative trends show that Medellín had the lowest homicide-to-capture rate among Colombia’s seven main cities (Sánchez, 2007: 40).

⁸ The next two sections essentially reproduce what was presented in another article (Giraldo, 2009b).

a sustained decrease, although the absolute numbers and rates are still exorbitant in the Latin American context. Between 1998 and 2002, there is a reversal of this reduction. Finally, starting in 2003, there has been such a dramatic decrease in both absolute ciphers and rates, such that now violence levels are unprecedentedly low compared to the city's last three decades.

Our intuition is that we find ourselves before a structural change in the behavior of homicide in Medellín, whose breaking point seems to have occurred in 2003.

To statistically corroborate this intuition, the data was incorporated into a Chow Test, with 2003 as the reference year. The results show that there is enough evidence to claim that a structural change in the evolution of the homicide rate took place in this year. This result was confirmed via the inclusion of a dummy variable that accounts for the possible effects of the proposed change for 2003. The report was statistically significant; in other words, there was a structural change in the number of homicides in the city in 2003.⁹

⁹ This statistical work was carried out by Professor Ermilson Velásquez (PhD in Mathematics) of Universidad EAFIT.

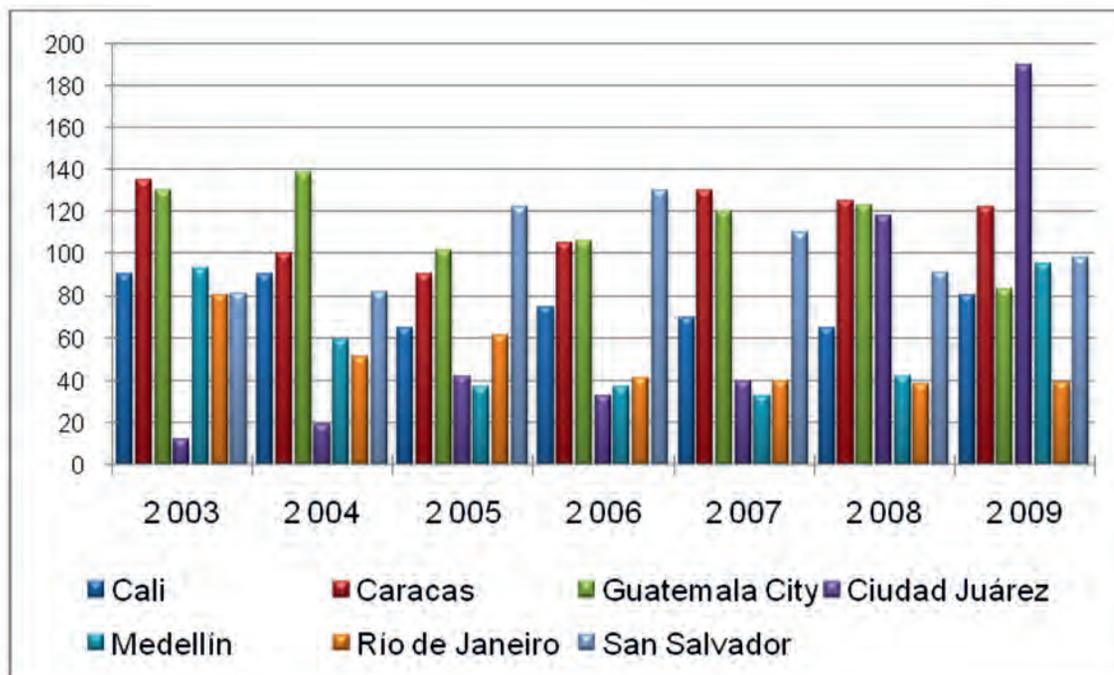


Figure 3.4 Monthly record: common homicides in Medellín, 1990-2009
Source: SISC

Thus, we can identify two stages during our period of analysis: from 1990 to 2003, and between 2003 and 2009. The identification of these two stages is relevant for two reasons: first, it indicates that explanations of this structural change are needed; and second, it shows that the first stage is a clear example of hysteresis. Hysteresis is a concept derived from Physics and is defined as the tendency of a material to conserve one of its properties in the absence of the stimulus that had generated it. In the social sciences, it is widely used in Economics as an explanation for the low elasticity of unemployment in the face of changes in economic growth. In the case at hand, the first stage presents low elasticity, in both the number and homicide rate in the face of changes in security politics.

Although statistically it is still premature to make strong claims regarding the second stage (2004 onwards), the leveling out of the decreasing tendency of the homicide rate in Medellín appears to configure a new stage of hysteresis, this time with rates significantly lower than those presented between 1990 and 2002.

The national government, national security and justice agencies and the local administration should ask themselves new questions concerning the logics of homicide in Medellín in order to approach the problem in a more effective way and to rupture the possibly emerging hysteresis. Clearly, in 2009 there was an increase in homicides that could elevate the annual rate to one mirroring the average of the last ten years (between 1980 and 1990), but one cannot affirm as yet that this signifies a changing trend and, less still, a structural change.

This break in the structural rate of homicides in Medellín constitutes an undisputable progress not only from a quantitative point of view, but also from a qualitative one. Medellín has ceased being statistically incomparable and has moved to become part of the problematic horizon of urban security in Colombia (Table 3.1) and in a joint group of Latin American cities that share similar phenomena of insecurity (Figure 3.5). Nevertheless, the number and rate of homicides in these cities, including Medellín, exceeds all the international averages and, as such, form the main problem of Colombia and Latin America nowadays.

Table 3.1 Incidence Index for three cities, 2001-2009

CITY	2001	2003	2005	2007	2009
Medellín	8.53	4.81	1.82	1.76	4.87
Cali	5	3.93	3.62	2.57	4.06
Bogotá	5.05	3.09	3.57	2.94	3.67

Source: made by the author

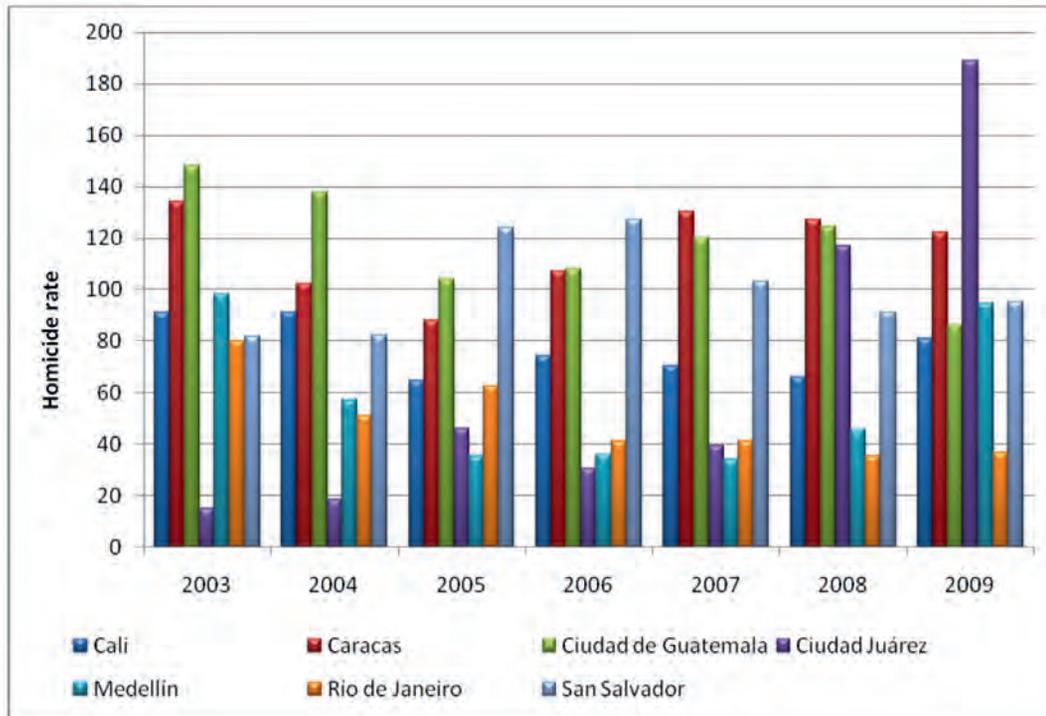


Figure 3.5
Homicide rates in
Latin American
cities, 2003-2009

Sources: Berganza (2006), Cali Cómo Vamos (2004-2009), Cervera-Gómez (2005), Comunidad Segura (2005), Centro para la Paz y los Derechos Humanos UCV (2005), Dreyfus and Fernandes (2008), ENADE (2009), Martínez, M. (2006). Martínez, S. (2008), Mendoza (2008), Observatorio Centroamericano sobre Violencia (2007), Observatorio de Juárez (2009-2010), Río Cómo Vamos (2010) and Sanjuán (2010).

From the actors in the armed conflict to organized crime

The main political and, up to a certain point, academic discussion in Medellín starting in 2006, has been the nature of the criminal organizations that operate in the city since the demobilization of the most important paramilitary groups and the diminishing presence of guerrilla and leftist militia groups.

The main competing characterizations use terms such as “criminal bands” and “neo-paramilitarism”. The first term has its most polished proposal at the *Comisión Nacional de Reparación y Reconciliación* (CNRR)¹⁰ in its Area on Demobilization, Disarmament and Reintegration (DDR), while the second one is represented by a working group at the Center of Resources for an Analysis of the Conflict (CERAC).¹¹ DDR begins with a

¹⁰ National Commission for Reparation and Reconciliation (TN)

¹¹ CNRR is a State agency created in 2005 to advise the government on reintegration and reconciliation issues after the main paramilitary demobilizations. The *Centro de Recursos para el Análisis de Conflictos* (CERAC) is a Bogotá-based think tank focused on conflict data and analysis (TN).

definition of paramilitary groups that includes three necessary criteria: 1) national reach; 2) a counter-insurgent orientation; and 3) an “institutional environment of collaboration, incapacity or tolerance, both at the sub-national and national levels” (CNR, 2007: 21-22). This same work proposes the use of the term “criminal bands” –additionally called “emergent” in the majority of documented cases– and does not include any organization based in Medellín or its metropolitan area. Meanwhile, CERAC’s characterization is much broader and defines “neo-paramilitary” groups according to four separate objects of influence: 1) control over the population; 2) State capture; 3) organized crime; and 4) counter-insurgency (Restrepo and Aponte, 2009: 477-482). Based on this, they establish four classes of “neo-paramilitarism”: 1) new paramilitary armies; 2) dispersed paramilitaries; 3) new self-defense groups; and 4) annexed criminal forces (Restrepo and Aponte, 2009: 488-494). This essay includes the so-called “Oficina de Envigado”, an important criminal organization based in Medellín and the conurbated city of Envigado, as part of the last class of neo-paramilitarism.

This second characterization has two serious problems that underestimate the Colombian

meaning of paramilitarism and relativize its main characteristics: its counter-insurgent nature and a certain level of institutional permissiveness. According to this thesis (which has been more amply presented elsewhere), paramilitarism falls under the generic denomination “partisan group”, whose configuration only attains meaning in the context of civil war and whose fundamental difference with respect to other phenomena of organized or collective violence is that it possesses an “existential enemy” (Giraldo, 2009: 106-115). Thus, it can be seen why is it unacceptable to have a characterization in which the inimical opposition to insurgency is not an essentially distinctive point. And certainly, in the inventory of groupings, CERAC’s work does not adjudicate this feature to the “Oficina de Envigado”.¹²

Research by *Universidad EAFIT*’s Center for Political Analysis (CAPEAFIT) provides an inventory of 47 criminal bands (*bandas*) and 51 gangs (*combos*) in Medellín: in other words, almost the same number documented in 2005, albeit with a significantly diminished number of group members. Among these organizations, criminal bands are said to have stronger and more varied links with organized crime and other illegal economies in the region. This essay and others before

¹² The thesis that sustains the transitivity between paramilitary groups and criminal organizations ignores the phenomenon of the accumulation of violence, described for the case of Rio de Janeiro by Michel Misse (2009: 112-113) and the “genetic hypothesis”, which affirms that irregular groups often use similar technologies (Cubides, 2005:67). However, this is not the place to fully explore this issue.

suggest that if the region’s paramilitary structures were basically networks –as was proposed some years ago (Alonso, Giraldo and Sierra, 2006)–, what we see today in Medellín is that the relationships between criminal bands and gangs lacks a command and control organization that exercises hegemony and frames these small groups into a clear strategy, as was done in the past by the Medellín Cartel and the *Bloque Cacique Nutibara*.

The disappearance of the structure of command and control –as the one implied in the demobilization of the *Bloque Cacique Nutibara*– in a network akin to the one that existed in Medellín during the first-half of the 2000 decade, tends to foment phenomena of high common delinquency in less-disciplined organizations, and organized crime in the more disciplined ones.¹³ This, of course, if we adopt the analytical matrix proposed by DDR (Chart 3.1).

Chart 3.1. Probable results of the demobilization of paramilitary groups

LEVEL OF INTERNAL DISCIPLINE	LEVEL OF DEPENDENCY ON THE STATE	
	Low	High
Low	Delinquency	Abuses/ Local Corruption
High	Organized crime	Reinsertion/Reintegration

Source: National Commission for Reparation and Reconciliation (CNRR), DDR.

There is no statistical or empirical evidence, nor is there any conceptual support, to affirm that what exists in Medellín is a prolongation of the intrinsic phenomena of urban armed conflict between 2000 and 2003. Instead, everything points to a scene of organized crime, coupled with waves of violence that depend on variables associated strictly to drug-trafficking and other illicit economies, which generate a catalyzing environment for violence carried out by bands, gangs or other juvenile crews, petty crime, and an intolerant and armed citizenry.

Everything seems to indicate that the perception of Medellín’s habitants with respect to the sources of insecurity in the city coincides with this conclusion. To the question of what are the most serious problems of security in the city’s neighborhoods, the most frequent answers point to drug trafficking, gangs, robbery and homicides (Table 3.2). These responses are consistent with the hypothesis that there has been a substantial

¹³ The succession of events that illustrate the disappearance of this structure includes: the assassination of Gustavo Upegui (May, 2006), the disappearance of Daniel Ángel Mejía (November, 2006), the extradition of Diego Fernando Murillo (May, 2008), and the assassination of Antonio López and Carlos Mario Aguilar’s surrender to the authorities (July 2008). These events, as well as a few captures, are tied to the origins of a dispute between criminal organizations that could explain the increase in homicides since April, 2009.

change in the actors responsible for the 2009 crime wave.¹⁴ It should be added that perception concerning the existence of militia, urban guerrillas and paramilitary groups is very close to the survey's margin of error, without taking into account the confusion produced by the constant movement of people between armed groups and the continuity of some in different groups, or –even less so– the recent collective memory, which overlaps with new realities.¹⁵

Table 3.2 Which are the most serious problems in your neighborhood in terms of security?

	2009	2008	2007	2006
None	15	26	40	49
Drug trafficking	37	37	19	17
Many street muggings / thieves / robberies	29	25	24	12
Presence of youth gangs	36	17	8	9
House and apartment muggings	9	9	11	9
Car-jacking or robbery of auto parts / motorcycle robbery	10	8	11	5
Homicides	17	6	2	2
Robbery of neighborhood stores / companies / banks	1	4	8	4
Marihuana junkies / drug addicts / drunkards	4	3	7	5
Militias (Urban Guerrilla / paramilitaries)	6	2	2	3
Presence of rape cases	2	1	1	1
A lot of beggars / homeless / invasions	2	1	0	1
They come from other neighborhoods to steal / presence of strange people	NA	1	1	1
A lot of noise in the streets	NA	1	NA	NA
Vandalism against the buildings	3	1	1	1
Street fights / quarrels between neighbors	NA	1	NA	1
There is no vigilance / a lot of insecurity / a very lonesome area	NA	1	NA	NA
Base	1500	1517	1517	1557
Answers per person	1.81	1.47	1.41	1.25

Source: “Medellín cómo vamos” –Ipsos Napoleón Franco

¹⁴ It should be noted that this survey was conducted in July, 2009.

¹⁵ Another aspect that is linked to this discussion concerns the course of the demobilized. In general terms, it is accepted that the program of re-incorporation designed and executed by the mayor's office of Medellín, has been successful. The balance offered by *Fundación Ideas para la Paz* (FIP) states that “as of February 2009, 86% of the paramilitary demobilized population was reported by the mayor's office of Medellín as being active. This means that they had participated in at least one of the psycho-social activities of the program during the last three months” (Palou and Llorente, 2009: 27). The number of deaths, detainees and judicially processed demobilized persons does not exceed 14% of the “inactive” demobilized population. Nevertheless, it is accepted that there has been enormous pressure to rearm on those demobilized.

Two periods (and one interregnum) of security and coexistence public policies

The starting point for an assessment of municipal public policies on the topic of security must be a double-sided one: on one hand, the construction of the local State's centrality, or else all the emphasis would be placed on the intelligence, willingness and assertiveness of the successive administrations; and on the other hand, the specific national framework for security and coexistence policies.

In the first place, and following the conclusions laid out by Leyva (2010), local administrations before 1995 were very constrained by the fact that they only had access to a relatively low budget, with high public debt levels and little resources available for investment. Additionally, their decisions and actions were concentrated on highway infrastructure. Secondly, public administrations during the 1990s were strongly affected by two groups of distinct criteria regarding security. The first group is constituted by pre-established ideas, such as that the reasons for insecurity were external to the city and that the corresponding responsibility was national, not local (Pérez and Vélez, 1997). The

second group of criteria is imbued with the assumptions and values expressed in the “*National Strategy against Violence*”¹⁶ and the 1991 Political Constitution. Diagnoses of the precarious legitimacy of the State and the socio-economic roots of urban conflict were deduced from these criteria, as well as guidelines concerning citizen participation and promotion of conciliation, dialogue and citizen culture.

The mayoral administrations of Gómez-Martínez (1988-1990), Flórez-Vélez (1990-1992) and Ramos-Botero (1992-1994) coincided in confronting the serious problems of insecurity in the city via strategies of participation, alternative mechanisms for conflict resolution, community development and the cultivation of values. Naranjo's term (1995-1997) gave these ideas a qualitative turn by channeling them towards the search for dialogue and agreements with armed groups, an approach which ended up having undesired and perverse effects. Meanwhile, Gómez-Martínez's second term (1997-2000) followed past policies, though they now came under the interpretation that violence was associated with poverty and inequality (Alonso, Sierra and Giraldo, 2007: 146-162).¹⁷

¹⁶ The “*Estrategía Nacional contra la Violencia*” is the official name for the policy against violence formulated and developed during the government of President Gaviria-Trujillo (1990-1994), although it had clear precedents in the administration of Barco (1986-1990).

¹⁷ In the following years, this vision was also substantially transformed and the dominant hypotheses became: a) violence and war are obstacles to human development (PNUD, 2003: 97-115); b) armed conflict constrain the effectiveness of local social policies (Rodríguez, 2009: 110); and c) criminal groups are critical factors in the violation of human rights (Arias, 2006).

Luis Pérez-Gutiérrez: erasing the past without understanding the present

In the last year of the Gómez-Martínez administration, the sustained but slow drop in the homicide rate began to reverse and at the national level it was evident that the “*National Strategy against Violence*” had worn itself out and, after the last peace treaties in 1994 –which had Medellín as their epicenter–, a war with new characteristics had begun (Giraldo and Fortou, 2010). The last tri-semester of 2000 –which coincided with local elections and the elaboration of the new mayor’s government plan– was the most violent since 1996 (Figure 3.4).

In this context, the new municipal government declaratively maintained the two philosophical pillars of security and coexistence policies from the last decade, that is, the idea that security was a basic responsibility of the central government and that the function of the local authorities was focused on citizen coexistence.

In the first case, it was declared that “citizen security and justice are essential responsibilities of the State” and it was reiterated that “is is the national public administration’s function to seek to prevent crime, maintain order, tranquility and collective wellbeing”

(Concejo de Medellín, 2001: 15). The second pillar is embodied in the first section of the local development plan (concerning “the revolution of citizen culture”), whose synthesis is the “formation of a new citizen” whose “spirit” is expressed by “respecting the law through conviction”, “unlearning violence”, “sobering-up the spirit”, and eradicating “verbal intemperance” (Concejo de Medellín, 2001: 10).

Curiously, the formulation of this plan did not impede the elected mayor, Luis Pérez-Gutiérrez, from sweeping away the inheritances of his predecessors. To begin with, he ended those programs directly related to security and participation strategies of the past administrations, such as the participatory budget program (promoted during the Naranjo administration) and the Consultancy for Peace and Coexistence¹⁸ (created during Ramos-Botero’s term). The “Citizen Coexistence” program, initially formulated by third sector actors (but also assumed as a central element by Gómez-Martínez) and financially dependent on the Inter-American Development Bank, was, nonetheless, substantially modified via the suspension of all the original components and the inclusion of new ones (Veeduría, 2004: 58) (Table 3.3).

¹⁸ The “*Asesoría de Paz y Convivencia*” was a municipal State agency that worked to mediate between social actors and forge non-aggression pacts among bands and gangs (TN).

Table 3.3 Citizen Coexistence program

GÓMEZ MARTÍNEZ ADMINISTRATION”	“PÉREZ GUTIÉRREZ ADMINISTRATION”.
The estate entities in charge of security and citizen coexistence come closer to the community	Neighborhood coexistence roundtables
Social reinsertion of youth aggressors	University internships
Strengthening of citizenship values for coexistence in neighborhood sectors with high indexes of violence	Network of schools and music bands
Strengthening of citizenship values for coexistence in schools and colleges in Medellín	Popular schools for sport and recreation
Strengthening citizenship values for coexistence in public and private establishments	Training of youths for employment
Awareness campaigns for economic and social readers	Infancy and family
Communication media as promoters of coexistence	Communications for peace
Institutional support- Modernization of NGOs-	

Source: Development Plans 1997- 2000, 2000-2002 – made by the author.

The mere enunciation of the new components unveils the fact that the original program had been substituted by a new one that conserved its name and financing, and that the final result was not a program of coexistence, but something else: a mixture of musical, sports and educational programs that took away specificity and pertinence from the policy. Perhaps such reshuffling had something to do with the idea, widespread within the administration, which considered social investment itself as a security policy (Vélez, 2001).

The total budget assigned to security and coexistence components for Pérez-Gutiérrez’s three-year term reached 111 118 million pesos, a very low sum that represented less than 1.5% of the yearly municipal budget and less than 0.5% for 2001 (Figure 3.6). This not only represented a negative variation with respect to the investment made in the Gómez-Martínez administration; it was also counter-intuitive, given that in 2001 the number of homicides increased by 10.2%. Indeed, budget execution in these

areas was extremely low: 28.5% in 2001, 47.9% in 2002 and 9% up until June 30, 2003 (Veeduría, 2004: 62-63). And all this in spite the fact that the available budget for investment for the Pérez Gutiérrez administration had doubled and tripled during the mayoral term when compared to the conditions of his predecessor (Leyva, 2010).

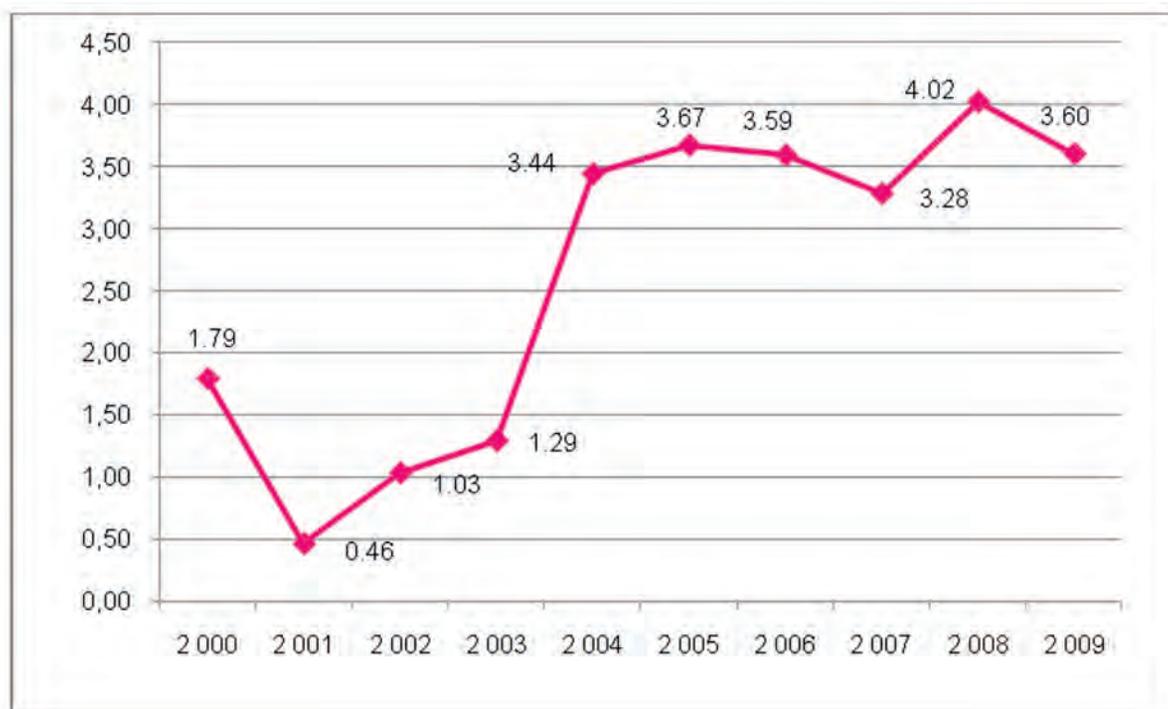


Figure 3.6
Investment in security and coexistence as a % of the budget
Source: Secretaría de Hacienda – made by the author

In 2002 the situation turned more serious, not only when considering the number and rate of homicides but also other crimes of high impact such as kidnappings, assaults on commercial and financial establishments and car-jacking.¹⁹ Indeed, there was a moment of symbolic drama when, in April, a commission headed by the mayor was shot at by irregular armed groups when visiting the *Comuna* 13. With such precedents, in August 2002 Pérez-Gutiérrez launched his “policy on security and reincorporation to civilian life”, christened “*Compro la Guerra*” (“I buy the war”), a proposal that was never converted into a municipal agreement and did not seem to affect municipal policies seriously, even though it is not devoid of interest. The document implies a radical turnaround because it places the “pacification

¹⁹ The author does not wish to tire the reader with excessive statistics; the present diagnosis had already been confirmed by the very mayor of the period in question (Pérez-Gutiérrez, 2002: 80-99).

of the city” at the center of citizen security (Pérez-Gutiérrez, 2002: 33), suggesting three steps: “urban peace dialogues”, the “reincorporation into civility”, and a guarantee that those people reintegrated would be offered “working activity for a minimum of 10 years” (Pérez-Gutiérrez, 2002: 43-44). The process was to be voted on in a popular national consultation, in order to “bring people into the peace” (Pérez-Gutiérrez, 2002: 62-64). This proposal, launched in August 2002, was an effort to apply the alternative that had failed nationally three years before, as well as to oppose the new policy of “*Seguridad Democrática*” (“Democratic Security”) designed by the President of the Republic, who was taking office at the same moment in which Perez’s policy “I buy the war” was grabbing media attention.

In these conditions, the national government intervened in Medellín through two very different actions. First, the punitive military operation known as “*Orión*”, presented as a reconquest of the *Comuna 13* by the State, and carried out by the Police, the Army, the Air Force, DAS and the *Fiscalía*,²⁰ between October 16 and 18, 2002²¹ in the following neighborhoods: 20 de

Julio, *Las Independencias*, *Belencito*, *El Corazón*, *Nuevos Conquistadores* and *El Salado* (Giraldo, 2008: 107-108). Second, diplomatic action that started with the negotiations with paramilitary groups at Santa Fe de Ralito (Córdoba), and carried on until the demobilization of *Bloque Cacique Nutibara* in December, 2003. A quick glance at Figure 3.4 shows the almost immediate effect that such actions had on homicides in the city: there was a drop in the number of monthly homicides (to below 200) from February, 2003 until May, 2009, with a four-year spell of less than 100 monthly homicides (November, 2004 to October, 2008). One should take into account that not a single month between January, 1990 and January, 2003 had less than 200 monthly homicides.

**Fajardo and Salazar:
institutionalization and learned lessons**

There is a wide consensus among national and foreign experts concerning the advancements Medellín has made in terms of security and coexistence, something which can be deduced from the behavior of high social impact crimes and the initiative and leadership of the

²⁰ DAS is the Spanish acronym for *Departamento Administrativo de Seguridad*, State agency in charge of some elements of national security. Meanwhile, the *Fiscalía* is a State agency whose function is to prosecute criminals, similar to the Attorney’s Office in the United States (TN).

²¹ The dates refer to an authentic combat, the military and humanitarian details of which have yet to be clarified. It is clear, though, that this operation was complemented by other ones in the city and the region, which together consolidated the territorial dominion of the State and eliminated the military presence of guerrillas and the militias in the city.

administrations of Sergio Fajardo (2004-2007) and Alonso Salazar (2008-2011).²²

How can this success be explained? From my perspective, it is the result of the conjugation of three factors.

The first has to do with the context of a successful national policy and the manner in which the municipal administration virtuously inserted itself into this policy. It is evident that the decrease in the homicide rate in Medellín is due to the measures adopted by the national government which permitted the defeat of the main national guerrilla groups, FARC and ELN,²³ during the last five years, as well as the militia group *Comandos Armados del Pueblo* in October, 2002. Another main factor is the demobilization of 874 members of the *Bloque Cacique Nutibara* on December 25, 2003. This way, the homicide rate fell from 184 in 2002, to 98 in 2003 and to 57 in 2004. These events have been widely recognized by the most recent municipal governments.²⁴

Therefore, the Fajardo administration decided to establish a close working relationship with national and departmental authorities in

terms of security issues. Thus, a simple step was taken, which nonetheless profoundly altered the old model that segregated security and coexistence into two parallel, autistic lines, assigning the former to the central government and the latter to the local government. This principle was clearly expressed in the conduct assumed by the mayor and his Secretary of Government (Fajardo and Salazar, respectively) with respect to the reintegration process of the demobilized members of the *Bloque Cacique Nutibara* and, later, of the other groups, especially the *Bloque Héroes de Granada*.

Fajardo's local development Plan established the strategy of "strengthening and developing agreements with those groups interested in demobilizing, through the construction of an integral public policy coordinated with the national and departmental governments" (Alcaldía de Medellín, 2004: 42). In fact, in Colombia only the municipal government of Medellín assumed responsibility for the reincorporation of those people who had demobilized collectively and individually from diverse illegal armed groups. This implied such a major deployment of administrative

²² "The achievement of turning Medellín into a more friendly, educated and peaceful city, something that is well embodied by the phrase of Fajardo, "from fear to hope", is unquestionable, nevertheless it is worrying that the policy of security and coexistence lacks the broad participation of the regional and national State" (Veeduría, 2008: 62).

²³ FARC is the acronym for Revolutionary Armed Forces of Colombia, while ELN stands for National Liberation Army (TN).

²⁴ "President Álvaro Uribe Vélez's (2002-2006; 2006-2010) Democratic Security policy has improved security in the city and the country" (Martin and Corrales, 2009: 142).

and financial resources that, at the end of Fajardo's term, Medellín attended 4,164 demobilized people, a number that represented 13% of the national total. The reintegration model developed by the "Program of Peace and Reconciliation"²⁵ attended 3532 demobilized people in psychosocial accompaniment, 2782 in education, 1825 in the generation of income, as well as an imprecise number in juridical consultancy (Alcaldía de Medellín, 2008: 83-85).

In the midst of the recognition that the model applied in Medellín has received, certain independent evaluators concluded that its impact has contributed to giving "sustainability to the decision taken by the paramilitary blocks with influence in the city not to use violence in general, and homicide in particular, as a mechanism to achieve political, economic and social objectives" and that the model provided "sustenance to the state's (national and municipal) intention to remove or try to remove from war, violent confrontation and illegality the not inconsiderable sum of 3700 individuals 'active' in the program" (Palou and Llorente, 2009: 30).

The second factor has to do with the lessons learned from the now

significant mass of critical studies on violence, criminality and armed conflict in the city and the country, as well as the corpus of public policies applied in the last twenty years.

On one side, the model confronted the diagnosis that insecurity in the city stemmed from the confluence of three factors: 1) "armed conflict and war"; 2) "very high levels of organized crime"; 3) "a lack of coincidence between morality, culture and law" (Alcaldía de Medellín, 2004: 23-24). As a consequence, the Fajardo administration, in association with the Metropolitan Area and the United Nations Development Program (UNDP), designed and put into action a "Master Plan for Security, Defense and Justice",²⁶ whose central components were set towards modernizing the security and justice agencies in two ways: a) *directly*, in terms of technological actualization and logistical support (disregarding the fact that both the police and the *Fiscalía* are national-level entities); and b) *indirectly*, through the administration's own actions. This bet on taking security seriously, along with its results, was recognized on numerous occasions by the President of the Republic²⁷

²⁵ The "Programa de Paz y Reconciliación" is a nation-wide program designed to manage the reintegration of ex-combatants (TN).

²⁶ Originally, "Plan Maestro de Seguridad, Defensa y Justicia" (TN).

²⁷ Álvaro Uribe Vélez claimed that Medellín "overcame its fateful days and it projects itself towards coexistence and security" (Ramírez, 2009: 5). He also considered that the "city has lived through a real transformative process in which, as well as achievements in educational and security issues..." (Martin and Corrales, 2009: 15).

and has a clear and tangible expression in the notable increase in municipal investment in security and coexistence (see Figures 3.6 and 3.7).²⁸

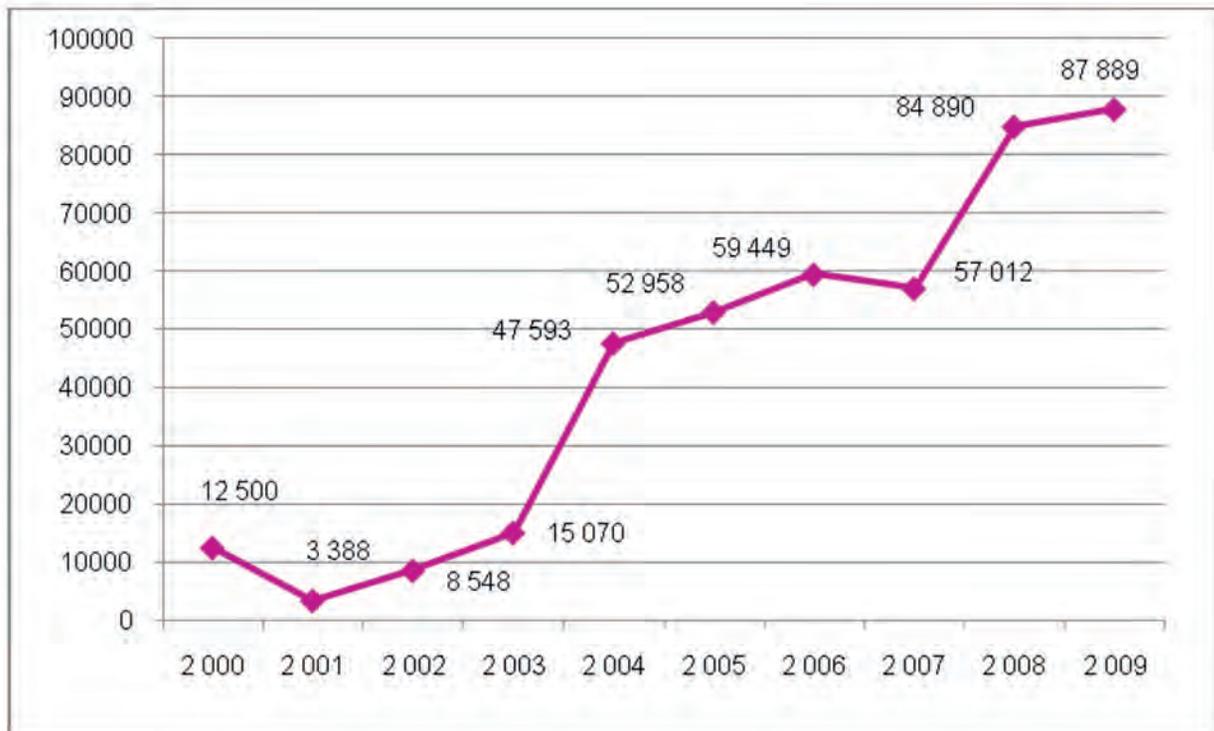


Figure 3.7
Spent investment
in security
Source: Secretaría
de Hacienda – made
by the author

This focus on security, strengthening police and armed forces and “head-on combat against criminals” (Ramírez, 2009: 23), was complemented by a human rights policy –the creation of the *Permanent Unit of Human Rights*²⁹ and the visibilization and protection of victims through a program bent on creating “historical memory”. Efforts to construct serious, trustworthy and public information were extended to the field of security with the creation of the Security and Coexistence Information System (SISC), which has allowed for the qualification of available information so that now the city possesses the country’s most reliable statistics in this area.

On the other hand, since 2004 the historical accumulation of past cultural, coexistence and citizen participation policies has been

²⁸ The average investment of the corresponding section in the Development Plan 2004-2007 was 98.6%, while the average investment for the security and coexistence component was 97,6% (Alcaldía de Medellín, 2008: 33).

²⁹ The “*Unidad Permanente para los Derechos Humanos*”, a local State agency that oversees the human rights situation in the city (TN).

recovered. The public sector had a learning rebirth in terms of citizen value formation, especially respect for life and self-regulation and the promotion of citizen and community organizations, as well as other notable elements from the 1990s such as violence prevention programs –including the “Plan of Disarmament”³⁰ and participatory communal budgets. Although social investment in the poorest neighborhoods of Medellín (focused in the northeastern and western zones of the city) had the objective of improving human development and the life quality of the habitants, the idea that there could be some positive correlation between social urbanism and citizen security was gradually instilled in the managers and analysts.

The third and last factor was the emphasis that Fajardo and Salazar placed on local institutionality. The starting point for the 2004-2007 development plan was understanding that one of the problems of the city was “State illegitimacy” (Alcaldía de Medellín, 2004: 42). This had two roots: a) corruption and clientelism, which both generate a major lack of trust towards the public sphere; and b) the provision of security and justice (nominally a public good)

by privately armed groups. In this way, the plan’s citizen participation component was oriented towards “citizen control of public administration and the recovery of confidence in the public sphere” (Alcaldía de Medellín, 2004: 35). The results show that the perception of transparency rose from 3.2% in 2004 to 4.5% in 2006, and that the internal control rating made by the *Contraloría*³¹ went from 55% in 2004 to 76% in 2007 (Alcaldía de Medellín, 2008: 64-66).

An inter-institutional civic project known as “*Medellín cómo Vamos*”³² signals that “Medellín’s recent results regarding public finances have been positive and stable, and show the municipality’s strength in the face of its own finances, savings and responsible decisions on investment and debt”. Additionally, since 2004 “Medellín’s fiscal performance index –elaborated by the National Planning Department–³³ has been over 70 each year” and “the city’s risk rating in the last five years has been AAA, which indicates the practical inexistence of risk factors” (Medellín Cómo Vamos, 2010).

But perhaps the most important strategy has been that which sought to “exercise authority legitimately” (Ramírez, 2009:

³⁰ In Spanish “*Plan Desarme*” (TN)

³¹ In the Colombian political system, the *Contraloría* (Auditor’s Office) is an agency that monitors public spending (TN).

³² “Medellín, how we are going”. (TN)

³³ *Planeación Nacional* is the national economic and development planning department (TN).

20-23). This strategy is based on creating two major systems of “justice close to the citizens” and “security close to the citizen”. This strategy was reflected in the creation of government and justice houses, conciliation centers and family commissaries in most of the city’s *comunas*. The creation of the Local Government Committees³⁴ deserves a special mention. These are organs of interlocution between the Secretary of Government and the community and are composed of a police inspector, a family commissioner, a police commander and a social technician. In fact, these committees –as well as the administrative centers of attention– are the manifestations of the local State in the everyday life of the city’s 16 *comunas* and five *corregimientos*.³⁵

Such an exercise of authority was preceded by the most element act of statehood: territorial control. Even as late as 2004, the physical territory of many of Medellín’s neighborhoods was controlled by private armed groups which impeded institutional presence, including the distribution of public service bills, taxation and actual police presence. The recovery of territory was accompanied by the provision of security equipment in every *comuna* and the entire urban perimeter, which included Centers of Immediate Attention,³⁶ new police stations (plus the modernization of

old ones) and the extension and upgrading of communication and transport equipment.

Fragilities and immediate challenges

We have said that Medellín’s progress in terms of security indicators, while undeniable, only leaves us in a situation similar to that of the most dangerous cities of Latin America, which itself is the most dangerous region in the world. The advances in the construction of the local State; a certain, although contested, hegemony of the public force; greater municipal institutionality in *comunas* and *corregimientos*; more and better coordination with the various levels of national and departmental government; and a more integral and effective security and coexistence policy are all factors that place the city in an incomparably better situation than the one it was in at the beginning of the 1990s’ decade of “borrowed statehood” (Leyva, 2010), or at the beginning of 2000, when disorder was co-managed by private armed groups. However, there are numerous factors that assure us that the situation is still fragile: the regional environment, the competing structures of organized crime, the transition in the models of protection in organized crime and, finally, the post-conflict.

³⁴ In Spanish: “Comités Locales de Gobierno”. (TN)

³⁵ *Corregimientos* (townships or localities) are the rural areas of the municipalities (TN).

³⁶ The “Centros de Atención Inmediata” are a type of small, neighborhood-based police stations (NT).

Medellín's great comparative weakness with respect to other Latin American cities rests in its regional environment. Antioquia continues to be a department with a high presence of new gangs and of at least three FARC military fronts. The department has approximately 700 hectares of coca plantations (Naranjo, 2009: 58), numerous clandestine drug-producing laboratories and a natural deep-water harbor, completely integrating drug production and exportation.

The organized crime around drug-trafficking, extortion and other illegal markets has undergone a certain reconfiguration (Palou and Llorente, 2009: 32; Giraldo, 2009b: 45-47). The increase in homicides, lethal aggression and car-jacking (on the rise since August, 2009) are a symptom of the professional capacity of the city's criminal organizations (Beltrán and Salcedo, 2007: 123). Additionally, the deactivation of one of the biggest command and control structures of organized crime in the city brought about a conflictive reordering of criminal organizations.

The confluence of State hegemony and criminal opposition could be bringing about a transition of the protection model of the city's illegal economies. From the 1980s to the early twentieth century, criminality had developed an autonomous

protection model via the creation of private armies of the Medellín Cartel, the so-called "*oficinas*",³⁷ huge criminal bands and pacts with other actors in the armed conflict. The disappearance and weakening of these structures tends to produce a heteronymous model of protection which resides in the corruption of the public force organisms, the justice system and the political class.

This environment aggravates the conditions of post-conflict (by themselves difficult). The sum of more than 4000 demobilizations, an undefined number of gang and band members, as well as the floating population of discharged public force members, constitute a highly available human resource in persistent conditions of high incentives for crime. Additionally –as has been observed by the Foundation Ideas for Peace–³⁸ the new situation demands a "revitalization of the political and social consensus" of reintegration and reconciliation programs (Palou and Llorente, 2009: 33).

In this way, the public sector's learning capacity, citizen initiative in security and coexistence issues, the social consensus around the State and the affirmation of legality, are challenged by the dynamics of criminality and the externalities that loom over the city. This is the challenge for Medellín and the region in the coming years.

³⁷ Literally, "offices": crime structures deep in the drug-trafficking business and possessing large private armies, like the "*Oficina de Envigado*" (TN).

³⁸ In Spanish: *Fundación Ideas para la Paz* (TN)

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DISASTERS AND POPULATION IN THE ABURRÁ VALLEY

Juanita López Peláez

Introduction

Year after year earthquakes, hurricanes, floods and other phenomena of various kinds, cause death and destruction across the planet. Nowadays disasters occur five times more often per year than those presented in the nineteen seventies and the losses associated with them are increasing. In years like 2008, marked by mega disasters such as the Sichuan earthquake in China and Cyclone Nargis in Myanmar, the 354 disasters caused 235 000 deaths worldwide, affecting 214 million people and generating economic losses of 190 billion dollars (Rodriguez et al., 2009).¹ That year was also particularly critical for Colombia: the country ranked seventh in events reported, all hydrometeorological in nature.

In fact, Colombia has been the most affected country in the Andean Community in recent years (Table 4.1), with economic losses that sum up to 570 billion dollars.² These effects do not correspond only to major events reported in large international databases which occupy the headlines and television. They are also due to recurrent small events that permanently affect low-income populations and become more important each day.

Evidence of the increasing impact of disasters has generated an entire movement of research, conceptualization and production of public policy frameworks, at all scales, which first gained popularity in the 1990s. Today there is consensus on the fact that disasters are closely related to inappropriate policies and a lack of development.

¹ Research Center on the Epidemiology of Disasters of Lovaina (CRED, available at: www.cred.be)

² Official Statement of the delegation of Colombia in the second session of the Global Platform for Disaster Risk Reduction (2009).

Similarly, their occurrence implies devoting considerable unbudgeted resources to rebuild and restore, and to that extent they can be seen as an opportunity to generate better conditions, but they are primarily a deterrent to growth and economic and social development. This approach stems from the understanding of risk as a social construction (Garcia, 2005) referring, on the one hand, to the way social representations of risks are built according to the social context, and to how society accepts, defines, perceives and categorizes different risks; and on the other hand, to the social construction process of the vulnerable material conditions that make a group or person more or less exposed to threats, and their ability to anticipate, adapt, resist or recover from a disaster (Wisner et al., 2004). These conditions have historical and social responsibility

roots (Rebotier, 2009), and result from interactions between the physical conditions of the territory, population and demographic processes and the socio-economic and cultural circumstances in which these processes occur. The resulting policy frameworks, summarized in what is now known as *disaster risk management*, seek to reduce the impact of disasters by directly attacking the underlying conditions of vulnerability, giving greater weight to prevention and mitigation policies and increasing the communities' resilience, or in other words, their ability to respond and recover effectively. With this more holistic view of risk it is sought to go beyond the historically dominant paradigm focused almost exclusively on the study of natural phenomena as isolated events and the response to disasters with humanitarian aid.

Table 4.1 Record of effects of disasters in the Andean sub-region, 1970-2007

COUNTRY	RECORDS	DEATHS	VICTIMS	AFFECTED	DESTROYED HOUSES	AFFECTED HOUSES
Colombia	23 373	37 762	3 366 808	22 782 518	173 649	478 940
Peru	19 928	82 357	4 333 677	3 527 208	192 361	313 561
Ecuador	4024	3915	324 096	1 243 949	11 519	42 045
Bolivia	2337	1326	594 718	844 678	5342	7012
Andean Community	49 662	125 360	8 619 299	28 398 353	382 871	841 558

Source: PREDECAN. Available at: http://www.comunidadandina.org/predecán/contexto_probl.html

Taking this conceptual approach as a starting point, this article aims to show in a general way the impacts that natural disasters have had on the population of Medellín and the Metropolitan Area and their economic and social consequences over time. Some previous publications on this topic are worth mentioning, such as the work of Aristizábal and Gómez (2007), and Aguilar and Bedoya (2008).

In an urbanizing world –it is estimated that within the next two decades, 60% of the world population will be urban– cities are the most common places where factors of vulnerability are reproduced and aggravated, especially considering that a third part of the urban population in developing countries lives in informal conditions (slums) (UN-HABITAT, 2008). Furthermore, in the current context of global environmental change, vulnerability is not only increasing, but new threats and complex webs of risk are emerging, which will have to be faced by communities and governments.

The dimensions of disasters

The latest international terminology, published by the International Strategy for Disaster Reduction of the United Nations, defines “extensive risk” as “the widespread risk associated with the exposure of dispersed populations to repeated

or persistent hazard conditions of low or moderate intensity, often of a highly localized nature, which can lead to debilitating cumulative disaster impacts” (UNISDR, 2009). This refers to the risks associated with precarious living conditions, poverty and environmental degradation in rural or in marginal areas, characteristic of cities in the southern hemisphere, where much of the population is vulnerable to phenomena such as floods, storms or landslides. These risks materialize in minor disasters that, as indicated by the definition, have very debilitating cumulative impacts for communities that lose their means of subsistence, their properties and their homes, and in many cases must absorb the losses and rebuild with their own resources, perpetuating their vulnerable conditions.

Extensive risk contrasts with *intensive risk*, defined as “the risk associated with the exposure of large concentrations of people and economic activities to intense hazard events, which can lead to potentially catastrophic disaster impacts involving high mortality and asset loss” (2009). On the other hand, *intensive risk* refers to what has historically been considered a “disaster”, defined as the breakdown in the functioning of a society or community due to events of high intensity and low-frequency such as earthquakes, tsunamis, or volcanic eruptions

that cause massive destruction and death at any given time. Given its size, an event that exceeds the response capacity of a city or country and thus requires foreign aid is considered a “disaster”. The international databases classify as such, all the events that meet this condition and produce at least ten deaths or affect at least a hundred people.³

Therefore, the emergence of the notion of extensive risk in the global discourse of disaster risk management responds to the need to give social visibility to those minor disasters that do not meet these characteristics of large scale, but whose impact on more local scales cannot be ignored. Recent studies show that in Colombia these events have cumulative impacts in terms of deaths and economic losses comparable or even greater than the impacts of major disasters that have marked the country’s history, such as the eruption of the Nevado del Ruiz volcano that buried the town of Armero or the earthquake in Popayan and the Eje

Cafetero.⁴ Of the total of the effects of disasters caused by natural or socio-natural phenomena between 1971 and 2002, 26.17% of the deaths, 79.23% of the victims and 43.40% of the economic losses were caused by small recurrent events (Marulanda and Cardona, 2006).

Disasters in the metropolitan area of the Aburrá Valley

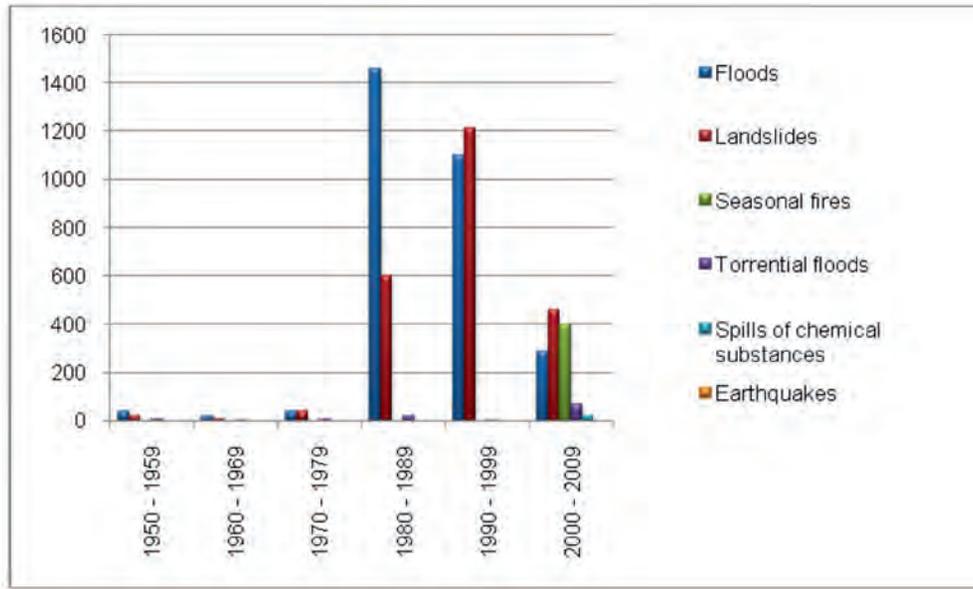
The history of Medellín has also been marked by disasters of different magnitudes. The Metropolitan Area of the Aburrá Valley⁵ is in fact an urban agglomeration where geographical restrictions, poor historical land management and formal and informal settlement processes on the slopes or on the banks of the creeks have resulted in a risky urban context (López, 2008). The most frequent events are floods, landslides and torrential floods, associated, to a great extent, to hydrometeorological phenomena. Figure 4.1 shows the share of different types of events throughout the area.

³ Available at: <http://www.emdat.be/criteria-and-definition>

⁴ *Eje Cafetero* (Coffee-Growers Axis or Coffee Route) is an area, part of the “Old Antioquia” or “Paisa” region, in the departments of Caldas, Quindío and Risaralda. (TN)

⁵ The Metropolitan Area of the Aburrá Valley or Metropolitan Area of Medellín is a region made up of the following 10 municipalities: Barbosa, Bello, Caldas, Copacabana, Envigado, Girardota, Itagüí, La Estrella, Medellín and Sabaneta. (TN)

Figure 4.1
Types of events recorded in the DesInventar⁶ database in the municipalities of the Metropolitan Area of the Aburrá Valley
Source: DesInventar database administered by the Metropolitan Area of the Aburrá Valley



As it can be observed, it is clear that the eighties have the highest record of events, which coincides with the urban explosion that took place since the late fifties, and whose environmental effects were just beginning to unfold. The reading of the figures should be done with caution; the significant change is also due to the absence of records in previous years and to database imperfections. However, the events of the eighties were catalogued as disasters, both nationally and abroad, forcing governments to act. Consequently, the decline in the frequency of events in later decades can be explained in part by the institutionalization of this issue. In contrast, Table 4.2 supports the conclusion that

although the number of events has indeed reduced, their impacts are increasing: the number of homes destroyed in the last decade nearly doubled the number of previous decades, and the death toll has doubled (if the 500 dead from the tragedy of Villatina are not counted). The historical record accounts for a significant number of 1348 people dead and 15 049 houses damaged or destroyed in the last six decades.⁷ The informal areas have been consolidated and densified, and more and more people are at risk, even in areas that historically had no risk. Disasters that happened in 2008 –El Socorro and Alto Verde, two of the most important that have taken place in the city in recent years– give a good account of it.

⁶ DesInventar (Disaster Inventory System) is a database for small, medium and large impact disasters initially created for the Andean subregion as a project of La Red (Network for Social Studies on Disaster Prevention in Latin America). Available at: <http://www.desinventar.org/>

⁷ According to records in the database *DesInventar*, administered by the Metropolitan Area of the Aburrá Valley.

Table 4.2 Impact of disasters in the Aburrá Valley

DECADE	DESTROYED HOUSES	AFFECTED HOUSES	DEATHS	VICTIMS	AFFECTED
1950-1959	4	72	138	0	0
1960-1969	10	59	14	640	0
1970-1979	683	25	155	3680	1250
1980-1989	638	2839	649	20 884	3645
1990-1999	448	4210	129	5382	12 117
2000-2009	1126	4935	263	6935	12 244
Total	2909	12 140	1348	37 521	29 256

Source: According to the DesInventar database records, 1950-2009

It is important to remember that the landslide that occurred on May 31 in El Socorro, an informal neighborhood located in the central-western area, destroyed 20 homes, and killed 28 people. Months later, on November 16, a new landslide occurred in the area of the Cola del Zorro street, to the southeast of the city, destroying six houses in an upper-end residential complex, killing 12 people. Landslides such as the one in Villatina in 1987, floods in the Iguana creek and other creeks in 1988, the flood of the Barro Blanco village in the municipality of Bello in October 2005 or the mud slide at La Cruz on May 28, 2007, have revealed the extreme vulnerability to socio-natural phenomena in the city. This vulnerability is also evident with the occurrence of re-

current minor disasters during periods of rain, affecting low-income populations located on the slopes surrounding the valley and on the banks of creeks. Regarding the impact of such disasters, it should be noted that 55% of deaths in the Aburrá Valley, as is shown in the table above, correspond to minor disasters, which caused less than ten deaths, so they would not pass the thresholds of international disaster databases.

The impacts can also be measured in economic terms, although the information that can be found is very limited. With reference to the emergencies handled by the Municipal Disaster Prevention and Response System of Medellín,⁸ in the period 2004 to 2009, in 4245 cases families were recommended

⁸ Sistema Municipal para la Prevención y Atención de Desastres (SIMPAD) (TN)

to evacuate the site temporarily, and in 5771 cases, to permanently evacuate, since the houses were left in uninhabitable conditions.⁹ The city administration is planning to implement a policy of temporary leasing for these families while a definitive housing solution is provided. A hypothetical analysis of losses based on the costs that the government would assume to replace the houses destroyed with social housing, according to recent studies (López, 2010) could be estimated at \$60 491 million pesos (current at 2008) in this period. In a critical year such as 2008, losses would represent 69.09% of the investment in the housing sector that year. These figures show the impact disasters have on local development. Due to a lack of clear preventive policies of resettlement and integral habitat improvement for populations at risk, governments in many cases have to act urgently when a disaster occurs and divert budgets, sometimes without ensuring the sustainability of the solutions provided.

However, in reviewing the historical evolution of the events, the first question that arises is:

Which are and where are the most affected populations located? The map in Figure 4.2 is illustrative of the relationship between disasters and development. The three areas with the most recurring events: the northeastern, central-eastern and central-western, have the lowest HDI.¹⁰ Moreover, the comparison between the northeastern and southeastern areas shows how, despite the similarities from the geomorphological point of view, in terms of slope composition and creek configuration, the development conditions are what really determine vulnerability.

According to the latest census, conducted in 2005, 27 771 houses were located in areas considered as high-risk zones in the municipality of Medellín (SMA et al., 2005). The areas in risk have varying degrees of consolidation, but are generally characterized by being the most precarious areas that lack aqueduct, sewage and other urban services. Consequently, deficiency in public service networks becomes in many cases the main cause that triggers the events. Many landslides are triggered by leaks, ruptures in pipes and rudimentary networks, sewages and rainwater that saturate the soil and increase the risk factors.

⁹ Information given by the SIMPAD based on the record of technical visits.

¹⁰ Human Development Index (TN)

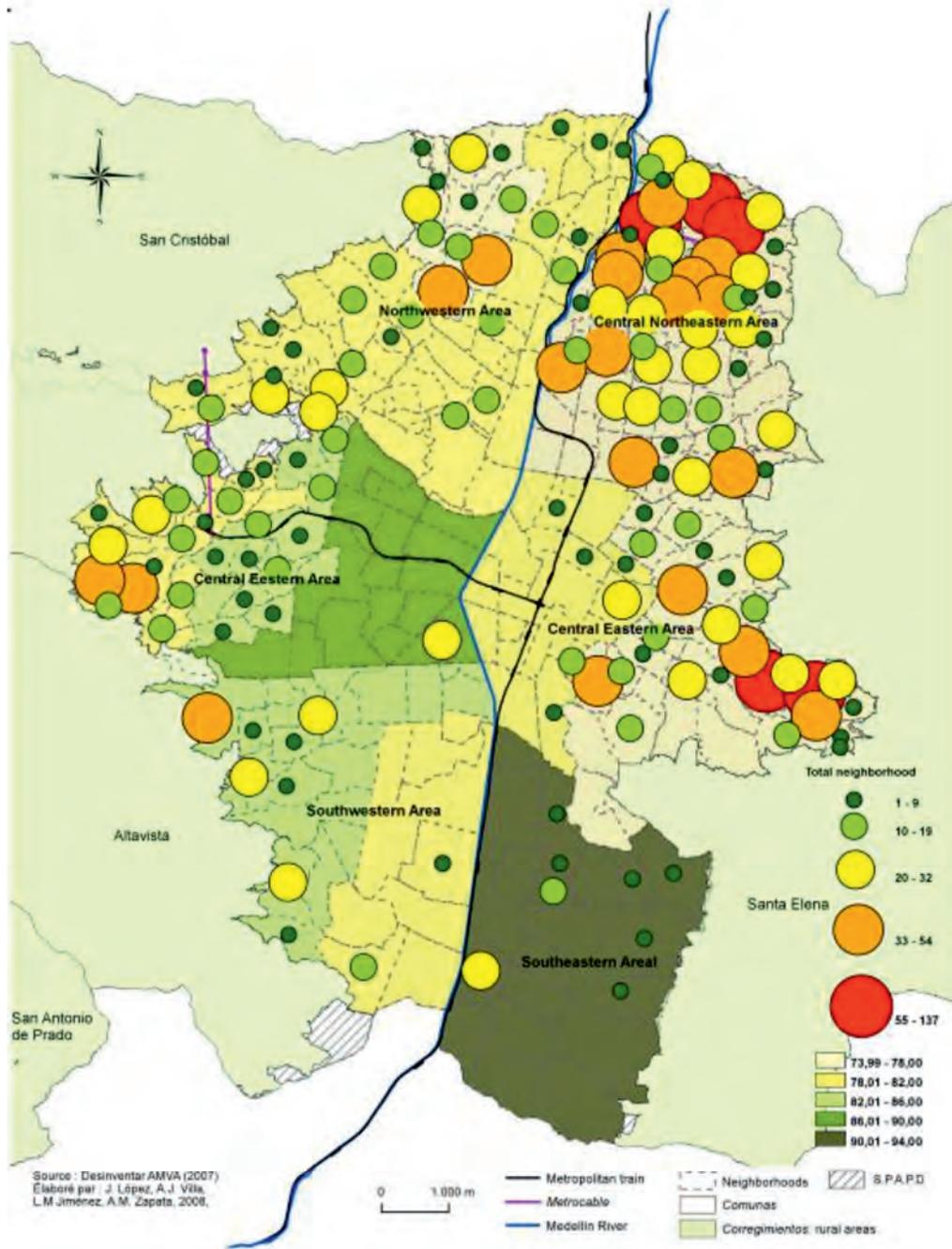


Figure 4.2 Geographic distribution of the events recorded in DesInventar in the period 1956-2006 and Human Development Index Source: López (2008).

The displaced population increases the already high housing deficit. The current subsidized social housing offer is clearly insufficient, and a habitat policy must be reached to overcome the dominant “housing” approach towards a habitat and human settlements’ upgrading approach, and thus exceed prevailing administrative limits of the municipalities of the valley in order to provide more effective solutions. The current dynamic in the region’s outskirts represents the continuation of a cycle of informality that began in the sixties. The continued occupation of the peripheral areas, given the natural processes of population growth and migration, are now one of the biggest challenges for local governments and demand responses and control actions that go even to the national level, beyond the regional and local levels. However, in the local context they require a further look at the city–region and toward longer– term planning policies.

Conclusion

The increased frequency and impact of disasters on the city-region is indicative of the heavy impact of the

enormous social and environmental imbalances that are occurring, not only in areas with informal growth, but also in areas with formal growth, and can draw attention to the need to reorient the local urban development approaches. Disaster risk management should be understood as a process that incorporates all development processes, designed to optimize the conditions for human security and sustainability, involving both governments and citizens in general.

While hydrometeorological events have produced the greatest impact, one should not overlook the seismic issue. Colombia is a seismic country and the Metropolitan Area has not been free of earthquake damage, as demonstrated by the Murindó earthquake in 1992. The current juncture in Latin America after the catastrophes in Haiti and Chile, and the lessons learned from both events, make this a good time to promote programs, campaigns, agreements, public-private partnerships and policies to reduce the existing conditions of risk, to avoid creating new risks and to prepare for response and recovery, all of them basic principles of disaster risk management.

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SOCIO-DEMOGRAPHIC CHANGES IN MEDELLÍN: INTER-CENSUS PERIOD 1993-2005

Edgar Sardi Perea

Introduction

Colombia, the same as other Latin American countries, displays certain changes in its demographic dynamics, which should be taken into consideration when formulating public policies with the end result of guaranteeing an equitable distribution of the benefits of development. Such a process denotes major differences when evaluations of smaller territorial entities evidence important socio-demographic and economic gaps which can be explained from within different spheres.

One of these is the advancement of the demographic transition that causes the process of aging, which should be seen as the result of an important change in the target population's age composition, derived from the infant population's reduced participation as a consequence of a decrease in fertility levels. Although this process has been fast, as it has happened in the Latin American average, by taking into account

the departmental dynamics and, even more, the municipal ones, the demographic transition at these levels maintains heterogeneous features which are correlated to differences in development that are observed between territorial entities.

Equally, the urbanization process has a major incidence in cultural changes, the composition of homes, the typology and characteristics of households, more education, access to health, among other social demands, the focalization of which requires an adequate knowledge of the population dynamics and their determining variables.

The last census, realized in 2005, due to its character of universal population reach and geography, as well as due to the diverse and integral themes it covered, constituted a fundamental and irreplaceable basis of knowledge concerning the demographic, economic, social and cultural conditions of the country. It was the most adequate census in terms of being able to dimension the socio-demographic changes in

smaller areas, such as is the case of the municipal level.

In the last decades, Colombian society has registered profound transformations and changes in terms of the foci of public policies, oriented towards the search for development, in its economic dynamics and in its social, demographic and territorial evolution, motivated by different factors which have incited, in an important way, in Colombia's, and its municipalities, population dynamics. This document shows the most relevant changes and discoveries that the information obtained in the 2005 General Census unearthed regarding the municipality of Medellín, which is constituted in a new base line for the focalization of a public policy based on emphasizing population equity.

The urbanization process

Urbanization, considered as a process of population concentration in a reduced number of core units, is, together with the modernization of society and industrialization, one of the most characteristic social phenomena of the 20th century.

Colombia, and as such its municipalities, from the mid-

last century, as in the majority of the region's countries, has been affected by the urbanization process. Colombia went from being a country with a high concentration of the population in the *remaining areas*¹ to have close to 75% of its habitants residing in *urban cores*, a process that has been very intense in Medellín. In effect, if we take into account the 1951 census (table 5.1), in Colombia's case, more than 60% of the population resided in the *remaining areas*, a process that began to be reversed from 1964 and which accelerated after 1985. For its part, Medellín displays a more modern distribution, a product of its importance as development pole, which was evidenced from the beginning of the past century, which explains why its urbanization process was more expansive than the national average. In the period 1951-2005, Colombia's *remaining areas* registered a decrease in its participation of 57.6%, while Medellín's participation stood at 80.4%, showing in a certain way the regional gaps in social, economic and demographic development.

In absolute terms, if one takes into consideration the last intercensus period of 1993-2005, the Colombian population in the municipal urban cores had grown by 31.2%, while for the same period

¹ The DANE (National Administrative Department of Statistics) uses the concepts of urban core (*cabecera*) and remaining areas (*resto*), taking into account that the definitions of urban and rural have other economic-based connotations. The head is the geographic area that is defined by a perimeter whose limits are established by means of a Municipal Council Accord; it is where the Mayor's Building is located. The remaining is the geographical area that is outside the boundaries of the urban core and contains the center towns, *corregimientos* (townships or rural localities) and dispersed areas.

in Medellín had increased by 40.8%, which displays Medellín's strong urbanization process in the twelve years prior to the General Census of 2005, evidencing the effect of internal, and especially inter-departmental, migration, where the migratory flow from Chocó is relevant, finding effects from within a series of regional factors generated by changes in the sub-regional migratory flows, which determine differential dynamics.

Table 5.1 Evolution of the population in the period 1951-2005

CENSUS	COLOMBIA			MEDELLÍN		
	TOTAL POPULATION	% URBAN CORE	% REMAINING AREAS	TOTAL POPULATION	% URBAN CORE	% REMAINING AREAS
1951	11 228 509	39.6	60.4	358 189	91.7	8.3
1964	17 484 508	52.0	48.0	772 887	92.9	7.1
1973	20 666 920	61.1	38.9	1 093 191	96.6	3.4
1985	27 867 326	67.1	32.9	1 468 089	96.6	3.4
1993	33 109 840	71.0	29.0	1 630 009	95.2	4.8
2005	41 489 253	74.3	25.7	2 219 861	98.4	1.6

Source: DANE

In this sense, Medellín constitutes a highly attractive center due to its development dynamics in the service sector, which generates a strong sub-regional and national influence, which in turn brings activity to the nearby regions and a special dynamic of population flows determined by work factors, forced displacement, study, costs of goods and services, among others. These are important factors in the growth of host municipalities, reductions in those of places of origin and, as such, they generate determining effects in the spatial distribution of the population.

Characteristics of housing and homes

In line with the urbanization process, it was shown that in the period 1993-2005, the housing in Medellín increased by 52.3%, which evidences a strong dynamic in construction that generates zonal dynamics in the city's interior.

If one takes into account the type of housing,² the 2005 General Census shows that the municipality has had an important increase in apartment-type housing in detriment to houses (figure 5.1), something

² House, indigenous house, apartment, room, other type of housing.

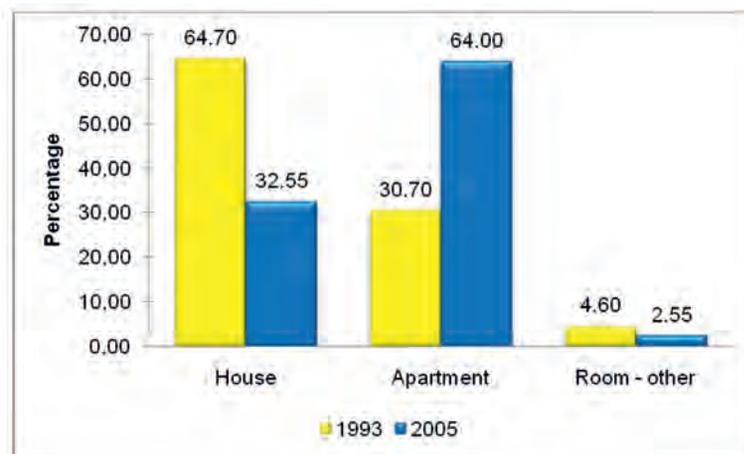
which is coherent with the increase in horizontal property that reflects, to some degree, changes in the organization and size of homes, an element that itself is correlated to the process of the first demographic transition and the beginnings of the second transition (Lesthaeghe and Van de Kaa, 1986). This process defines new factors of vulnerability, due to the fact that it generates profound transformations in terms of marriage, the fecundity calendar and its formation, consolidation and structuration in the long term of family arrangements.

In figure 5.1 one can observe the reduction in room-type housing –other³ and, in accordance with the conceptual design of the census, one can catalogue these types as being housing that is qualitatively deficient. At the national level this proportion remains stable,

which illustrates the differences in terms of development and the implementation of housing policies by the local authorities. In this sense it is important to take into account the fact that many house-type residences or apartments, when considering the types of materials used for floors and walls, as well as the lack of connection to public services, can be catalogued as qualitatively deficient housing.⁴

An important aspect in the evaluation of the inventory of housing is the existence or not of a connection to public services in homes,⁵ where a positive evolution is evident in recent years throughout the country. If we compare the level of national departmental connection for 2005 one encounters major differences which should be taken into consideration when evaluating the efficiency and efficacy

Figure 5.1
Total-Medellín: evolution
of housing types in the
period 1993-2005.
Source: DANE. Housing
censuses of 1993
and 2005. Author's
calculations.



- ³ This refers to the fact that a part of the Colombian population lives in rooms of modified houses, bridges, boats, caves.
- ⁴ There are methodologies that allow one to measure deficiencies of both the qualitative and quantitative type, but this process is not the theme of this document.
- ⁵ The census identifies the existence or not of a connection to public services, without taking into account the legality or the quality of the service.

of the implementation of policies in this area by the administrations. Effectively, if we take into account the data that is presented in figure 5.2, one can see the significant differences in favor of Medellín in terms of energy, sewage systems, aqueducts and fixed-telephone-line connection, all of which are in line with the business organization in these areas.

Equally, one should highlight the high proportion of occupied residences with energy connection, which is explained by the increase in residences with this service in the *remaining areas*. Another point identified is the high growth of natural gas in the last 12 years,⁶ being higher at a national level, which reflects the effect of coverage in departments with exploitation of

this product that facilitates a higher opportunity for the connection of residences.

Characteristics of homes

Colombian homes display important structural changes in the last 12 years, something which can be explained by lower rates of fecundity, higher rates of female insertion into the labor market and an increase in education levels. The first evidence of these changes is noted in the size of the household, all of this associated with the effects of the first demographic transition (Thompson, 1029), the effects of which are proven in the age range structure of the population and in the household size.⁷

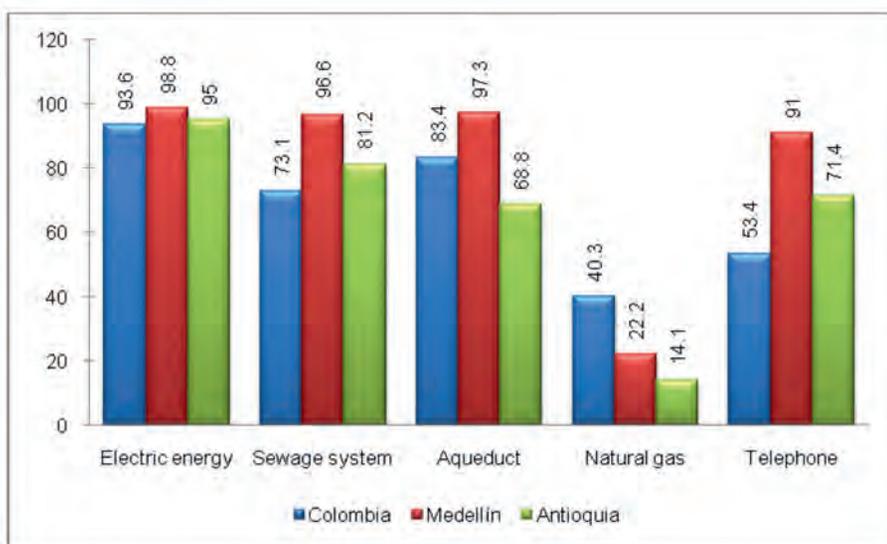


Figure 5.2
Occupied households with connection to domestic public services: censuses 1993 and 2005. Source: DANE. Censuses 1993 and 2005. Author's calculations.

⁶ In the 1993 census there were no questions relating to this type of connection but at this time, the proportion was very low.

⁷ The theory of modern transition was developed by the working group of the Population Office of Princeton, based on the work of Notestein: *The Future Population of Europe and the Soviet Union*, published in 1944.

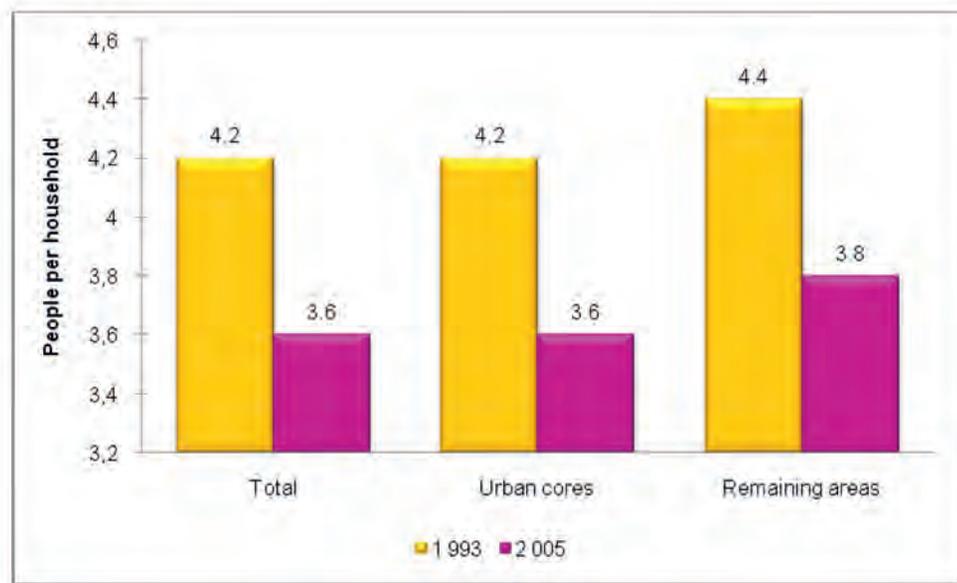
Medellín, under these criteria shows an advanced state of demographic transition with respect to Colombia and the department of Antioquia, displaying with this significant transitional gaps that are strongly correlated to the level of development of each region.

As can be seen by observing Figure 5.3, the average size of households in Medellín has fallen from 4.2 people per household in the year 1993, to 3.6 in 2005, which is the result, principally, of the decrease in fecundity. As with all socio-demographic variables, there exist differences which are associated with levels of development. One finds that household size increases when the houses are located in rural areas or when they have high poverty levels. This relationship is equally valid for the variables of fecundity and mortality as will be shown later. In the same graph one can observe two further aspects:

the first is the decrease in the average size of households in the municipality in the last inter-census period, in line with the expected tendencies; the second provides evidence of how the gap between *urban cores* and *remaining areas* has been maintained, with the *remaining areas* having a bigger average size.

Another aspect to be highlighted is the distribution of the head of the household, wherein women have increased their participation, something which is related to the dissolution of marital unions, an increase in the number of single mothers, as well as the phenomenon of displacement (households that arrive to big cities due to the murder of the man in the places of origin). In the 1993 census we can see that 30.3% of the households had a woman as the head; in the 2005 census this proportion had increased, coming to 37.1% of

Figure 5.3
Medellín: average household size: 1993-2005.
Source: DANE. General Census 2005. Author's calculations.



households. This means that female heads of household in the period 1993-2005 have increased by 22.2%, while male heads of household have decreased by 9.9%. This is very important considering that due to many factors these households have higher levels of social and economic vulnerability which should be taken into account.

Of all the households, according to the 2005 General Census (10 731 074), 11.1% are single person ones and 55.6% have a size of between two and four people (figure 5.4).

However, one still encounters households of a very big size explained by the households of the *remaining areas* and those municipalities where primary sector activities stand out.

As is expected, these differences are maintained for Colombia and Antioquia where the household size for 2005 was 3.9 and 3.8 respectively; showing the existence

of differential socio-demographic factors that impact on this type of indicator.

One indicator that shows the combination of social, demographic, economic and cultural factors is the distribution of households according to the number of people per household, in which single person households have acquired an important weight, as can be seen in figure 5.4.

The high proportion of single person households and those with two people, in the case of Antioquia is explained principally by the contribution of cities such as Medellín and the municipalities that comprise the Aburrá Valley. In effect, this type of household is characteristic of single people or students who work, many of whom are immigrants from smaller cities where the supply of work and study is less than the demand. As such, when considering this

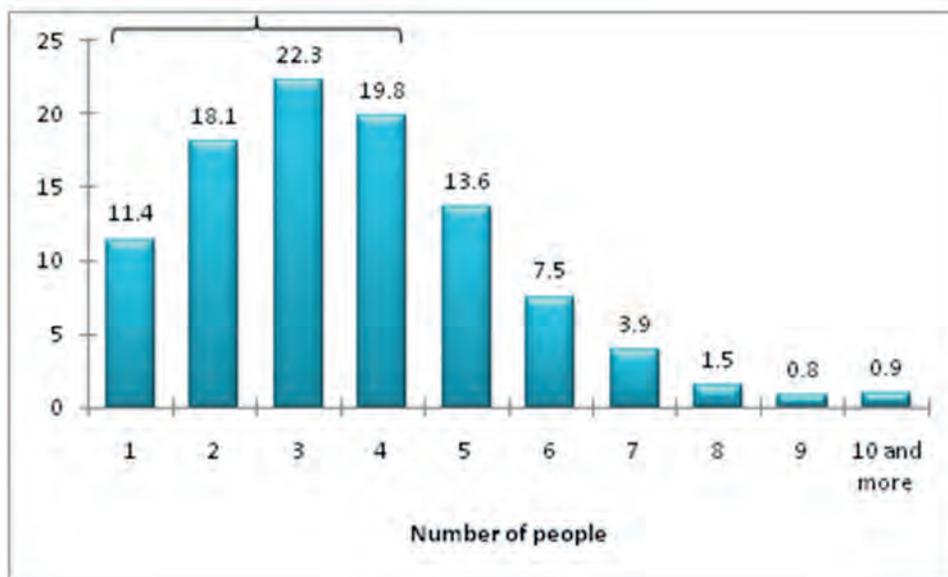


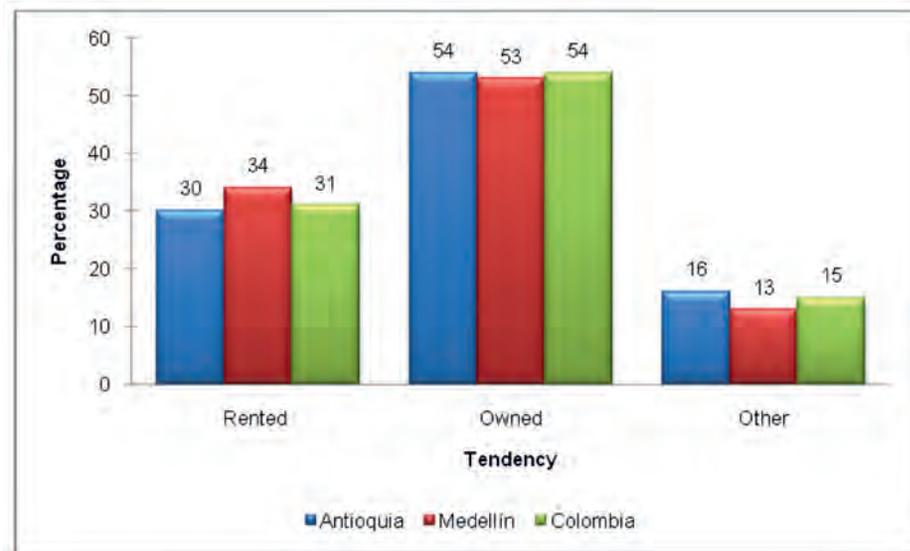
Figure 5.4
Distribution of households according to the number of people, 2005.
Source: DANE. 2005 General Census.
Author's calculations.

same indicator for Medellín (figure 5.4) one finds that the percentage of single person households in Medellín is slightly superior to the departmental (11.0%) and national (11.1%) averages. The 2005 census shows that 71.6% of households are comprised of four or less people, evidencing a cultural change when considering the notion that “*paisa*” households are large”;⁹ for the Antioquian region the average is 68.6% which illustrates the differences in composition of households in the rest of the municipalities, where there exist greater numbers of households with five or more people. The process of advanced transition, which is characterized in Medellín by a rate of fecundity around the level of

replacement, leads to a consequent reduction in the number of people per household.

An aspect of major importance is that which refers to household tenure of the residence. In accordance with the distribution of households in terms of possession of the residence where the members reside habitually, one can consider that Colombia is a country with a high proportion of “renters” and as such its territorial entities are smaller. Effectively, at the national level, 31.0% of households pay rent or sublet and for Medellín, where 34% of households pay rent, the proportion is superior to the national average, which can be observed in the following figure.

Figure 5.5
Distribution of households according to possession of housing, 2005.
Source: DANE. 2005 General Census. Author’s calculations.
*Other type of possession refers to households where the members live by permission of the owner without any type of payment, or tenure or possession without any title among others.



⁸ *Paisa* is the local expression to refer to the people of the departments of Antioquia, Caldas, Risaralda, Quindío and some parts of Valle del Cauca and Tolima. *Paisas* are sometimes called *Antioqueños* (in reference to the *Old Antioquia*), and they have a very defined and particular cultural identity. (TN)

⁹ For the national average, 66.8% of households have four or less people. For Antioquia, this indicator comes to 68.7%, which shows that there exist *paisa* regions that maintain traditional characteristics in terms of the conformation of family groups.

The data from the previous figure evidence the existence of an important quantitative housing deficit, which should be considered in the formulation of housing policies with the end result being to improve the life conditions of the population, especially housing for conglomerated populations of middle to low incomes.

Another point of additional value, which can be obtained from the data of the 2005 census, is the knowledge of the proportion of Medellín households with

ex-members residing in foreign countries. In table 5.2 one can observe that 80.7% of the households of the *urban cores* have an ex-member residing in Spain, the United States, Venezuela or Canada. This proportion is higher in the *remaining areas* given that 85.1% of these households declared that there was one member residing in one of these countries, something which implies possible differences in terms of access to and opportunities for minimum household income to be able to satisfy basic needs.

Table 5.2 Medellín: proportion of ex members of the household residing overseas, according to the 2005 census.

COUNTRY	% TOTAL	% URBAN CORE	% REMAINING AREAS
Venezuela	5.5	5.5	5.2
United States of America	55.5	55.4	57.5
Spain	17.0	17.0	21.6
Canada	2.8	2.8	0.7
Other Country	19.3	19.3	14.9

Source: DANE. 2005 Census. Author's calculations

The data from the previous table show the relative importance of international emigration differentiated according to area of habitual residence. This corresponds to the importance that remittance flows have, and with the international crisis the vulnerability of these households increases, given that the great majority of them depend entirely on these resources for their subsistence.

Socio-demographic characteristics of the population

Colombia, and subsequently its smaller administrative divisions as in the case of Medellín, has experimented, during the last five decades, the process known as demographic transition, which is to say that, after having during a long period of time high rates of

fecundity and mortality, these rates begin to descend to low levels and as such one can conclude that Colombia and Medellín find themselves in the “advanced phase” of this transition process.¹⁰

This process has been accompanied, as well as by the important advancement of urbanization, by significant changes in the sectors of education, health and technological development, all of which form part of the globalization of the economy, and which are determining factors in the evolution of both the level and structure of the basic components of the population dynamics of each one of the administrative entities that make up the country.

These demographic transformations, which have to do with the existence of small households and increasing longevity, have been displayed in Medellín for some years, a behavior that is conducive to only a few societies and in the most favored sectors of developed countries. The municipality of Medellín, in the last decades, has been confronting the effects of transformations that give as a result a gradual reduction in the population’s growth rate, continuing the ageing of the

age range structures, but with big differences at the level of each *comuna*¹¹ or *corregimiento*,¹² displaying factors of inequality and vulnerability which should be evaluated.

A first evidence of the transformation of the Medellín population structure can be observed in the following figure, in which the structures registered in 1993 and 2005 are compared.¹³

In the pyramid one can observe how those aged less than 15 lose in terms of their participation, a product of the reduction in fecundity levels, while a gain is obtained by the group corresponding to people aged 35 years and more, a result of the reduction in adult mortality. Equally, a reduction in the youth-adult age group, between the ages of 15 and 30, is presented, which is explained by internal and international emigration, which is itself differential depending on sex and age, as well as by the effect of the excess rates of masculine mortality.¹⁴ This last factor is determined by the higher risk that men face, considering their roles in the workforce, as well as factors of violence among others.

¹⁰ If one takes into account the classification proposed by CELADE, Colombia and Medellín would be in an advanced transition considering that the Birth Rate according to the 2005 General Census, for this year, came to 19.8 and 16.4 per thousand respectively.

¹¹ The *comunas* (districts) are administrative subdivisions. The municipality of Medellín is divided into 16 *comunas*. (TN)

¹² The *corregimientos* (townships or localities) are the rural areas of the municipalities. Medellín has five *corregimientos*. (TN)

¹³ The transparent pyramid corresponds to the year 2005.

¹⁴ This is the relation between mortality for age groups of men and women, and it is calculated by the equation ${}_nq_x^h / {}_nq_x^m$

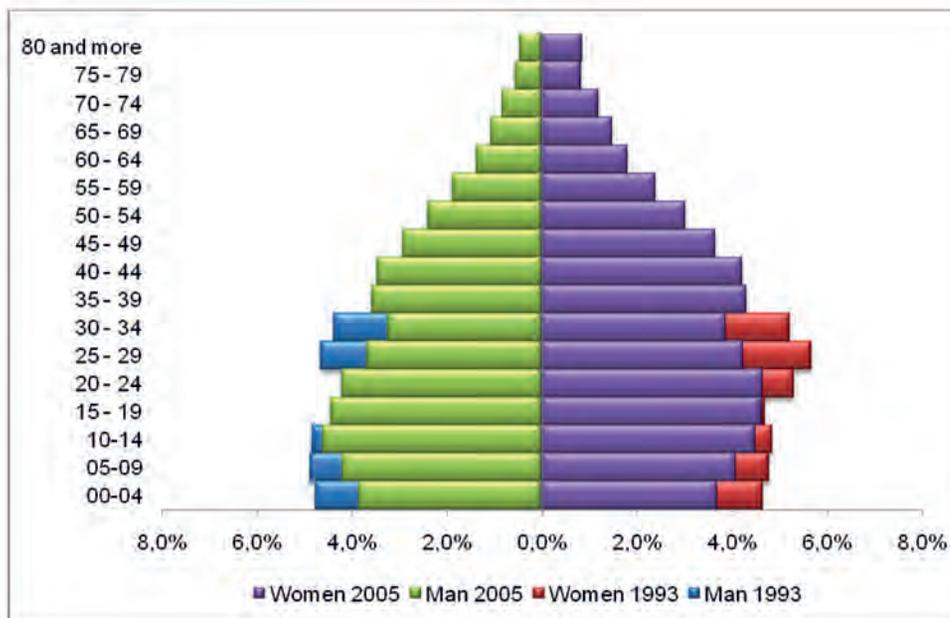


Figure 5.6
Medellín-Total: age
and sex structures
according to the
1993 and 2005
censuses.
Source: DANE.
1993 and 2005
censuses.
Author's calculations

Social characteristics

The municipality of Medellín, according to the data from the last census, presents significant advances in terms of its educational characteristics, just as in the fact that it can show the ethnic composition and limits of the residential population.

Educational

This variable is of major importance given that it is related to the conformation of human capital, and it is a determining variable for fecundity, infant mortality and childhood. A first indicator is related to the literacy of the population, which, together with the two indicators of mortality

mentioned previously, forms part of the commitments of the Colombian State with respect to the Millenium Objectives.¹⁵

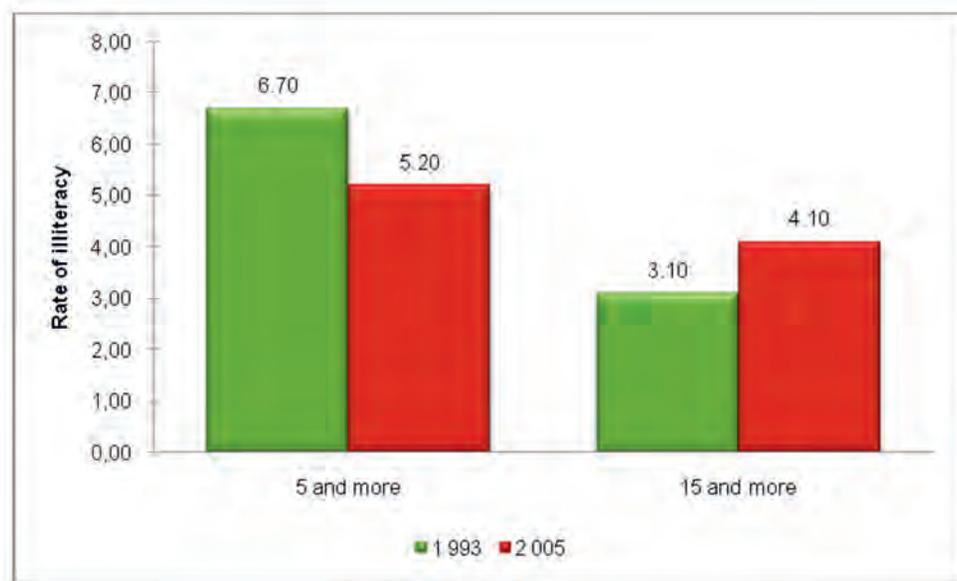
This indicator should be examined in terms of the behavior of two large population groups. The first, those people aged five and older which allows for the measurement, to a certain degree, of primary and secondary educational coverage in the last five years, taking into account the student cohorts; as well as those fifteen years and older which is the indicator used internationally for the effect of comparison. Nevertheless, it is necessary to take into account that this is affected by the differences in the age structure and the effect of selective migration. In the case of

¹⁵ While it is true that these indicators are at the national level, the knowledge of these at the level of smaller areas can weigh in at the national average, allowing for the re-direction of respective policies.

Medellín, being a node of attraction, the major proportion of immigrants with low levels of education are arriving to the most depressive *comunas* (DANE-Alcaldía, 2010a).

Figure 5.7 displays the evolution of this indicator between the census years, 1993 and 2005, in which one finds that for the population aged five years and older there is a reduction in illiteracy of 21.9% while in the population aged 15 and more there is an increase in illiteracy of one percentage point.

Figure 5.7
Total-Medellín: rate
of illiteracy according
to the censuses
of 1993 and 2005.
Source: DANE. 1993
and 2005 Censuses.
Author's calculations.



The increase in illiteracy in the population of people 15 years and older could be explained by the generational gaps and by the effects of migration. This argument is confirmed according to the results of the Inter-administrative agreement 008 of 2009 realized between the DANE and the Municipal Mayor's Office to undertake the projections for each *comuna*. Effectively, the selectivity of immigration towards Medellín is confirmed, wherein "Manrique presents, for the period concerned, the highest percentage of immigrants to Medellín without schooling, that is 11.70% for a total of 802. Next comes the *comunas* of Popular with a participation of 11.3%, Villa Hermosa with 9.3% and Aranjuez with 8.78%". Additional to the previous points, the process of ageing determines a greater proportion of elderly adults whom, due to generational gaps, are a population group with low or no levels of schooling. Another aspect is the effect of immigration, which is high human capital which searches for other job opportunities or better education, as much in other parts of the country as in foreign lands.

If we take into account the evolution of schooling attendance for the population between 5 and 24 years of age, as can be seen in the following figure, one finds that in the *remaining areas* this rate is the one that increases in greatest proportion; while in the total and the *urban cores* the increase in school attendance is 2.2% and 1.5% respectively, in the *remaining areas* the increase is 9.9%. This indicates that people do not conform to only reaching primary and secondary levels given the more specialized requirements of the labor market.

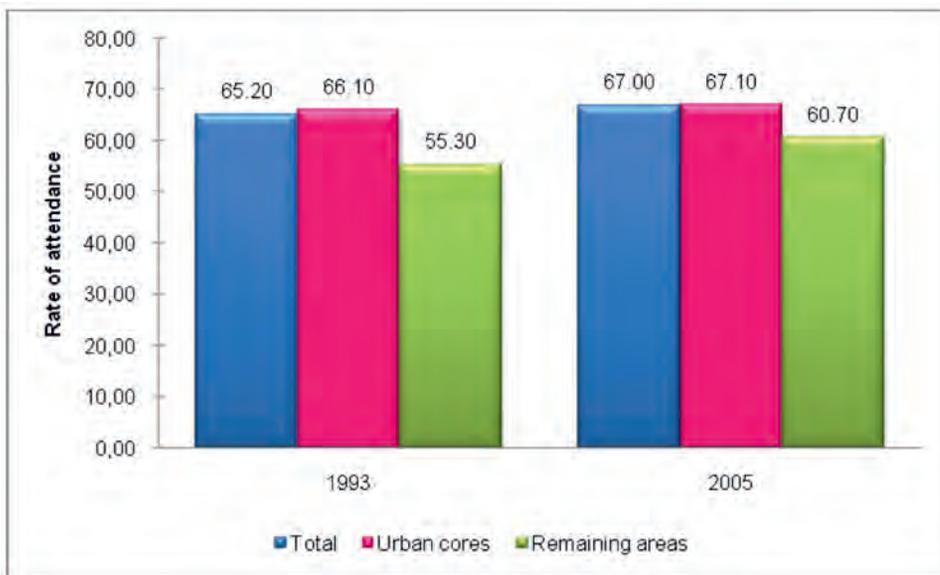


Figure 5.8
Total-Medellín: rate of attendance of the population from 5 to 24 years of age, according to the censuses of 1993 and 2005.
Source: DANE. 1993 and 2005 Censuses.
Author's calculations.

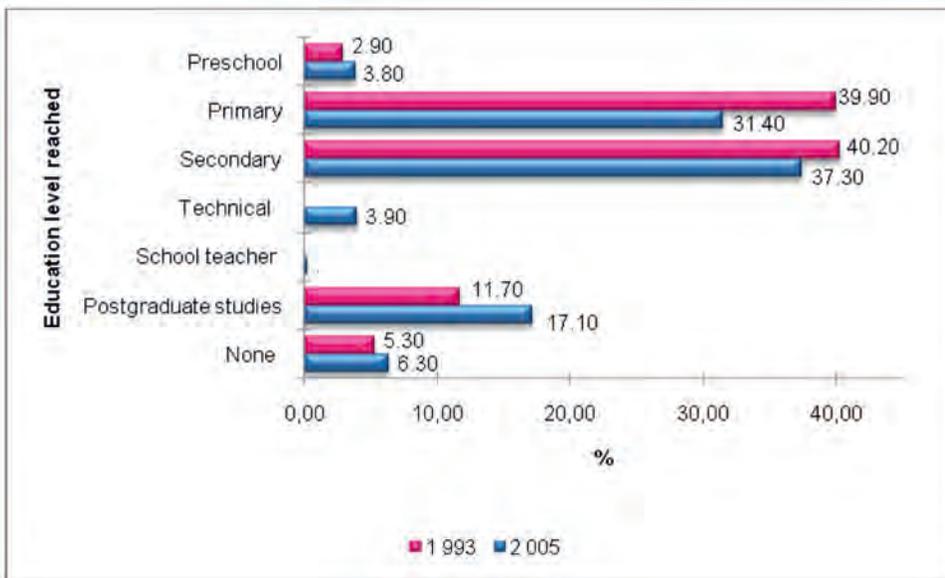


Figure 5.9
Medellín: proportion of people per education level reached, according to the 1993 and 2005 censuses.
Source: DANE. Censuses of 1993 and 2005.
Author's calculations.

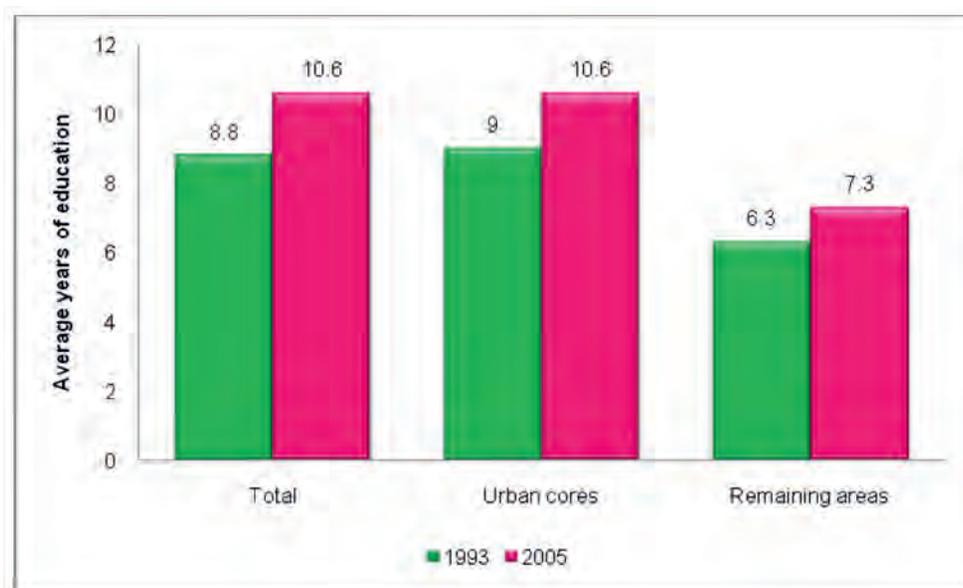
Another indicator of great relevance is the evolution of the education level reached by the population, which in the case of Medellín displays a positive evolution in terms of the schooling of its population.

According to data collated by the last two censuses in terms of education level, one can observe that the proportion of primary and secondary education in 2005 was less than that in 1993, which confirms that people do not conform with merely finishing primary and secondary education and that their aspiration is to improve their academic preparation, given the actual exigencies in terms of accessing better quality employment. This is verified by the fact that in 2005 the proportion of people who had reached the level of postgraduate studies rose by 46.3%.

Nonetheless, something that calls our attention is the higher proportion of the population without any formal education, a number that increased by 19.0%. This could be explained by the fact that the immigrant population has a significant participation in the total number of people who have no schooling (DANE-Alcaldía, 2010a:41). The anterior point should be taken into account when defining the strategies of schooling programs for the vulnerable population, given that they affect the indicators concerning the follow-up and evaluation of policies.

All of the previous information is reflected in the increase in the average years of schooling of Medellín's population; figure 5.10 illustrates the differences by area for this measurement.

Figure 5.10
Medellín: average years of education according to the 1993 and 2005 censuses.
Source: DANE. 1993 and 2005 censuses.
Author's calculations.



The data from the previous figure shows that the highest proportion of average years of education in the twelve years previous to the 2005 census are found in the *urban cores*, explained by the better opportunities in terms of educational offers, especially at the superior levels.

In terms of the improvement of human resources, the census data shows that in the period 1993-2005 the schooling average in Medellín increased by 19.7%, a relevant element which has an impact on the improvement of the municipality's productivity and competitiveness.

Ethnic composition

The 2005 census, due to its thematic design, allowed for the classification of the Colombian population according to its different ethnic groups, recognized by the Constitution of 1991, confirming the cultural plurality and its distribution throughout the national territory.

Migration and its causes of different kinds: work, health, education, family, displacement as a form of life protection, among others, shows its effect on the composition of Medellín's population. Effectively, in the total population residing in Medellín at the moment of the 2005 census, it was found that 6.5% recognized themselves as black or Afro-Colombian¹⁶ and 0.1% as indigenous, both groups, of which due to cultural aspects,

present differences both in terms of fecundity as well as in mortality and schooling levels; differences which could affect the indicators in the destined *comunas*. Considering the existing legislation concerning these minority populations, it is necessary to take such differences into account in the processes of development planning.

Permanent limitations

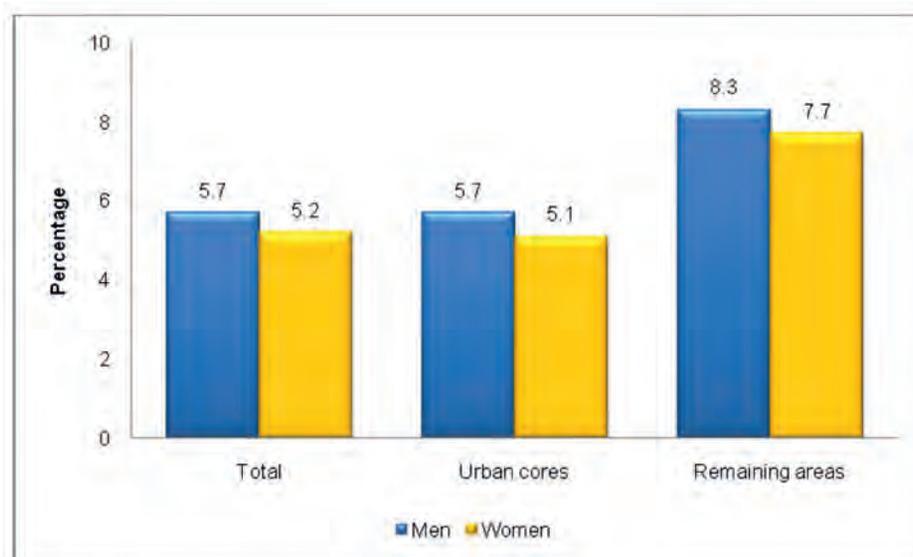
The variable concerning the limitations a population faces in order to undertake its daily activities is basic when one wants to characterize and define the base lines that need to be taken into account when orienting public policies concerning basic health, educational and infrastructural attention.

As can be observed in the data from figure 5.11, it was found that for the year 2005 there is a higher prevalence for men, being of a superior magnitude in the *remaining areas*; this higher prevalence could be associated with accidents and violence.

The problem with this type of data is that they do not refer to the type of severity (disability) of the limitation, which would give more elements for policy formulation. However, in terms of the interview it is proven that by thematically focusing on this factor, the omission is very high given that the concept of "disability" is not accepted by many people.

¹⁶ The immigration from Chocó to Medellín is relevant.

Figure 5.11
Medellín:
prevalence of
permanent
limitations by sex,
according to
the 2005 census
Source: DANE.
Author's calculations.



Evolution of fecundity

Fecundity, as a variable responsible for the biological offer to population growth has been decreasing by a significant manner in the last decades in Medellín, influenced by a series of determining factors,¹⁷ leading to the result that women modify their reproductive criteria. This decrease, for example in the Colombian case, has been of a higher intensity in the period 1993-2005, but in the case of Medellín it took place before the census of 1993. In effect, while at the national level, fecundity has presented a fall of 21.0%¹⁸ in the last inter-census period, in Medellín it has fallen by only 7.2%,

passing from an average number of children per woman of 2.13 in 1993 to 1.98 in 2005, explained by a more advanced acceleration of the transition process than that found in the national average. In Medellín, by finding itself with very low levels of fecundity (almost at replacement), the gains are much lower.

These differences or transitional surpluses are explained by the fact that this variable has a high correlation with the levels of poverty, less education or belonging to indigenous groups, the population groups of which have higher levels of fecundity, an aspect which is confirmed when one considers, for example, the results of this variable at the departmental level.¹⁹

¹⁷ These are the variables denominated intermediate which inhibit fecundity: marriage deferral, use of contraceptive, induced abortion and postnatal infertility. Studies show that the variable that has highest statistical significance is the use of contraceptives.

¹⁸ It went from a TFR of 3.15 in 1993 to one of 2.48 in 2005.

¹⁹ The Total Fertility Rate for 2005 is: Bogotá (1.92), La Guajira (3.58), Amazonas (3.77), Guainía (4.03), Chocó (4.23), Vaupés (4.25), and Vichada (4.37).

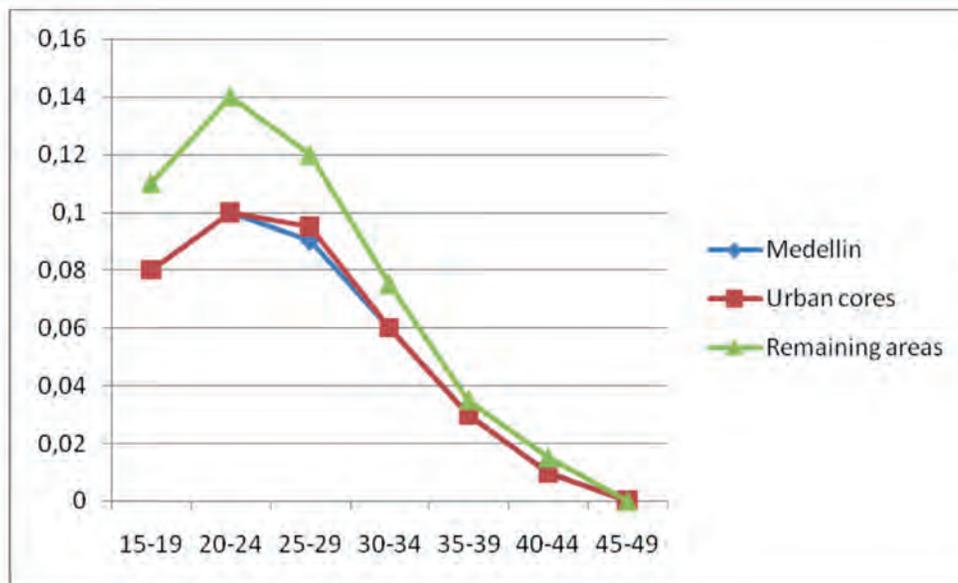


Figure 5.12
Medellín-Total:
specific rates of fecundity by age, 1993 and 2005.
Source: DANE. 1993 and 2005 censuses.
Author's calculations.

In the figure 5.12 one can observe the differences in the probability that, according to age group, women have of having children.

According to the previous figure, while the Total Fertility Rate (TFR) displays a decrease between the years 1993 and 2005, taking into account the behavior of age groups of fertile women, one discovers that for the late adolescent, 15 to 19 years of age, the fecundity rate in all of Medellín has increased by 16.6% and, given its importance, taking into account that pregnancies at this age are high risk, it can have an impact in terms of maternal mortality and as such in increased costs for the health sector. This increase is much higher in the *remaining areas*, coming to the order of 41.7%.

The previous point means that the drop in fecundity in Medellín

is explained specifically by the reduction in the percentage of participation of the fecundity of women of 20 years or more, data presented in table 5.3.

As can be seen in the table mentioned, the fecundity of women aged between 15 and 19 has increased in the last intercensus period, both in the *urban cores* and in the *remaining areas*, with the *remaining* displaying a significant rise in terms of its contribution to fecundity (47.7%). These differences in participation explain, to a great degree, the *urban cores-remaining areas* gap in the Total Fertility Rate.

An increase in the participation of late adolescent fecundity is basically explained by the increase of this indicator in the majority of the *comunas*, given that the relative weight of the *remaining areas* does

not significantly impact on Medellín’s total. As can be observed in table 5.4 (in nine of the sixteen *comunas*) adolescent fecundity increases in its percentile contribution at the level of fecundity per *comuna*, with the neighborhoods of La Candelaria, Villa Hermosa, Manrique, San Javier and Guayabal being the ones that present the highest increases in the 1993-2005 period, above 10% in terms of each one’s contribution to fecundity. The total number of women in this age group residing in *comunas* whom increased their contribution to fecundity represents 60.5% of the feminine population of this group for all of the 16 *comunas* and 57% in Medellín’s total, which explains the increase in the contribution to the fecundity level for all of Medellín.

The data in table 5.4 shows the coherence between the low contribution of adolescent fecundity and the *comunas* of higher socio-economic “status”.

Table 5.3 Medellín: percentage change of the participation to the fecundity of women between 15 and 49 years of age. 1993-2005 period

AGE GROUPS	1993 – 2005 PERIOD		
	% MEDELLÍN	% URBAN CORES	% REMAINING AREAS
15 - 19	25.7	24.6	47.7
20 - 24	- 4.7	-4.5	-3.3
25 – 29	-5.6	-5.3	-10.1
30 – 34	-6.6	-6.9	-7.6
35 – 39	-5.2	-4.6	-20.4
40 – 44	-2.3	-1.3	-3.2
45 - 49	-25.7	-23.0	-43.0

Source: DANE. 1993 and 2005 censuses. Author’s calculations.

Table 5.4 Medellín-comunas: percentage change of the participation to the fecundity of women between 15 and 19 years of age. 1993-2005 period

COMUNA	SPECIFIC RATE		VARIATION
	1993	2005	
Popular	0.1284	0.1353	5.4%
Santa Cruz	0.1238	0.1153	-6.9%
Manrique	0.0874	0.0971	11.1%
Aranjuez	0.0853	0.0940	10.2%
Castilla	0.0765	0.0641	-16.2%
Doce De Octubre	0.0909	0.0931	2.4%
Robledo	0.0768	0.0769	0.1%
Villa Hermosa	0.0849	0.1049	23.6%
Buenos Aires	0.0676	0.0634	-6.3%
La Candelaria	0.0538	0.0592	10.1%
Laureles – Estadio	0.0270	0.0140	-48.3%
La América	0.0364	0.0292	-19.6%
San Javier	0.0814	0.1019	25.11%
El Poblado	0.0251	0.0175	-30.1%
Guayabal	0.0474	0.0587	24.0%
Belén	0.0457	0.0430	-5.8%

Source: DANE. 1993 and 2005 censuses. Result of the agreement DANE-Alcaldía.

As indicated previously, Medellín, in the year 2005, already finds itself below the rate of replacement, given that its level for this year is 1.98 children per woman. This low level is explained by the reduction in the contribution to fecundity on the part of women between 20 and 49 years of age and, as such, this also explains this point in the *comunas*. The previous point is correlated to a higher education level for women, an increase in the inter- and proto-genic intervals, explained by the greater amplitude between having children, or putting off having the first child, because of the mother's entrance into the labor market or to superior studies as well as the utilization of modern methods of contraception. All of these factors explain the reduction in the size of households.

In the table 5.5 Medellín's fecundity levels in the census years are displayed, years in which one can see the magnitude of the drop in the fecundity level, as well as the demographic gaps that are presented among the different conglomerations of which the municipality is composed.

Table 5.5 Medellín: Total Fertility Rate. Years 1993 and 2005.

TFR			
COMUNA	1993	2005	VARIATION
Popular	3.04	2.73	-10.2%
Santa Cruz	2.77	2.46	-11.1%
Manrique	2.48	2.13	-14.2%
Aranjuez	2.25	2.03	-9.7%
Castilla	2.23	1.71	-23.2%
Doce De Octubre	2.48	2.02	-18.8%
Robledo	2.28	1.98	-13.0%
Villa Hermosa	2.36	2.26	-4.2%
Buenos Aires	2.06	1.87	-9.4%
La Candelaria	1.77	1.75	-1.5%
Laureles – Estadio	1.49	1.40	-5.9%
La América	1.57	1.46	-7.3%
San Javier	2.42	2.31	-4.6%
El Poblado	2.0	1.62	-19.2%
Guayabal	1.81	1.49	-17.8%
Belén	1.74	1.60	-7.9%
Total urban cores	2.06	1.94	-5.7%
Total remaining areas	2.62	2.51	-4.2%
Total Medellín	2.14	1.98	-7.5%

Source: DANE. 1993 and 2005 censuses. Result of the agreement DANE-Alcaldía.
Author's calculations.

When considering the level of fecundity for the *urban cores* and *remaining areas*, the first finds itself below the replacement level, associated with a higher education level for women of a fertile age, which permits a better

knowledge of the use of modern methods of contraception, a factor which explains the drop in fecundity (around 75%). Considering the level per *comuna*, it is evident that there are still high levels with respect to Medellín's total, as is the case with the neighborhoods Popular, Santa Cruz, Villa Hermosa and San Javier, all of which could be showing social inequities and high vulnerability.

The evolution of mortality

Mortality is another of the variables that explains changes in the level and structure of a population and, combined with fecundity, it determines the natural population growth in a given year or period.

In the last decades in Colombia, and particularly in Medellín, there have been changes in the life conditions, which, added to medical advances as well as the increase in knowledge of the etiology of illnesses,²⁰ have generated a significant reduction in mortality in early ages, something which has been reflected in an increase in the life expectancy of Colombians in general.

In Medellín, and in greater or lesser intensity in the rest of Colombia, and in the countries of the region, feminine mortality is inferior to masculine mortality, which expresses itself in superior levels of life expectancy at birth for women.²¹ These changes and differences in mortality by sex and age group are evidenced via the estimations obtained in the 2005 General Census and from the vital statistics which corroborate the existence of higher mortality levels in men of all ages, especially in the group of men between 10 and 45 years of age, associated with violence and certain illnesses that have more serious effects on men. These differentials can be observed in figure 5.13.

With the estimation for the year 2005 one can observe an important reduction in male mortality in the ages 15 to 35, which was brought about by the reduced effect of violence²² upon masculine mortality. Equally, one can observe in the previous figure an important reduction in the mortality of women between 15-19 years of age, which could be associated, in part, to the reduction in accidents and maternal mortality.

²⁰ Similar to the demographic transition, in terms of health, Colombia has presented an epidemiological transition which determines a change in the profiles of morbidity, mortality from causes and the distribution of defections by age and sex.

²¹ This contrast is associated to the differential prevalence by sex of illnesses or circumstances that cause death and the possibility of facing them. Biological differences do exist between the sexes, taking into account that there exist illnesses that affect women (pregnancy complications and birth) which have been more successfully combated than those illnesses that affect mostly men (causes of death associated to cardiovascular illness, violence and certain types of malignant tumors).

²² According to the registers, for the period prior to 1993 the first cause of death in men was violence (homicides); from 2003, the first cause became ischemic heart illness and violence fell back to second place.

Figure 5.13
Medellín:
possibilities of
death by sex and
age, 1993 and 2005
censuses.
Source: DANE.
2005 General
Census.
Calculations
taken from the
agreement DANE-
Alcaldía.

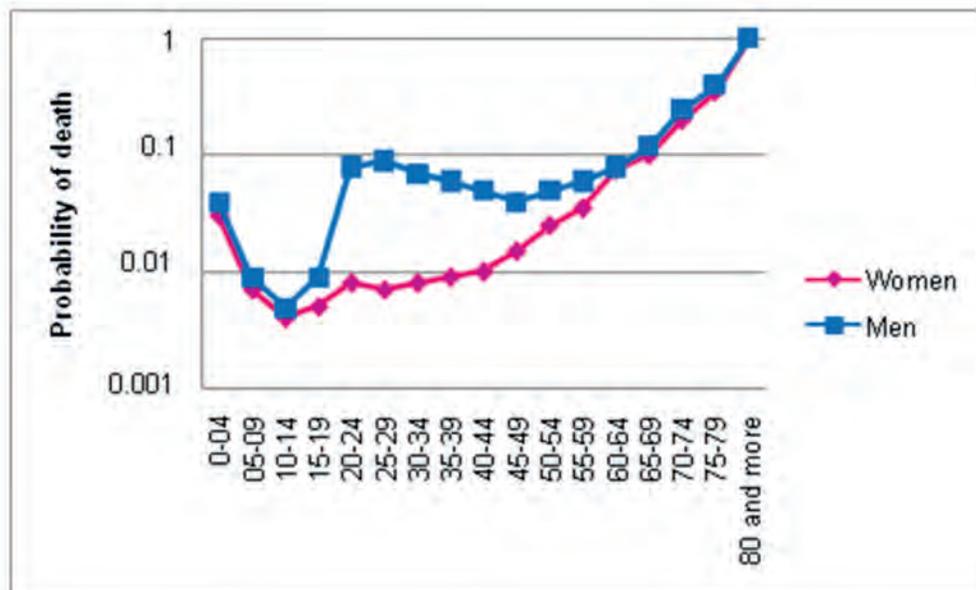
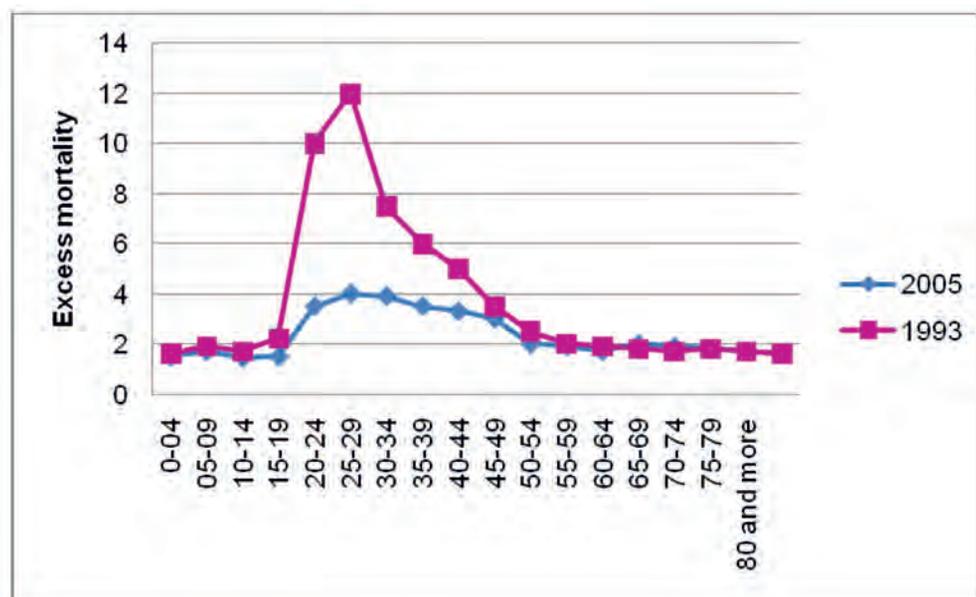


Figure 5.14
Medellín: excess
masculine
mortality by age,
year 1993
and 2005.
Source: DANE.
2005 General
Census.
Calculations
taken from the
agreement DANE-
Alcaldía.



With the aim of visualizing the evolution of the excess rate of masculine mortality, in figure 5.14 one can identify how the main risk factor for men has always been present, although it was less intense in 2005.

From figure 5.14 it is important to highlight the reduction in the excess rate of masculine mortality in the inter-census period 1993-2005 which could be highly associated with the lower participation of violent causes of death and changes in the epidemiological profiles in the *comunas*, which define new patterns of morbidity-mortality. In the same manner, this decrease in mortality is a consequence of a lower infant mortality rate²³ and as such, an increase in the life expectancy at birth.

In table 5.6 one can observe the behavior of these two variables, which identify, in an appropriate manner, the quality of life of a society, of which two aspects are fundamental. The first is related to the overall total for Medellín and for the *comunas* with differentials in terms of life expectancy for the year 1993, which is a result of excess male mortality for the period prior to this given year, associated principally with violent deaths. This pattern is replicated at the level of the *comunas* with more intensity in those with higher

levels of poverty, bringing about, for that year, male life expectancy rates below the 60 years of age. This implies that for this era, the epidemiological profiles per *comuna* displayed major differences which, afterwards have improved, bringing about important milestones in terms of years of male life for the year 2005, with sex differentials of around five years; in the year 1993 these differentials were very wide.

The second aspect has to do with the evolution of infant mortality in the same period, measured with probability. As can be observed in the data from the previous table, infant mortality has presented an important decrease in the last twelve years, with Medellín as a whole showing the intensity of this decrease to greatest extent in males, to a degree of 9.7%, while for women the figure came to 5.7%. The reduction in infant mortality, as well as in mortality for the group of men aged between 15 and 35 years, displays progress in terms of life expectancy at birth for both sexes, showing an increase in the period analyzed of 13.6%. This increase is explained by the fact that this indicator presents an improvement of 23.7% in men and 5.2% in women, which demonstrates a difference between the sexes of 5.8 years for 2005.²⁴

²³ The demise of infants of less than one year of age per thousand births.

²⁴ For the same year the gap between the sexes in this indicator at the national level came to 6.9 years.

Table 5.6 Medellín: life expectancy at birth and infant mortality, years 1993 and 2005

COMUNA	SEX	LIFE EXPECTANCY AT BIRTH			INFANT MORTALITY (per thousand)			COMUNA	SEX	LIFE EXPECTANCY AT BIRTH			INFANT MORTALITY (per thousand)		
		1993	2005	2005	1993	2005	2005			1993	2005	2005	1993	2005	2005
Popular	Male	54.80	68.72	24.09	21.42		La Candelaria	Male	53.52	68.33	30.27	21.82			
	Female	70.08	74.05	22.23	17.32			Female	70.48	75.03	27.25	19.96			
	Both	62.25	71.32	23.18	19.42			Both	61.80	71.60	28.80	20.91			
Santa Cruz	Male	54.55	68.88	20.22	17.03		Laureles Estadio	Male	61.35	75.03	14.39	11.33			
	Female	70.24	74.85	16.80	15.38			Female	74.42	80.99	13.43	9.20			
	Both	62.20	71.19	18.55	16.22			Both	67.73	77.93	13.92	10.29			
Manrique	Male	53.99	69.13	23.36	21.45		La América	Male	62.29	74.67	15.75	11.52			
	Female	70.89	75.56	19.93	17.35			Female	75.15	79.94	12.86	9.66			
	Both	62.23	72.27	21.69	19.45			Both	68.57	77.24	14.34	10.61			
Aranjuez	Male	54.51	69.88	21.68	18.26		San Javier	Male	60.69	68.02	23.21	18.39			
	Female	71.40	76.73	16.49	14.03			Female	73.00	75.30	20.31	16.36			
	Both	62.75	73.22	19.15	16.20			Both	66.69	71.57	21.80	17.40			
Castilla	Male	54.27	72.51	19.55	16.24		El Poblado	Male	66.60	78.59	14.31	8.41			
	Female	71.24	78.63	16.87	15.20			Female	74.57	81.95	13.36	7.69			
	Both	62.55	75.50	18.24	15.73			Both	70.49	80.23	13.85	8.06			
Doce de Octubre	Male	56.38	70.93	20.01	17.15		Guayabal	Male	55.59	72.29	24.34	21.82			
	Female	72.55	77.22	17.51	14.19			Female	71.73	79.00	18.25	17.02			
	Both	64.27	74.00	18.79	15.71			Both	63.46	75.56	21.37	19.48			
Robledo	Male	56.24	71.20	24.40	18.18		Belén	Male	60.02	72.94	19.04	15.93			
	Female	71.82	74.01	19.23	14.25			Female	74.35	79.81	16.90	13.47			
	Both	63.84	72.57	21.88	16.27			Both	67.01	76.29	18.00	14.73			
Villa hermosa	Male	54.93	69.36	25.09	17.53		Total comunas	Male	57.54	71.56	21.14	19.79			
	Female	71.98	76.15	19.04	15.92			Female	73.23	77.91	18.94	17.58			
	Both	63.25	72.67	22.14	16.75			Both	65.19	74.65	20.07	18.71			
Buenos Aires	Male	55.37	69.72	20.65	15.31		Total Medellín	Male	57.64	71.32	21.97	19.84			
	Female	72.28	75.16	17.90	13.85			Female	73.36	77.15	19.07	17.98			
	Both	63.62	72.37	19.31	14.60			Both	65.30	74.17	20.56	18.93			

Source: DANE. 1993 and 2005 censuses. Vital statistics. Results from the Agreement DANE-Municipal Mayor's Office.
 *Infant mortality refers to the probability that a baby will die in Medellín before celebrating his/her first year of life. The life expectancy at birth is the number of years that a recently born baby can expect to live; this indicator decreases with the advance of age.

Nevertheless, when one looks at the indicators at the level of *comuna*, one encounters major differentials, showing high social and economic inequalities. In the case of infant mortality for the year 2005, Medellín and its *comunas* are below the national average (22 per thousand), which shows the difference in terms of attention and prevention in terms of health policies. However, up until 2005 the infant mortality rate for Medellín was 18.9 per thousand life births and this includes a high weight of deaths that were avoidable; 64.8% of the deaths of infants of less than one year old per year in Medellín are avoidable; of these the ones of highest incidence are: ARI²⁵ (7.1%), ADD²⁶(3.7%) and perinatal death²⁷(87.6%). According to the registries of deaths, in terms of the mother's residence, the deaths from ARI in 2007 came to 14.7%, for ADD 1.7% and for perinatal death 81.5%, which illustrates that the decrease in the rate of infant mortality in Medellín is explained, fundamentally, by the reduction in perinatal deaths.

The evolution of internal migration

Migration is another variable of population dynamics, although it is

one that is not random but selective in terms of age and sex, and it is a result of the social, economic, political and environmental characteristics that prevail in each of the regions.

This variable has two components of great relevance in the development of a region or country. The first concerns internal migration, which has a huge impact on the spatial distribution of a population, and as such, on the urbanization process; the other, is international migration, which in the case of Colombia in the last twelve years, presents important changes in both level and structure.

Many factors interplay in the determination of internal migration flows in Colombia, and in the lower-level administrative entities, as in the case of Medellín. The results are given principally in the urbanization process and, with this, the conformation of centralities of regional attraction, such as the case of Barrancabermeja in the Magdalena Medio; the triangle Pitalito-Garzón-La Plata in the south of Huila; the entire corridor of cities in the central part of the Valle de Cauca and the Eje Cafetero²⁸ up until Medellín; the route of Piedemonte Llanero with

²⁵ Acute Respiratory Infections (TN)

²⁶ Acute Diarrheal Disease (TN)

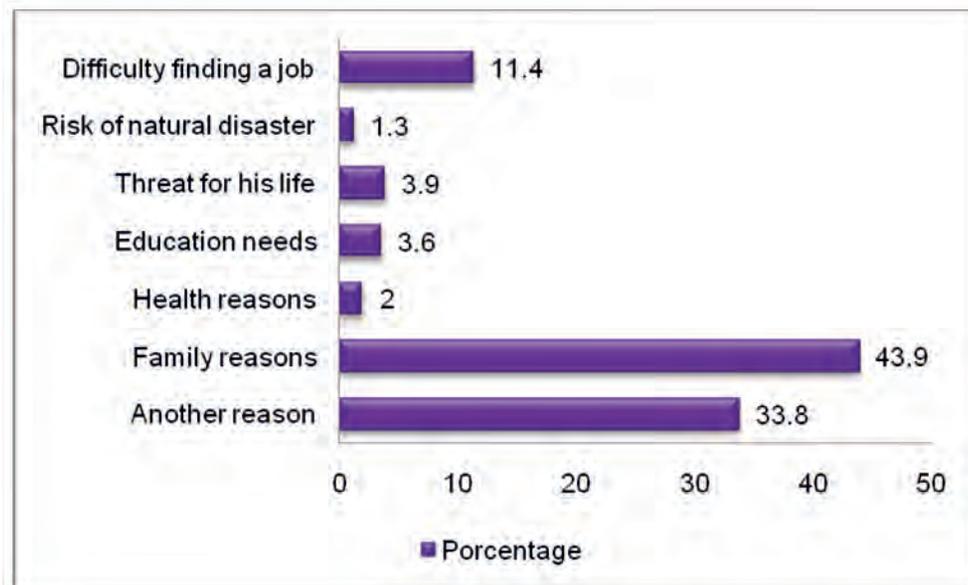
²⁷ These are the deaths that occur in the first seven days after birth.

²⁸ *Eje Cafetero* (Coffee-Growers Axis or Coffee Route) is an area, part of the "Old Antioquia" or "Paisa" region, in the departments of Caldas, Quindío and Risaralda, famous for its great development in the production of coffee and for its touristic importance. (TN)

Villavicencio-Yopal; the corridor of influence of Bogotá D.C. as a city-region; the metropolitan areas of Bucaramanga, Cúcuta, Cartagena, Barranquilla; the corridor of Pasto-Ipiales in Nariño, among others.

In the case of immigration to Medellín in the period 2000-2005, the causes that motivated these changes²⁹ show a high frequency in terms of “family reasons” and “other reasons” which together represent 77.7% of all causes. Here it is important to take into account the fact that, among these categories, it is possible that some people, due to external reasons, did not declare the true cause of the change in their habitual place of residence, as is the case for violent factors. In the following figure, one can observe the frequencies of each of the causes for change in place of residency in the last five-year period.

Figure 5.15
Medellín: principal causes for changes in the place of residency in the period 2000-2005. Source: DANE. 2005 General Census. Author’s calculations.



For Medellín, it is evident that the labor factor is significant as a cause for changes in the place of residency, being the variable that represented 11.4% of all the people that realized internal migration movements during the five years prior to the census. Also, it is necessary to call attention to the cases when a change in the place of residency was motivated by death threats, given that this population is made up of households that have a high number of people lower than the age of 20 and of female heads-of-

²⁹ The 2005 General Census included a question for the entire population that looked into the cause of the last change in the period 2000-2005.

house with low levels of schooling. This analysis of violently displaced population is of great importance in decision-making concerning adequate attention which, by law, the local, departmental and national authorities should provide to these people in the places they arrive to, as a means of guaranteeing this population access to basic subsistence services, as well as the means of reinserting themselves back in their places of origin.

Taking into account the results for this theme within the framework of the Agreement DANE-Alcaldía, one can see that the immigration to Medellín is mostly feminine, given that of the total number of immigrants in the period 2000-2005, 52.2% were women. If we take into account the place of origin of these immigrants, one finds that 77.9% come from the Western Region;³⁰ it is also important to note that 5.0% of these immigrants come from another country, and some of these people could be part of a returning immigration process (table 5.7). One aspect to consider which is concurrent with the pattern and selectivity of migration is the fact that the majority of this population is economically active. According to the census, 36.4% and 37.7% of the

women and men who immigrate fall within the age bracket between 20 and 34 years, which means higher demands for goods and services and especially, greater pressure on the labor market.

If we take into account immigration to Medellín according to the regions of Antioquia from which it stems, one sees that the main offer comes from the Aburrá Valley, which represents 36.7% of the immigration from Antioquia towards Medellín; the East and South-East zones follow in importance, providing 19.3% and 12.4%, respectively, of the immigrants (table 5.8 displays the volumes for the rest of the regions). This shows that Medellín, as a centrality of regional and national attraction, should be considered in planning processes as a “city region” that brings social, economic and cultural dynamics (among other factors) to an entire territorial sphere.

An important result within the frame of the Agreement DANE-Alcaldía was that it could identify the flow of immigration towards the *comunas* and *corregimientos* that make up the municipality of Medellín, as can be seen in table 5.8.

³⁰ See the table that shows the composition of each region in Annex 5.1.

Table 5.7 Medellín: number of immigrants per region of origin in the period 2000-2005

REGION	TOTAL	MEN	WOMEN
Atlantic Coast	11 034	5109	5925
Amazonas	491	276	215
Orinoquía	799	434	365
West	110 878	52 475	58 403
Center-East	12 024	6131	5893
Other country	7151	3621	3530
TOTAL	142 377	68 046	74 331

Source: DANE. 2005 General Census. Based on the results of the Agreement DANE-Alcaldía.
See table Annex 5.1 for the composition for national regions.

Table 5.8 Medellín: number of immigrants per region of Antioquia in the period 2000-2005

REGION OF ANTIOQUIA	TOTAL	MEN	WOMEN
Aburrá Valley	21 365	10 186	11 179
Bajo Cauca	1566	722	844
Magdalena Medio	1129	548	581
North-East	3015	1388	1627
North	3924	1737	2187
West	5292	2373	2919
East	11 246	5279	5967
South-West	7225	3260	3965
Urabá	3502	1591	1911
Total	58 264	27 084	31 180

Source: DANE. 2005 General Census. Based on the results of the Agreement between DANE and the Alcaldía de Medellín.

See table Annex 5.2 for the composition for the regions of Antioquia.

Table 5.9 Medellín: distribution according to sex of the number of immigrants to Medellín in the five-years, 2000-2005, according to habitual residency per comuna and corregimiento in the period 2000-2005.

PLACE OF RESIDENCY	SEX						YEARLY AVERAGE			MEDELLÍN'S TOTAL (%)		
	MEN		WOMEN		TOTAL		MEN	WOMEN	TOTAL	MEN	WOMEN	TOTAL
	N	%	N	%	N	%						
Popular	2952	5.15	3076	4.88	6028	5.01	590	615	1206	0.28	0.26	0.27
Santa Cruz	2142	3.74	2315	3.67	4457	3.70	428	463	891	0.21	0.20	0.20
Manrique	3569	6.23	3703	5.87	7272	6.04	714	741	1454	0.34	0.31	0.32
Aranjuez	4091	7.14	4219	6.69	8310	6.90	818	844	1662	0.39	0.36	0.37
Castilla	4200	7.33	4492	7.12	8692	7.22	840	898	1738	0.40	0.38	0.39
Doce de Octubre	2892	5.05	3150	4.99	6042	5.02	578	630	1208	0.28	0.27	0.27
Robledo	3778	6.59	3994	6.33	7772	6.46	756	799	1554	0.36	0.34	0.35
Villa hermosa	3601	6.29	3584	5.68	7185	5.97	720	717	1437	0.35	0.30	0.32
Buenos Aires	3686	6.43	4018	6.37	7704	6.40	737	804	1541	0.36	0.34	0.35
La Candelaria	3389	5.92	3223	5.11	6612	5.49	678	645	1322	0.33	0.27	0.30
Laureles Estadio	4475	7.81	5308	8.41	9783	8.13	895	1062	1957	0.43	0.45	0.44
La América	2300	4.01	2834	4.49	5134	4.26	460	567	1027	0.22	0.24	0.23
San Javier	3639	6.35	3865	6.13	7504	6.23	728	773	1501	0.35	0.33	0.34
El Poblado	3672	6.41	5422	8.59	9094	7.55	734	1084	1819	0.35	0.46	0.41
Guayabal	3363	5.87	3440	5.45	6803	5.65	673	688	1361	0.32	0.29	0.31
Belén	5542	9.67	6453	10.23	11995	9.96	1108	1291	2399	0.53	0.55	0.54
Total for comunas	57 291	81.57	63 096	82.22	120 387	81.91	11 458	12 619	24 077	5.52	5.34	5.42
San Sebastián de Palmitas	119	0.92	98	0.72	217	0.82	24	20	43	0.01	0.01	0.01
San Cristóbal	2348	18.14	2537	18.59	4885	18.37	470	507	977	0.23	0.21	0.22
Altavista	1947	15.04	1950	14.29	3897	14.66	389	390	779	0.19	0.16	0.18
San Antonio de Prado	8031	62.05	8587	62.94	16 618	62.50	1606	1717	3324	0.77	0.73	0.75
Santa Elena	498	3.85	472	3.46	970	3.65	100	94	194	0.05	0.04	0.04
Corregimientos	12 493	18.43	13 644	17.78	26 587	18.09	2589	2729	5317	1.25	1.15	1.20
Total for Medellín	70 234	100.00	76 740	100.00	146 974	100.00	14 047	15 348	29 395	6.77	6.49	6.62

Source: DANE. 2005 General Census. Based on the results of the Agreement DANE-Alcaldía.

As can be observed in the previous table, Belén is the *comuna* that received the highest volume of immigrants in the stated period, representing 10% of the total amount of immigration to Medellín. The average yearly number of immigrants arriving to the *comunas* came to 24 077, of which more than half are women (52.4%); as is indicated in the previous paragraphs, the main proportion come from the Aburrá Valley.

Another important fact is that the immigrant population is made up of a high proportion of people with no schooling, an aspect that is coherent with the pattern of this phenomenon, but due to the volume it could have an impact on strategic indicators. Nonetheless, the additional value of unraveling these patterns is that political and social redirections can be made, which can reduce negative impacts concerning the medium and long term planning process. According to the study realized via the Agreement, it was found that, for example, “[...] of the 16 *comunas* for the period considered, Manrique presents the highest percentage of immigrants without schooling coming to Medellín, that is 11.70% for a total of 802 people. It is followed by the *comunas*

Popular, with a participation of 11.3%, Villa Hermosa with 9.3% and Aranquez with 8.78%. On the contrary, the *comunas* with the lowest participation of immigrants without schooling were: Poblado with 2.03% and La América with 2.35%. It should be noted that, by observing the participation of each *comuna* in terms of the proportion of immigrants without schooling with respect to the total number of immigrants residing there, after arriving in the five years period of analysis, one can note how the *comunas* Popular, Santa Cruz, Manrique and Villa Hermosa present the highest proportions, effectively, 13.3%, 11.83%, 11.42% and 9.13% respectively” (DANE-Alcaldía, 2010a).

All of the previously mentioned points show that the *comunas* with the lowest level of development are those that are receiving the highest number of immigrants without schooling, and this should be taken into account because such a situation generates less opportunities for insertion and, in the medium term, it is an attributing factor to vectors of violence, drug addiction and prostitution, all of which are destabilizing vectors and, as such, factors of inequity and vulnerability.

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Annex 5.1 Departments of the national regions

ATLANTIC COAST	AMAZONÍA	ORINOQUÍA	WEST	CENTER – EAST
Atlántico	Amazonas	Arauca	Antioquia	Bogotá
Bolívar	Caquetá	Casanare	Caldas	Boyacá
Cesar	Putumayo	Guainía	Cauca	Cundinamarca
Córdoba		Guaviare	Chocó	Huila
La Guajira		Meta	Nariño	Norte de Santander
Magdalena		Vaupés	Quindío	Santander
Sucre		Vichada	Risaralda	Tolima
San Andrés			Valle	

Annex 5.2 Municipalities of the regions of Antioquia

REGIONS OF ANTIOQUIA									
Aburrá Valley	Bajo Cauca	Magdalena Medio	North-East	North	West	East	South-West	Urabá	
Medellín	Cáceres	Caracolí	Amalfi	Angostura	Abriaquí	Abejorral	Amagá	Apartadó	
Barbosa	Caucasia	Maceo	Anorí	Belmira	Santa fé de Antioquia	Aleandría	Andes	Arboletes	
Bello	El Bagre	Puerto Berrío	Cisneros	Briceño	Anzá	Argelia	Angelópolis	Carepa	
Caldas	Nechí	Puerto Nare	Remedios	Campamento	Armenia	El Carmen de Viboral	Betania	Chigorodó	
Copacabana	Tarazá	Puerto Triunfo	San Roque	Carolina	Buritica	Cocomá	Betulia	Murindó	
Envigado	Zaragoza	Yondó	Santo Domingo	Don Matías	Caicedo	Concepción	Ciudad Bolívar	Mutatá	
Girardota			Segovia	Enterríos	Cañasgordas	Granada	Caramante	Necoclí	
Itagüí			Vegachí	Gómez Plata	Dabeiba	Guarne	Concordia	San Juan de Urabá	
La Estrella			Yalí	Guadalupe	Ebéjico	Guatapé	Fredonia	San Pedro de Urabá	
Sabaneta			Yolombó	Ituango	Frontino	La Ceja	Hispania	Turbo	
				Dan Andrés de Cuerquía	Giraldó	La Unión	Jardín	Vigía del Fuerte	
				San José de la Montaña	Heliconia	Marinilla	Jericó		
				San Pedro	Liborina	Nariño	La Pintada		
				Santa Rosa de Osos	Olaya	Peñol	Montebello		
				Toledo	Peque	Retiro	Pueblorrico		
				Valdivia	Sabanalarga	Rionegro	Salgar		
				Yarumal	San Jerónimo	San Carlos	Santa Bárbara		
					Sopetrán	San Francisco	Támesis		
					Uramita	San Luis	Tarso		
						San Rafael	Titiribí		
						San Vicente	Urrao		
						El Santuario	Valparaiso		
						Sonsón	Veneza		

ABSTRACTS

THE NATURAL ENVIRONMENT

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The Medellin Valley and its slopes are underlain by a large variety of rocks of different ages, mainly igneous and metamorphic. Most of the slopes are mantled by colluvial deposits which may reach ages of 2,0 M years and the bottom of the valley is filled with alluvial deposits of variable thickness.

The valley consists of a 60 km long and 1,5 km deep trench opened in the surrounding plateaus and mountains which may culminate at 3040 m asl. The climate of the valley is humid and tropical. The average temperature (at 1500 mas l) is 22°C and diminishes with altitude. Rainfall varies from 1400 mm in the north to about 3000 mm in the southern end, due to the general direction of trade winds modified by topography. The valley and its slopes were originally covered by thick humid mountain forest. A great variety of soils are found due to variation in lithology, climate and slope. Fertility is low, as the original forest which recycled natural nutrients is now destroyed. Several aspects of the natural environment deserve further studies; valley sediment thickness, ground water dynamics and detailed meteorological processes and distribution are representative examples.

HUMAN IMPACT

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When the first Spaniards reached the Valle of Aburra in 1541, they found it scarcely populated, but described broad stone trails and remnant of large buildings. Little by little the valley was occupied by the newcomers and dedicated to cattle raising and agriculture to support the surrounding gold mining districts.

Medellin was recognized as a city in 1675, a relatively late foundation in Colombia. The town started to grow during the 17th and 18th centuries and became the capital of the province of Antioquia in 1826, after the

culmination of independence wars. It continued concentrating commerce and wealth and at the beginning of the 20th century it started its industrial growth. Its population grew from 60 000 inhabitants at the beginning of the century to more than 2 millions in 2000, due to its regional attraction. With the other 9 municipalities which integrate the Valle de Aburra Metropolitan Area, the total population is now (2010) about 3.3 million inhabitants, who benefit from the advantages of a modern city but also suffer from pollution, transportation problems and high population density. The valley's original environment has been almost totally transformed in urban or suburban landscape. Inhabitants depend, on a very large proportion, of regional and national supplies for water, energy, food and building materials. Its ecological footprint is now 2.6 ha per capita; in other words, the valley needs 66.6 more land than its own area in order to subsist.

HAZARDS AND RISKS IN THE ABURRA VALLEY

Departamento de Geología. Universidad EAFIT

Due to its topographical, geological and climatological conditions and to its dense human occupancy, the Aburra Valley is exposed to numerous hazards which have produced heavy tolls and destructions since the beginning of 20th century: lands slides, floods, flash floods, earthquakes, forest fires, etc. Local prevention and relief official organizations are now coordinated under the Area Metropolitana. Several projects are presently carried out as recollection and data analysis, organization of a risk management net including all the municipalities, the design and management of an Early Alert System, the inclusion of natural risk considerations in territorial planning, seismic microzonification, improvement of hazard and risk scenarios, chemical risk map preparation, integration of the information system, creation of local groups for intervention in case of emergency, etc. Although complete control has not been reached to avoid occupancy of hazardous areas, a continuous effort is being carried on in this direction. This situation is particularly difficult due the permanent immigration of people coming from rural areas. Several recommendations are given, including enforcement of control on dangerous area and strengthening of local administration.

LANDSCAPE MANAGEMENT IN THE ABURRA VALLEY TOWARD NATURE CONSERVATION IN THE CITY

Claudia Helena Hoyos Estrada

How sustainable is a metropolis like Medellin and surrounding municipalities? The transformation of a rural to a completely urban environment has occurred without the necessary planning scheme and has created many inconvenients. No ecological design existed and the stretching of urban areas caused a reduction in the landscape and of the natural system capacity to

provide environmental support to the urban population. The Territorial Management Plan defined the Main Ecological Structure to integrate urban parks and protected areas and organized a net including green spaces and corridors which preserve and guide biodiversity negation and essential ecological processes.

The Plan for Land Use and Management of the Rio Medellin and tributaries was designed to secure environmental conservation, protection, recovery, production and urban consolidation of the area. Another initiative is the Antioquia Central Park which covers 9000 km² and 50 municipalities centered around the Aburra Valley. Finally the Master Plan for Green Urban Public Areas completes the programme, and is oriented to incentivate a more ecological behavior of society.

POTENTIAL USE OF SATELLITE IMAGES AS A TOOL FOR URBAN AND ENVIRONMENTAL PLANNING IN THE VALLE DE ABURRA

Jorge Eduardo Patiño

Remote sensed data availability has grown in the past few decades and this has led to the diversification and exploration of new uses and applications for this kind of data in disciplines such as demographics, spatial economy, and social science. Urban ecosystems, physical expression which is reflected in urban morphology, can be described in terms of both bio-physical variables that account for environmental conditions like moisture, temperature, soil type, etc., and human related variables, for example, the presence of pavement and manmade structures, demographics, health and the population's socioeconomic conditions. A significant sample of studies that have used remote sensed data for characterizing and analyzing the urban landscape can be found in the specialized literature and this trend is growing with time. Even though it can be argued that socioeconomic and cultural information cannot be directly observed in remote sensed images, this application is based on the hypothesis that the physical expression of an urban territory reflects the social and cultural conditions of its population. Lo and Faber (1997) mention the work of Green (1957) and Green and Monier (1957) as the first examples of applications that used remote sensed data in the social analysis of the city of Birgmingham, Alabama. Other examples include the work of Mullens and Senger (1969), Miller and Winner (19849, Herold *et al.* (2002), Weeks *et al.* (2007), and Stow *et al.* (2007). This article presents a range of these new urban related applications that could be useful and applicable in the Valle de Aburrá area, beginning with the most basic-like detection and monitoring of mining sites, natural hazard vulnerability assessment, impervious surface quantification in urban watersheds, to the most innovative-like urban morphology characterization, vegetation, land cover and socio economic relationships, slum detection, quality of life assessment and studies about urban space-time

dynamics. The increasing availability of remote sensed data and decreasing costs, along with the launching of the Colombian Space Commission a few years ago, justify research funding in these technologies which can provide useful and relatively inexpensive support for many urban and environmental planning issues in the Aburra Valley .

INFORMALITY AND “URBANISMO SOCIAL”

Alejandro Echeverri, Francesco M. Orsini

Among the consequences caused by the urbanization process and the incapacity of public institutions to supply for the growing demand for land, housing and infrastructure, the production of informal settlements represents one of the biggest challenges that face local governments today while trying to foster more equitable and inclusive cities.

Within this global context Medellín represents a typical example of Latin-American city, where physical informality during the last decades has been growing simultaneously to economic development and demographic expansion, with negative impacts on the physical, social and environmental sphere. Due to these reasons, starting in the nineties, a new generation of integrated slum upgrading programs has been developed. These integral interventions seek to mitigate the deep imbalances that usually characterize informal settlements.

The scope of this article is to portray the phenomenon at the local level and to describe the main characteristics of recent successful interventions as the Primed and the Integral Urban Project (PUI) that, due to the impact they generated, represent today models of intervention. By doing this we will try to extrapolate which are, among many different aspects, the possible keys for success, and which are the features that still need to be improved.

THE PUBLICITY OF THE PUBLIC SPACE

Carlos Mario Rodríguez, Luis Fernando Arbeláez

In light of the present social and cultural conditions in Medellín as a place for collective coexistence, this article synthesizes the principle of *restoring the city as a public space in itself*. In the city, public space should be considered essential for life in society and as the fundamental means for the population to shape and express its political wills.

In the case of Medellín, public space possesses specific characteristics in the way they first appeared and how they articulated with the urban territory. These conditions evidence special characteristics of the public space and its use as a consequence of the urban growth model. These also show the way the territory is occupied in the process of urbanization.

MOBILITY-TRANSFORMING EVENTS ABURRÁ VALLEY, 1995-2010

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José Fernando Ángel Pérez. Architect, Degree in Housing and Urbanism. Consultant. Ex-Secretary of Transportation and Transit, Medellín.

Introduction

This chapter synthesizes the most relevant facts in the evolution of infrastructure, the culture of mobility, and the changes of the public transportation system over the last 15 years. As a result we observe the rationalization and modernization of the bus fleet and its integration to the Metro as well as an increase in the number of cars, motorcycles and taxis in the metropolitan area of Medellín as a system of seven conurbated municipalities.

The chapter analyzes projects and programs referring to public space and pedestrians when the “Roads and Transit” approach changed its main concept to “Mobility”. Finally, it points out important aspects to be considered at the present time in order to achieve a more amiable and sustainable future for the city.

LAND-USE PLANNING AS A MECHANISM FOR SOCIAL TRANSFORMATION: A JUDICIAL AND POLITICAL APPROACH TO THE URBAN TRANSFORMATION OF MEDELLÍN

Camilo Piedrahíta Vargas, José Alonso González

This article seeks to identify, synthesize (if possible), and analyze some of the urban transformation experiences in Medellín over the last decade considering the main judicial and political guidelines established by the land-use planning framework in Colombia.

From the perspective of the judicial institutions, the goal of the projects of urban intervention is to encourage the public administration's commitment of guaranteeing the right to live in an ordered space. It also has an important point of reference regarding the progress, strengths and limitations in Colombia's judicial and political framework in urban planning in Medellín's recent experience. If we were to synthesize the urban transformations (mainly physical) the city has gone through during the last decade, inclusion and integrality are two words which would necessarily have to be used.

DIGNIFIED HOUSING

Ana Elvira Vélez Villa, Ximena Covaleda Beltrán

The present article tries to review the construction of *dignified housing* in housing construction in Medellín during the past ten years. The conceptualization of *dignified housing* is based on the Human Rights Declaration,

its incorporation as a Fundamental Constitutional Right, and its application within the Colombian legislation, comparing domestic management models to those in Spain and Chile.

In order to evaluate the role of dignified housing in the city's urban transformation, the article compares five public and private housing development projects between 1950-2000 and 2000-2010. The projects are assessed in terms of four analytical categories –Normative + Society + City + Architecture– in order to put forth the actual parameters of housing construction according to norms, its inhabitants, the urban environment, and its formal and spatial quality.

CITIES AND THE POVERTY TRAP

Jorge Iván González

Levels of poverty and extreme poverty in Medellín are relatively high in the Colombian urban context. Considering this reality, this article starts out reflecting on income as a proxy to happiness and good life conditions. Second, it analyzes the dynamics of poverty and extreme poverty. Then, it points out the main characteristics of the labor market. Finally, it proposes a reflection on pro-poverty growth which shows that the only way out of the poverty trap is through the combination of both growth and distributive policies.

THE PROCESS OF LOCAL STATENESS CONSTRUCTION (1998-2009): THE KEY TO UNDERSTANDING CHANGE IN MEDELLÍN?

Santiago Leyva Botero

This chapter focuses on the State as an explanatory variable of Medellín's transformation during the last decade. Therefore, it examines three main topics. First, it studies the transformation of the institutional capabilities of the local State. Second, it evaluates whether these capabilities have gained more importance in the broader institutional context. Finally, it stresses the importance of other actors, aside from municipal bureaucracies, in the process of stateness construction in Medellín.

CHANGES IN INTERPRETATION, BEHAVIOR AND PUBLIC POLICIES REGARDING HOMICIDAL VIOLENCE IN MEDELLÍN

Jorge Giraldo Ramírez

There is little doubt that the main security problem in Medellín over the past two decades has been homicidal violence. This study strives to

prove that at least four important changes have occurred in this matter. In chronological order, the first one alludes to the interpretive framework of violence. Two others refer to the phenomenology of homicidal violence concerning a structural variation in the rate of homicides and their nature. Finally, the fourth is a process of social and political learning expressed in an essential change in municipal policies on safety and coexistence.

DISASTER AND POPULATION IN THE ABURRÁ VALLEY

Juanita López Peláez

This article vies to show, in general, how natural disasters and their long-run economic and social consequences have impacted the population of Medellín and its Metropolitan Area. It also highlights the importance of implementing policies derived from what is known as *disaster risk management*. These seek to reduce the impact of natural disasters by directly attacking the underlying conditions of vulnerability, thus influencing prevention and mitigation policies, as well as increasing the community's capacity to respond and recover efficiently.

SOCIO-DEMOGRAPHICAL CHANGES IN MEDELLÍN: INTERCENSAL PERIOD, 1993-2005

Edgar Sardi Perea

This chapter presents the demographic and population dynamics in Medellín based on the 1993 and 2005 censuses, pointing out its particular characteristics compared to those in the rest of the country. In addition to basic socio-demographical aspects –population composition by sex and age as well as fertility and mortality rates– others refer to education, housing, ethnicity and immigration.



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