

HOUSING WHAT'S NEXT?

FROM THINKING THE UNIT TO BUILDING THE CITY

Verónica Adler & Felipe Vera, EDITORS / Verónica Adler, Felipe Vera, Laura Sara Wainer, Pablo Roquero, Mariana A. Poskus, Luis Valenzuela, Marcela Letelier, Pablo Olivares, John Treimun, Alexis Gamboa, Karina Canales, Javier Guajardo, Nora Libertun de Duren, Diane E. Davis, Michael G. Donovan, Pauline Claramunt Torche, María Paloma Silva, AUTHORS.

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Abstract:

Over the course of the 20th century the world's population grew more than during any other period in history, increasing from around 1.5 billion people in 1900 to nearly seven billion people today. Given this exponential growth, it is essential to reflect on what we have done to house this growing population—or what residents have done to procure housing on their own. According to the numbers, we have been capable of building enough housing to compensate for the quantitative deficit; the biggest challenge we face today is to how to make qualitative changes to the existing housing stock. Population growth continues to be strong in the emerging economies of the Global South, and exploring the potential of housing to transform the urban fabric is critical to building better cities.

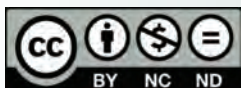
This project by the Housing and Urban Development Division of the IDB is an invitation to make strategic use of lessons learned, to imagine new solutions and possibilities, and to bring a renewed agenda to housing and urban development in the years to come.

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At the Housing and Urban Development Division of the Inter-American Development Bank, we believe that the region faces a major challenge: how to address the growing need for housing. Over the past century, the world's population has grown more than during any other period in history. Today a great part of the world's people live in poverty and the projected rise in the population means that housing will be key to building sustainable, inclusive cities. In 1959, the urban population in Latin America and the Caribbean was 108 million people; today, that figure is nearly 500 million. While the process of urbanization in Europe took a century, Latin America has experienced exponential growth in just 50 years, with the urbanization rates in some countries growing

between 4 and 10% annually. In other words, this has been an extremely rapid process, one that has entailed major challenges for local and national governments seeking to provide housing and citizen services, in the broadest sense of the term. Today an important topic we must address is not only how to increase the amount of housing available but how to remedy the large number of units that need improvements in quality. If we consider the numbers presented in this book, this need becomes even more pressing. For example, the quantitative housing deficit represents just 6% of the total deficit in urban areas while the greatest deficit is related to the coverage and quality of services, housing tenure and other qualitative aspects. One interesting fact is that

while the aggregate qualitative deficit represents 94% of the total deficit, 90% of housing solutions involve the construction and delivery of new units. In other words, housing policies are not addressing the need to improve the quality of existing stock and habitats. Therefore, it is necessary to change the way in which we are supporting housing in these countries, putting greater emphasis on their quality and surroundings. In addition, a more integral vision is needed, one that allows us to enrich the discussion on housing and approach it as a key component to building the urban fabric of our cities.

When we refer to housing quality, one fundamental element involves better locations and more affordable

conditions. Therefore, this project is an invitation to think about housing policies that consider the complexity of urban systems and the accessibility to services and territorial assets in order to guarantee a better quality of life. In recent years, dispersion has characterized urban growth models and the peripheral location of social housing has had a major impact on the social, economic and environmental level. Statistically speaking, homes on the urban periphery are often poorer than those in city centers, with an average difference in household spending of 45% (Brazil), 42% (Mexico) and 27% (Colombia). These households are also more vulnerable and are home to a much greater number of female household heads (65%) than those in the city center (45%). In this context,

new ways of observing the territory are needed, ones that consider accessibility in transport models, mixed land uses, the urban habitat and the social function of the territory to ensure greater sustainability in the production of both housing and city. At the Housing and Urban Development Division, we are convinced that one of the IDB's fundamental missions is to add value by integrating international experiences. That is why the goal of this book and project is to learn from the cases and solutions presented from across the Global South that we consider relevant for Latin America and the Caribbean. The sample gathers lessons learned from 100 housing projects in the Global South with solutions that reveal how to improve existing stock

and enhance the housing of the future in an efficient, participative and inclusive manner. These include stories of success from the emerging economies of Latin America, Asia and Africa that contribute lessons in key areas. How can we make housing a driver of inclusion? How can we make housing accessible, in the broadest sense of the word? How can we ensure that housing is resilient in all aspects? And finally, how can we finance housing and ensure that it is affordable for all? We hope that this book and its accompanying exhibit represent a step towards building better cities.

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In our review of the state of housing in Latin America and the Caribbean, figures indicate that although housing has been built to adequately address the quantitative deficit, the greatest challenge we face at this time is to improve the quality of the existing stock. Emerging regions are currently experiencing demographic growth, and housing provision programs tend to primarily address the quantitative deficit. Given this—and the need to target both quantitative and qualitative issues simultaneously—the question of how to change the paradigm and begin to consider housing’s contribution to the quality of the urban fabric becomes critical to building better cities.

HOUSING, WHAT’S NEXT? poses a series of questions that aim to

start a productive, evidence-based conversation by looking at cases that have transformed local contexts or changed the vision of what housing can offer. We approach the subject from two angles: on the one hand, in order to consider the transformative powers of housing, we examine how it shapes the urban fabric. In order to shift the paradigm from an approach that seeks to cover the quantitative housing deficit to one that addresses the qualitative deficit, we need to take a serious look at the context of residential areas and the impact this has on them. In this vein, our comparative study of housing and cities in the region reveals that the gaps in access to urban basic services are essential when deciding what improvements are needed. On the other hand, we chose cases that

help answer some of our questions about housing's transformative powers within a city.

How can housing contribute to people's health? How can we use incremental self-building in a positive manner? What are we doing to promote housing that is adaptable for multiple uses? How can we replicate functional typologies without dismissing a community's identity? How do we ensure that housing is accessible to all? How can we productively rethink the life cycle of housing? How can we imagine the space beyond the private domain? How do we build functional housing that responds to fluctuations in population size? How can we cover the needs of all people? What are the minimum standards that housing

must meet? What strategies can we use to reclaim dilapidated housing stock? These are just some of the questions that emerged over the course of our investigation. In our search for answers, we collected case studies from the entire Global South and reviewed what emerging countries of Latin America, Asia and Africa have done to address these issues. In all cases, we asked the following four questions: How can housing be a driver of inclusion? How can we make it accessible, in the broadest sense of the word? How can we ensure that it is resilient in all aspects? And finally, how can we finance housing and ensure that it is affordable for all?

In order to advance the discussion on housing accessibility, we have

incorporated a series of examples that provide insight into the myriad aspects this involves. We have included cases of scalable housing, which includes growth strategies at the level of the unit or housing complex. Scalability may refer to the size of the home: a small unit may be expanded or subdivided on a programmed basis. Scale may also refer to regulatory frameworks, that is, to incremental compliance with the housing standards established in the urbanization and building codes of each city or town. We also analyzed open housing projects that emphasize the relationship between interior and exterior, bestowing permeability, porosity, thresholds and gradual transitions to the buildings. In this process, we learned how housing can better address issues such as

ventilation, lighting and temperature fluctuations, as well social interactions and community dynamics.

We also review exemplary cases of flexible housing that show how homes can adapt to different changes, whether in family composition or functional needs. Often, flexible housing design is apparent in the architectural decisions related to the unit, typically in choices that impact the private spaces of the home and affect its overall use. Flexibility in housing can also refer to partial compliance with current construction and urban planning directives, or flexibility on financial issues, such as risk guarantees or requirements that can be adapted to different socioeconomic needs. When

addressing whether dilapidated housing can be recovered, it is necessary to consider substandard units that need improvements, such as repairs, changes to building materials, additions, or connections to public utilities. Sometimes, housing that provides a rapid solution to imminent needs should be considered, where construction work can be streamlined through innovative organizations and building systems that reduce the time and costs of a project. We also examined experimental housing, which tests ideas in order to perfect traditional building methods, find new ways to apply solutions, or determine how to replicate them. Elsewhere, we encountered incremental housing examples. Developed in stages, these projects draw on strategies

that link the financial management and oversight of the project to the sustainability of the building or housing complex.

Another challenge we faced was to think about resilience in a comprehensive manner. Therefore, we incorporated cases of ecological housing, which achieves optimal habitability through minimum energy consumption by considering the orientation of the building as well as the surrounding land and natural environment. The ecological housing projects examined here have low maintenance costs, as they rely on local energy sources and/or use building materials that meet responsible production standards. We also explored disaster-resistant housing, which entails

the capacity to withstand both natural and man-made disasters. Here, construction systems and design play important roles in withstanding disasters, as does the strategic location of the housing unit. Ensuring that both inhabitants and communities are committed to the housing project is vital when dealing with possible external pressures. Other examples we studied address resilience through the construction of productive housing. This type of housing may incorporate productive activities in the living space, or involve the future residents in the construction of the housing or complex. In these cases, residents' participation in the building process improves their technical skills, employability and the economic livelihoods of their

families. We have also highlighted cases where housing works to enhance the physical and mental wellbeing of residents by improving their living conditions. Healthy homes and surroundings form a part of an environmental action strategy that recognizes the right to a decent environment in which one can grow physically, mentally and emotionally. Other cases included here offer safe housing for those who face violence, the possibility of displacement or threats of other kinds. Some of the examples we analyzed address security in terms of the inhabitant's ownership and right to housing, including legal and secure tenure, housing policies or guarantees, construction safety and the safety of the surroundings. In other cases, the housing solutions sought to prevent

insecurity, in the most common sense of the term.

Lastly, we explored cases that reflect on housing affordability. These included cases that involve incremental housing projects, which are based on a gradual building system. Though construction is incomplete when they are delivered, the units are designed to be habitable and users can complete them by their own means and according to their needs and capabilities. Other cases are illustrative of incremental financing or morphology. Affordable housing, for instance, is categorized as such according to the economic capacity of inhabitants and the final cost of units. Though not necessarily cheaper, affordable housing covers a range of issues such as payment

terms, access to credit, maintenance costs, resale possibilities and the unit's lifespan. In cooperative housing projects, a group of people that share similar needs come together to access better quality housing at a more affordable price. Though it varies from case to case, these groups may establish formalized housing cooperatives or act as non-profit entities. There may also be multiple collaborative partnerships with different actors such as the state, industries, developers, or the communities themselves. In all cases, these actors negotiate their own incentives with the other parties to create better quality housing. Temporary housing, on the other hand, provides interim housing solutions for groups or individuals. It addresses the needs

of a wide target population, from those who have suffered the loss of their homes due to natural disasters, economics or political events to those residing temporarily in an area due to health, education or work-related circumstances. We have also selected examples of controlled housing, where management by the community itself encourages users to exercise governance over residential units.

The cases and reflections included in this publication provide a repository of disruptive ideas that allow us to learn from what has already been done in other contexts. It is our hope that they will contribute to thinking broadly about how housing can be leveraged as a transformative element of cities.

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INTRODUCTION

HOUSING ACCESSIBILITY IN LAC COUNTRIES: The Next Round of Challenges

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There is little doubt today that urbanization can contribute to both reducing poverty and increasing economic productivity. More than 80% of global GDP is generated in cities and urban residents have a better quality of life than those living in rural areas.

Unlike in Europe, however, urbanization in Latin America has expanded more quickly and unevenly. In this region, urbanization has not necessarily been driven by higher economic productivity or by the concentration of activity in urban areas. In addition, Latin American governments—especially at the local level—have often been unable to plan and coordinate appropriately to ensure equitable and universal access to quality urban services. The phenomenon of urban inequality can be found in almost every Latin American city and it has worsened over time; the trend reproduces itself with an ever-increasing difference in service access between rich and poor. For example, while the World Health Organization (WHO) has established a minimum of 97 sq. ft. of green space per capita, the average in cities like Buenos Aires is 64 sq. ft., and poorer neighborhoods have even less access to green areas. What can be done in such a city, where areas like Villa 31 have just a little over three square feet of green space per capita while other neighborhoods like Puerto Madero have over 200 sq. ft. for each resident? Are we all aware that urban and social inequality creates a society with fewer opportunities and, as a result, more violent cities?

Despite the challenges, change is still possible. At the UN Sustainable Development Summit of 2015, members agreed on a list of objectives to meet by the year 2030, known as the Sustainable Development Goals (SDGs). Under SDG 11, the member countries agreed to work to make cities and human settlements inclusive, safe, resilient and sustainable. Meeting these goals represents a major challenge that all countries in the region are working to address today.

By foregrounding case studies and references from the Global South, this manual emphasizes how SDG 11 can be achieved from the perspective of housing and surrounding areas, sharing insights drawn from the chain of value of the housing sector. Herein we have chosen the experiences that best address what we consider the main obstacles to housing access.

HOUSING QUALITY

We need policymakers to realize that Latin America's main housing deficit is not about quantity but about quality. Our housing has problems in terms of access to basic services like power,

water and sanitation and issues related to the materials used in their construction. A decent home can have a major impact on a person's quality of life and increase his or her possibilities of emerging from the vicious circle of poverty. In Latin America and the Caribbean, the quantitative deficit represents just 6% of the total housing deficit in urban areas, while the aggregate qualitative deficit is responsible for 94%. Nonetheless, 90% of housing solutions involve the construction of new units. Strictly speaking, the qualitative deficit is related to a lack of access to basic urban services, but today the notion of what these services entail has been expanded to include quality public spaces, transport, educational services and schools, all of which increase the quality of one's habitat and housing.

GOVERNANCE

An emphasis on the quality of housing also requires rethinking the roles and functions of governmental institutions. Programs to improve today's housing stock at the country-city level requires analyzing and reimagining not only government functions at different levels but also the roles of the private sector and civil society. In order to optimize today's housing stock quickly, governance needs to be rethought and innovated to provide shorter-term solutions. What role do subnational governments play? How do we work with civil society organizations? How can technologies contribute to achieving this more quickly?

FORMALITY

Governments should proactively focus on eliminating obstacles for accessing the housing market; currently, many administrations limit themselves to implementing remedial policies that only address the results of the past. Informality is the biggest issue facing Latin America today. According to estimates, more than 130 million Latin Americans are informally employed, representing on average 46.8% of all jobs. This greatly increases the nearly insurmountable challenges associated with formal solutions and the credit market. Are there ways to integrate people who hold informal jobs into the credit market? What models have worked? How can we generate mechanisms that make it possible for people in the informal economy to not only save money but also pay off a housing loan? Would these mechanisms be capable of expediting the building process for incremental housing and thus providing families with an adequate habitat more quickly?

DESIGN OPPORTUNITIES

There should be incentives or conditions in place that acknowledge the key role design can play in solving people's problems or helping them adjust to new ways of living. If states today have the chance to allocate resources to improve housing stock—or create incentives for the private sector to do so—they should not let the opportunity pass. Additionally, climate change adaptation should be taken into consideration in these improvements, along with issues such as gender and diversity, for example.

LAND

It is important to bear in mind the state's role as manager and planner of urban land use. There is room for innovation with regards to affordable housing in areas where services are already in place. Latin American cities hold large swaths of urban vacant land, in many cases government-owned, which provides an opportunity for thinking of new mechanisms to generate affordable housing and habitat. However, in most cases, social housing projects are designated to the periphery, negatively impacting dwellers as a result: The costs of their commute are twice that of those who live in the city center, and travel times are often three times as long. As a result, property values on the urban periphery are 40% lower than those in the city center, and rentals are half the cost of units with more strategic locations; these factors can lead to housing being abandoned for other options. Given that the location of social housing is so important, how can we generate incentives or create partnerships for the construction of accessible housing in areas where densification is possible? What role does the private sector play and what is the role of the public sector at different levels of government?

We hope this publication serves as a starting point to think differently about an affordable habitat and ways to expedite the construction of incremental housing.

HOUSING, WHAT'S NEXT?

Considerations for Rethinking Housing for the Coming Decades

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NEW PATTERNS, NEW ANSWERS

During the 20th century, the world's population increased more than in any other period in history, from 1.5 billion people in 1900 to almost seven billion today. Around three billion people live in cities and close to one billion live below the poverty line. Faced with this unprecedented growth, it is impossible not to reflect on how we have managed to accommodate such a huge population, or how all these people have managed to find housing. The figures show that, although we have been able to build large quantities of housing to begin to cover the quantitative deficits, the main challenge at present is to improve the quality of the existing housing supply in order to enhance people's quality of life and prevent a quantitative housing deficit in the future. Held in Quito in 2016, the Habitat III conference—an event that takes place once every twenty years—addressed how we will manage our cities in the future: over the next two decades, an additional two million residents are expected to move to cities and twice as many people will be living below the poverty threshold. Much of this growth will take place in medium-sized cities, where the possibility of designing new housing models for a relatively young and diverse population will be essential. By 2050, an estimated 70% of the world's population will live in cities, 60% of whom will be under 18 years of age.¹ In an age when vibrant population growth will continue—particularly in areas of the Global South and in emerging economies—the key question is how to change the paradigm and start thinking about housing in relation to the quality of the urban fabric it creates, so as to harness its full potential to build fairer, more sustainable and more democratic cities.

This scenario is arising in a context in which Latin American governments have committed to building housing for lower-income sectors. In recent years, the national governments of emerging economies have delivered subsidized housing for the most vulnerable populations on an unprecedented scale. The administrations of countries in Africa, Asia and Latin America have demonstrated great efficiency in providing housing under different schemes by subsidizing both supply and demand. For example, to summarize the figures from Brazil, Colombia, Peru, Chile, Paraguay and Argentina, more than six million units were delivered to low-income or vulnerable populations over the last twenty years.² However, this sudden and simultaneous expansion of national programs shows that, in spite of the different political, institutional, demographic and economic contexts, housing



Aerial view of Novo Santo Park
Amaro V, São Paulo. Ph. Courtesy of
Viglicca & Associados.

RESIDENT POPULATION IN SLUMS/INFORMAL SETTLEMENTS
2014 (percentage of urban population)

Argentina	17%
Bolivia	44%
Brazil	22%
Chile	9%
Colombia	13%
Costa Rica	6%
Ecuador	36%
Guyana	33%
Haiti	74%
Mexico	11%
Nicaragua	60%
Paraguay	17,6%
Peru	34%
Trinidad and Tobago	25%

UN-Habitat and the United Nations Statistics Division agreed on an operational definition for slum/informal settlement household as one in which the inhabitants suffer one or more of the following household deprivations:

1. Lack of access to improved water source.
2. Lack of access to improved sanitation facilities.
3. Lack of sufficient living area.
4. Lack of housing durability
5. Lack of security of tenure.



Umusambi House under construction, Rwanda.
Ph. Ben Segal.

policies have produced the same type of urbanization: homogeneous, low-quality neighborhoods on the outskirts of cities, isolated from urban centers and from sources of work. In this regard, housing policies and the resulting construction have reflected a trend toward expansive urban growth, in which most urban features are located in the highly dense centers, which raises the land value and creates a monopoly for agglomeration, higher levels of diversity, and mixed use. This phenomenon can be seen as a reflection of urban development processes that result in mass accumulation, encouraging residential megaprojects—what Rahul Mehrotra has called “impatient capitalism,” or the excessive pressure by international investors to accelerate housing production on real estate markets. Thus, in places that have seen huge capital investment, there has emerged what we might call the “hypercity”: a series of settlements where the advantages of agglomeration are concentrated in dense large-scale metropolitan centers. This has tended to push the residential fabric out toward the peripheries, thereby increasing social segregation and depriving the residential unit of the potential of its multiple attributes and skills. This growth dynamic in cities brought about the period’s greatest urban transformations towards the end of the last century; however, alongside urban megaprojects—which housed over twenty million people—arose new dwelling-related problems. Governments and private developers in cities that have long been major engines of economic and social growth, such as Mexico City, Mumbai, São Paulo or Istanbul, produced a stock of peripheral housing on a mass scale that has contributed to increasingly more severe expressions of social exclusion. Although these megaprojects address the housing shortage in Latin America, the quantitative deficit only accounts for 6% of the total deficit in urban areas, while the greatest deficiency is related to the coverage and quality of services, housing tenure and other qualitative aspects. For example, 21% of the housing deficit is due to a lack of access to infrastructure (4% to electricity, 15% to sanitation, 9% to running water); 12% is owed to the quality of the dwelling (3% to a poor roof, 6% to a dirt floor, 2% to poor walls); 11% to the absence of security of tenure and 6% to overcrowding.³

In short, while the aggregate qualitative deficit accounts for 94% of the total deficit, 90% of housing solutions are executed through the construction and delivery of new units.⁴ For the most part, the production and design of the newest residential fabric would appear to be the result of an almost exclusively pragmatic serial exercise, one often divorced from

a deeper understanding of the social and cultural implications housing has for urbanism, as well as the landscape and identity of the city. Consequently, housing production is split between the creation of large urban spectacles with global resonance and the serial production of replicas in never-ending suburbs that tend to neutralize the diverse expressions of communities. In parallel, the dynamics of urban development now emerging show new growth patterns that also invite us to rethink housing production under different scenarios. This is especially the case in contexts of the Global South, where cities are experiencing a change in the way they grow. Patterns of “urban implosion” marked the formation of the big cities of the 20th century, in which the magnetic effect of city centers influenced the construction of the urban fabric. The patterns have since shifted to “urban explosion,” which create continuous stretches of growth with low density and greater territorial dispersion.⁵ Processes of urbanization are slowing down in the huge agglomerations and have begun to intensify in a secondary network of minor agglomerations. Attention—and thus investment—is also moving from large metropolitan areas to peri-urban areas and small and medium-sized cities. If we look at the figures, we can see that 75% of the population lives in settlements of less than 500,000 inhabitants, meaning that “hypercities”—which now concentrate most of the social and economic power—are not the place where the largest amount of housing will be produced in the future.⁶ Latin America and the Caribbean, the second most urbanized region on the planet, contains within it 242 cities of less than two million people each that are growing at higher rates than the countries in which they are located. These cities produce 30% of the region's GDP, a figure that is expected to increase to 40% by 2025. In this regard, projections indicate that, by 2025, 184 of these cities will have between one and five million inhabitants, and 237 will have between 500,000 and 1,000,000.⁷ In other words, there will be high levels of housing demand for lower density contexts, with all the risks that the development of low-density housing sprawl brings for urban development. Empirical research in Mexico, South Africa and Colombia shows that families often leave inadequately built houses on urban outskirts in search of closer proximity to jobs, schools and healthcare institutions. In this context, one of the biggest challenges for current policy is how to abandon the logic by which economies of scale are produced to cover the quantitative housing deficit. Nowadays, policies are needed to encourage the construction of qualitatively better and affordable housing, located near job opportunities, in order to consolidate neighborhoods and to ensure

RESIDENT POPULATION IN SLUMS IN LATIN AMERICA AND THE CARIBBEAN

	POPULATION LIVING IN SLUMS (THOUSANDS)	PROPORTION OF TOTAL POPULATION
1990	1 06.054	33,7%
1995	1 12.470	31,5%
2000	1 16.941	29,2%
2005	1 12.149	25,5%
2007	1 12.547	24,7%
2010	1 12.742	23,5%
2012	1 16.227	23,5%
2014	1 04.847	21,1%

Since 2000, the population worldwide living in informal settlements has grown by an average of six million people per year, the equivalent of 16,500 inhabitants per day.

In the Latin American and Caribbean region, where the regularization of informal housing has historically contributed to providing housing solutions, slums continue to make up a significant portion of urban areas. At least 21% of the region's urban population still resides in informal settlements, in spite of a 17% decrease over the last decade.



Members of the Mahila Housing Trust. Ph. MHT SEWA.

that central and better-quality construction for lower-income sectors is an attractive investment opportunity.

In addition to location, it is important to closely examine the new ways in which housing is built, from the mechanisms for intervening in housing transactions to the new building methods used to produce residential units. It is crucial, for example, to rethink construction protocols and explore new alternatives, particularly considering that emerging contexts offer broad possibilities with high potential for exploration, such as innovation with local materials, the optimization of operations with the help of IT technology and the use of environmentally sustainable processes. This is the case of the construction industry in China, where the speed of construction is accelerating apace. Some time ago, an Argentine newspaper published an article about a 57-story skyscraper being built in China. The text specifically highlighted the speed of the processes of construction and urbanization, as well as the increasing scale of buildings there. Indeed, the skyscraper in question boasts 19 atriums, each 10 meters high, 800 homes and office space to accommodate 4,000 people. Zhang, the CEO of the company in charge of project, stated that the construction process had reduced the use of concrete by 15,000 truckloads, which, he explained, dramatically cut airborne dust emissions. He also stated that the air inside the building is extremely pure thanks to the implementation of new technologies. In addition, the building is so energy efficient that it can lower CO₂ emissions by up to 12,000 tons when compared to other buildings of the same size and use. This example demonstrates that existing technology can change the pace and speed of housing construction; it also raises the question of what this means for the sector and how we can take advantage of these new technologies in a productive and rational manner.

We believe that these and many other phenomena can be seen as indicators that urban reality is changing and that these changes open up numerous opportunities. Grasping the essence of these new realities is key to beginning to align our tools and programs to the needs of a transforming urban environment. In order to address the qualitative problem of housing, solutions have emerged in recent years that seek to propose quality alternatives. New approaches in the design and production of housing typologies, communities and neighborhoods offer the possibility of larger homes that improve over time, with better locations and spaces that can be adapted to specific needs. They also improve subsidy targeting mechanisms, since the investments are earmarked

for beneficiaries in an efficient system of resource allocation. However, alternative and novel proposals face significant challenges in the public policy sphere. For one, innovation is often associated with the breakdown of standards proposed by master plans, building codes and regulations. Furthermore, upscaling these successful micro-experiences is no simple matter: the intrinsic relationship between innovation and informality highlights two main challenges. On the one hand, how can the public and private sectors incorporate innovative solutions, which often entail overstepping the limits of legality, within policy frameworks and market strategies? On the other, low-income users are often the ones who have to bear the negative burdens of innovation. For example, the lack of local government capacity to coordinate multiple micro-experiences within a territorial strategy may pose a risk for the most vulnerable communities.

Given that some of these approaches are very recent experiments and others have a longer track record, an analysis of the comparative experiences between different countries of the Global South can provide interesting lessons for Latin American nations. The main objective of this project is to identify the challenges and opportunities for the regional context while taking into account international experience and the particularities of local conditions. We thus hope to achieve a better understanding of the qualitative housing deficit in our region and to think about how these innovative examples would work when applied to Latin America and the Caribbean to ensure that public resources can be maximized for the benefit of vulnerable populations. To address this challenge, at the IDB's Housing and Urban Development Division, we are starting to think about how to make strategic use of what we have learned over several decades of work in order to come up with new solutions and possibilities, and thereby incorporate into the discussion a renewed agenda for housing and city development in the coming years.

HOUSING, WHAT'S NEXT?

HOUSING, WHAT'S NEXT? is a project aimed at collecting evidence of good practices in order to foster discussions that can influence the way we think about alternatives, designs, policies, financing schemes and the set of values and variables on the basis of which we envision housing, with the goal of developing innovative approaches to improve the stock of existing housing and to create that of the future. It is difficult

ACCESS TO BASIC SANITATION SERVICES
2015 (percentage of urban population)

Argentina	95%
Bolivia	64%
Brazil	91%
Chile	100%
Colombia	88%
Costa Rica	98%
Ecuador	89%
Guyana	89%
Haiti	37%
Mexico	91%
Nicaragua	86%
Paraguay	98%
Peru	82%
Uruguay	96%
Venezuela	98%

Basic sanitation services refer to improved facilities that are not shared with other households. The indicator covers both people who use basic network sanitation services and those who use alternative sanitation services that are managed safely. Improved sanitation facilities include sewer systems or discharge to sewer systems through pipelines, septic tanks or pit latrines, ventilated improved pit latrines, composting toilets or pit latrines with slabs.

for us to think about how to do this if we see housing merely as a discrete unit and fail to take into account the impact that its production has on cities and on habitats in the broader sense. This becomes clear when we consider that the vast majority of the urban fabric is constructed on the basis of housing. The IDB has many years of experience leading an agenda of neighborhood improvement programs that develop the urban environments where housing is introduced.

The approach to housing production has generally been thought of in sectors, with a separation between discussions on design and those on financing, or between private sector action and public sector management. Part of the challenge, then, has been to find clear examples of policies implemented or experiments carried out that might invite us to think in a more multi-sectoral manner, by blurring the limits in the housing production value chain and integrating the economic, social, environmental and cultural opportunities that the residential fabric can offer cities. The set of case examples, studies and reflections included in this project therefore seek to foster a discussion that broadens the range of options when it comes to considering housing through a more systemic lens aimed at defining new models that include the new stakeholders needed to envision city living in an integrated and socially meaningful way.

Methodologically, two conceptual frameworks intertwine to establish a dialogue between design thinking, public policy and the financial perspectives of housing. The methodology follows the principles of housing value chain analysis, which takes into consideration the entire real estate market and the construction industry, and examines each of the key steps involved in delivering the products to the end user. This is particularly important for contemplating aspects of the qualitative deficit because it serves to show that housing production is subject to a series of value-added processes before it reaches the user, which makes the final product more valuable, affordable or exclusive.

The focus on the housing value chain enables the analysis to cover each one of the steps, most of whose respective sub-markets are affected. Traditionally, this framework is used to analyze financing mechanisms and market behavior and focuses on: (1) public policy, the legal and regulatory environment and the institutional framework; (2) the processes and actions involved, and the necessary inputs; and (3) the links and processes through which the main steps and stakeholders interact. There are five essential basic steps in housing production: land provision, access to services (physical and

social), the construction of buildings (which can be divided into architecture, building materials and technology) and evolution (which includes home expansion and renovation). The focus is often on the supply behavior, but the examples cited in this presentation show that both supply and demand are involved in housing production. Finally, traditional housing value chains focus only on the production of the housing unit and pay less attention to aspects related to integrated habitat creation, such as community building and job creation. We propose that the housing value chain should extend to the community, the urban scale and the post-construction phase.

Throughout this project, therefore, we examine what the extended housing value chain and the role of design thinking would be each step of the way, taking into account the principles of affordability, resilience, accessibility and inclusion. With this aim in mind, we have decided to begin by identifying various kinds of cases with attributes that can be translated into a glossary of conceptual and practical tools geared toward producing more affordable, sustainable and culturally significant housing. That is to say, in order to operationalize and rationalize these general principles, we have put together a series of indicators or modifiers characteristic of the project with a focus on innovation, change and positive results. The aim of the modifiers is to systematize the information provided by the cases studied and the value chain and insert them at a particular point in the habitat building process.

IDENTIFYING CASES AND LEARNING FROM MODIFIERS

By analyzing housing cases from across the Global South, we have identified multiple modifiers that can help us rethink the way we produce housing and its role in city building. These are organized around the aforementioned principles and seek to break down the question posed by Lawrence Vale (2014): “What should affordable housing afford?”

The cases explored for this study are ones that reflect, to some degree, a broad understanding of what inclusive housing is. Inclusivity encompasses a wide range of rights relating not only to issues of economic status, but also to differences in gender, identity and culture. To achieve inclusiveness, many governments and non-governmental actors have developed projects and policies aimed at guaranteeing that all the members of their communities live full and fulfilling lives. Such is the case of the Mahila Housing Trust (MHT), an



A community participating in the reblocking process. Ph. Andrea Bolnick for Ikhayalami.

ACCESS TO ELECTRICITY GRID
2016 (percentage of urban population)

Argentina	100%
Bolivia	93%
Brazil	100%
Chile	100%
Colombia	99%
Costa Rica	100%
Ecuador	99%
Guyana	84%
Haiti	34%
Mexico	100%
Nicaragua	81%
Paraguay	98%
Peru	94%
Trinidad and Tobago	100%
Uruguay	100%
Venezuela	99%

Access to the electricity grid currently represents one of the largest gaps in terms of integrating vulnerable populations. Although, generally speaking, the region has high rates of access to electricity, in some countries the lack of access represents a major challenge.

SOURCE: World Bank, Sustainable Energy for All (SE4ALL) database from the SE4ALL Global Tracking Framework led jointly by the World Bank, the International Energy Agency, and the Energy Sector Management Assistance Program.

autonomous organization supported by the Self-Employed Women's Association (SEWA) in Ahmedabad, India. After realizing that the formal financial sector did not support the development of adequate housing as a productive asset for member workers, SEWA Bank came together with the Foundation for Public Interest (FPI) to set up a trust headed and managed by women living in informal settlements. MHT mobilizes women in marginal neighborhoods to exercise their rights, empowering them with the knowledge to interact with the government and to take charge of the habitat improvement process. In conjunction with the local government, MHT negotiated and developed the concept of transitional tenure, a 10-15-year non-eviction guarantee for women living in informal settlements and their families. This institution defined as "semi-formal properties with high security of tenure" land for which the dwellers hold undisputed occupancy and possession rights although they are not formally registered as landowners in the public land cadaster and where the property is not in critical conflict with urban planning instruments. Through MHT, SEWA disburses loans solely to women who have been part of their regular mobilization, awareness and training activities. Women are thus spearheading the informal settlement regularization processes in order to progressively gain access to adequate housing.

Equal housing Initiatives with a gender perspective have also been implemented in Latin America, as in the case of the Florestan Fernandes and José Maria Amaral Social Housing project, an example of self-management with strong female leadership. The project is part of a social housing program by the name of Minha Casa Minha Vida - Entidades, launched by the Brazilian government in 2009. This program allows community organizations to manage the entire process of developing social housing, from project design to construction. Since many of the low-income families living in outlying areas are headed by women, the program is aimed primarily at female-headed households with a gross monthly family income of up to USD 43. It also prioritizes the elderly, families with people with disabilities, and those living in high-risk areas or who have lost their homes due to natural disasters. In addition to actively participating in the project design and construction, and in accordance with program rules, female heads of household can sign the housing loan contract irrespective of whether their spouse agrees, and property titles will be registered in the women's name in the case of nuclear families. In addition, the women's property rights are guaranteed even in the event of divorce.

In this sense, ensuring maximum social coverage in terms of eligibility, requirements and application proves to be a fundamental mechanism for producing adequate housing for all family compositions and stages of people's development. Empirical evidence demonstrates that housing needs vary over a person's lifetime. Public policy support for these different needs can be an effective way to manage the stock of existing housing on the market. For this reason, eligibility schemes in Singapore guarantee that, in each public housing condominium, there is adequate representation of the various minorities that make up society so as to ensure mixed housing, not only from an economic point of view, but also an ethnic and cultural one. In 1989, the Ethnic Integration Policy was implemented in the country to promote racial integration, followed by other priority eligibility measures for various types of applicants. In South Korea, meanwhile, as part of the Sharing City program, an intergenerational housing policy has recently been applied that not only aims to expand the possibility of eligibility, but also address other problems such as loneliness and isolation among seniors. Through a cell phone application, young adults in need of temporary accommodation are linked up with elderly people still living in their original family homes who now have more than one unoccupied room. The aim here is to promote intergenerational housing. This case also exemplifies the potential role of IT technologies in developing alternative models to guarantee access to housing.

Cultural aspects are also important when considering inclusion from an identity perspective; in the construction of housing for low-income sectors, in order to cut costs, architectural expression is usually reduced to a minimum, which affects the lives of inhabitants who lose their identity, traditions and customs in homogeneous neighborhoods that are repetitive and characterless. The Housing for the Fishermen of Tyre, Lebanon, serves as a reminder of the importance of the cultural context of residential dwellings. In a collaboration between the fishing cooperative of Tyre, a city declared a World Heritage Site by UNESCO, and the team led by architect Hashim Sarkis, a vibrant and modern housing system was developed. Not only does the project meet the ambitious goals of the fishermen on a small budget, it also fosters a sense of community by striking a balance between the private and the public space in accordance with the traditional lifestyle of its inhabitants. By merging architecture, landscaping and urban planning, Sarkis's collaborative approach to this design has resulted in a residential complex that exemplifies the power of architecture to compensate for chaotic environmental

HOUSING AS A CONSTITUTIONAL RIGHT

2016

	HAS HOUSING RIGHTS LEGISLATION	YEAR OF LAW
Anguilla	NO	
Antigua and Barbuda	YES	1981
Argentina	YES	1994
Barbados	NO	
Belize	NO	
Bermuda	NO	
Bolivia	YES	1967
Brazil	YES	1988
Chile	NO	
Colombia	YES	1991
Costa Rica	YES	1949
Cuba	YES	1992
Commonwealth of Dominica	YES	1978
Dominican Republic	YES	1966
Ecuador	YES	1998
El Salvador	YES	1982
French Guiana	NO	
Guatemala	YES	1985
Guinea	NO	
Guinea-Bissau	NO	
Guiana	YES	1980
Haiti	YES	1987
Honduras	YES	1982
Martinique	NO	
Mexico	YES	1917
Nicaragua	YES	1987
Panama	YES	1978
Paraguay	YES	1992
Peru	NO	1993
Puerto Rico	NO	
Saint Helena, Ascension and Tristan da Cunha	NO	
Saint Kitts and Nevis	NO	
Saint Lucia	YES	1978
Saint Pierre and Miquelon	NO	
Saint Vincent and the Grenadines	NO	
Saint-Barthélemy	NO	
Saint Martin	NO	
San Marino	NO	
São Tomé and Príncipe	YES	1975
Trinidad and Tobago	NO	
Uruguay	YES	1918
Venezuela	YES	1999

Seventy years ago, access to adequate housing was recognized in the Universal Declaration of Human Rights. Although most countries have incorporated housing as a right in their constitutions, there is a clear divide between the regulatory and legal frameworks and the enforcement of rights: more than 900 million people worldwide live in slums and are subject to stigmatization and marginalization.

SOURCES: Assembly, U. G. (1948). Universal declaration of human rights. UN General Assembly./Leilani Farha (2017) Report of the Special Rapporteur on Adequate Housing as a Component of the Right to an Adequate Standard of Living, and on the Right to Non-discrimination in this Context./TECHO (2015) Derecho A Una Vivienda Digna En Latinoamérica Análisis Normativo y Jurisprudencial./United Nations Housing Rights Program, Report # 1 (2003) National Housing Rights Legislation./United Nations Housing Rights Program, Report # 3 (2003) National Housing Rights Legislation./United Nations Housing Rights Program, (2003) Background report for Expert Group Meeting on Housing Rights Monitoring./Housing Rights Watch, National Countries Housing Legislation (2017) Retrieved from: <http://www.housingrightswatch.org/> TECHO (2015) Derecho A Una Vivienda Digna En Latinoamérica Análisis Normativo y Jurisprudencial.

conditions while respecting the social and cultural mores of the community. At the same time, it shows that it is possible to develop affordable housing for lower-income sectors at World Heritage Sites.

Community participation proves indispensable when it comes to guaranteeing inclusiveness in the habitat building process. But how much can we ask of communities? When does self-managed habitat production become a burden rather than a benefit? In order for organized self-management processes to be successful and efficient, public policy must work not only with the communities, but also with agents that assist them throughout the entire process of building their homes. Without organization and support, the burdens become much more difficult to manage and reduce the potential benefits of a participatory housing policy. The uTshani fund, the largest NGO involved in South African housing, is working to achieve the aforementioned objective. The institution handles administrative procedures and provides bridge financing in support of a process led by and for the community. The uTshani fund projects enable a more efficient and socially equitable distribution among communities. By governing and managing how the grant funds will be used, each community can participate in the housing decision-making process, defining quality standards, typologies, characteristics of the public space, etc. Also, by taking charge of the construction of the neighborhoods and infrastructure, the community can oversee the materials and ensure that the work is carried out according to the pre-agreed guidelines. In a comparative study between a uTshani project and a traditional one, 26% of uTshani residents reported having construction-related problems in their dwellings, while this figure increases to 62% in homes built by traditional developers. This case highlights the importance of participatory housing and including alternative developers in the housing market to achieve higher quality standards. Also based on a national initiative, the Community Mortgage Program was created in the Philippines to expand poor communities' access to the acquisition or construction of housing. In 1988, the Philippine government launched the Community Mortgage Program through the National Home Finance Corporation. This program allows communities to take out group loans to purchase land using the land itself as collateral.

The importance of community participation in habitat building processes is also reflected in the capacity of bargaining power of different stakeholders and their agendas. The Empower Shack project's reblocking system, developed by the NGO Ikhayalami, the South African affiliate

of Slum Dwellers International, the Urban Think Tank/ETHZ and local communities in Cape Town, is a spatial reconfiguration process for informal settlements designed and led by the community, whereby houses are reorganized and rebuilt to maximize space within highly complex and dense urban plots. Reblocking is made possible thanks to a community negotiation model and a credit system through which residents who relinquish private space to improve the settlement earn credit that translates into a cost reduction on the construction of their new home. Empower Shack proposes a system of incremental compliance with standards, offering progressive—not temporary—solutions that strategically satisfy some standards while leaving others in a state of informality so that families can gradually formalize their homes. In this way, both homes and the neighborhood can steadily adapt to regulations, in a manner negotiated with the government and without the need to wait for major plans and investments.

Finances play a major role in the inclusive management of subsidies for low-income families working in the informal economy, and this poses a significant challenge. In general, traditional financing does not reach such families, and micro-credit systems charge high interest rates. The need for a secure home is paramount for those usually unable to access the formal mortgage market. In October 2004, the government of Morocco created the Guarantee Fund for Populations with Irregular and/or Modest Income (FOGARIM) program with the aim of facilitating access to housing loans for low-income Moroccans working in the informal economy. FOGARIM is subsidized by taxes on the construction industry. When a FOGARIM customer is unable to make their monthly payment, the mortgage bank is covered by the guarantee and, if need be, can foreclose on the mortgage within a period of nine months. By reducing the loss in the event of non-compliance and transferring a large proportion of it to the government, FOGARIM improved access to home financing and granted more affordable guaranteed housing loans to the poor. Although it is not a subsidy, the guarantee indirectly reduces the interest rate by minimizing the risk for banks. This initiative was created as part of a national urban strategy to support the production of affordable housing through tax exemptions, public-private partnerships, zoning changes and a solidarity fund that subsidizes urban improvement and housing production.

We have also analyzed cases that help us to consider accessibility to housing in a multidimensional fashion. The idea of accessible housing encompasses multiple factors inherent to the internal and/or external conditions of the residential unit.



Patrimonio Hoy. Ph. Patrimonio Hoy - CEMEX.
Available online.

QUANTITATIVE URBAN HOUSING DEFICIT
2009 (latest published data)

Argentina	5%
Bolivia	30%
Brazil	6%
Chile	3%
Colombia	9%
Costa Rica	2%
Ecuador	10%
Mexico	2%
Nicaragua	12%
Paraguay	3%
Peru	14%
Uruguay	0%
Venezuela	8%

Quantitative deficits measure households in inadequate conditions and damaged beyond repair.

SOURCE: Inter-American Development Bank 2012. Un espacio para el desarrollo: Los mercados de vivienda en América Latina y el Caribe/César Patricio Bouillon, editor.

For example, on the one hand, accessible housing must adapt to the fluctuating living conditions of different family members as well as fulfilling the technical and spatial conditions that enable it to be used autonomously and comfortably. But accessible housing also brings together the requisites of centrality, location and access to sources of employment, and leverages the advantages of urban agglomeration. In this sense, both those cases that work to guarantee affordable urban land as well as projects that focus on improving the conditions of the existing fabric and neighborhoods help us think meaningfully about the concept of housing accessibility.

The question of the location of social housing is a long-standing challenge that has not yet been systemically solved. However, we find a series of examples of public and private initiatives that can shed light on how to produce social housing in good locations in a way that is both economical and institutionally viable. In Medellín, Colombia, a private construction company called Concreto took advantage of the national social housing policy, which offers tax benefits, to carry out the La Playa Apartments, a complex of affordable units located in downtown Medellín. Its location allows residents to enjoy the amenities and urban services typical of a well-located home, near to schools, theaters, hospitals, markets, parks and public transport systems. The project addresses the problem of density as a principle factor and achieves a balance between the density required in this central area and suitable and ample public space. Furthermore, one of the main attributes of La Playa is its typological flexibility, which helped to reduce construction costs. Its typologies provide flexible spaces that avoid familiar layouts and pre-established spatial distributions. A major challenge in Latin America is how to develop more well-located social housing for rental by lower-income sectors: the problem of a centralized location. In South Africa, the Social Housing Regulatory Authority (SHRA) subsidizes the capital costs of housing projects for new real estate ventures in which 30% to 70% are earmarked for social rent. This financing model for social housing for rental enabled the development of social housing institutions. One of the most successful, the Johannesburg Housing Company, established in 1995, has built a new affordable housing model in the downtown area with a building management system. The company was able to attract loans from commercial banks to the city center, which at the time was rundown and devoid of investment. This rental system allowed the development of centrally located housing for the lower middle sectors of Johannesburg and, at the same time, fostered a process of urban renewal led

by social rent housing. That same objective of tackling the decay of central urban fabrics and developing social housing led to the creation of the housing project component of the project Housing and Habitats: Revitalizing Managua's Historic District in the downtown area of the Nicaraguan capital. This urban development proposal for the efficient use of land puts forward a redensification model with housing designed to improve and consolidate the urban habitat. It includes plans for 365 multifamily residential units of both social as well as standard housing, along with storefront space within an area covering two hectares of publicly owned land in a traditional downtown neighborhood. The project incorporates solutions for families of various income levels, as well as making use of innovative building materials and systems that comply with national construction standards.

In this sense, we believe it is important to address the many questions that arise when considering housing models that can help create cities on the basis of their main attributes. This can contribute to a new way of envisioning the procedures and programs aimed at reformulating, reshaping, redesigning or even redefining the role and impact of housing on existing urban fabrics. In the largest and most emblematic slum in the city of Buenos Aires, Villa 31, the contrast between the values promoted by current regulations and the reality reveals a yawning gap that seems insurmountable given the entrenched positions and self-exclusion that often takes place. And it also demonstrates the urgency of coming up with a new way of looking at the possibilities and resources that might serve as a bridge between the two worlds. The Housing Lab will be installed as an open innovation space in a unit within the Villa 31 neighborhood. A space to “do what we do not yet know how to do,” it is based on a participatory design and construction methodology and will incorporate and develop local human capital, make use of discarded materials, and design and test three prototypes for innovative construction techniques and experimental housing. Work will be carried out on both the facades as well as the home interiors, thereby offering a number of opportunities to explore improvement mechanisms, with a particular focus on solutions that can help adapt to and mitigate climate change and develop the circular economy. Of particular interest is the reuse of recoverable demolition materials as building supplies for the improvements and the harnessing of technical skills and labor already established in the neighborhood.

The possibility of working on existing stock is applied in areas, neighborhoods and residential complexes that have



Florestan Fernandes and José Maria Amaral. Ph. Felipe Garofalo.

QUALITATIVE URBAN HOUSING DEFICIT
2009 (latest published data)

Argentina	27%
Bolivia	34%
Brazil	25%
Chile	16%
Colombia	19%
Costa Rica	10%
Ecuador	31%
Mexico	26%
Nicaragua	58%
Paraguay	36%
Peru	46%
Uruguay	25%
Venezuela	20%

A qualitative deficit refers to dwellings where tenure is insecure, walls are built with waste materials (such as palm fronds or cardboard), with dirt floors, there is no potable water or adequate sanitation, or inhabitants suffer from overcrowding (three or more people per room).

decayed over time, resulting in public housing that exacerbates the qualitative housing deficit. Such was the case of the historic Pedregulho Housing Complex. From its conception, it was a holistic and ambitious project. The architectural design followed urban principles formulated at the International Congress of Modern Architecture (CIAM) in 1937. Despite being declared a public monument of Rio de Janeiro in 1986, the project received nothing in the way of public investment and suffered social and physical deterioration until 2002, when residents launched a campaign to restore it and led the initial renovation efforts. In 2010, the state-run Companhia Estadual de Habitação began the renovation process under the direction of Alfredo Britto, who established a close relationship with the community and supported their plan. The residents' association was integrated to the restoration board. A strategy was also included to pass on to the inhabitants of Pedregulho the meaning and values of the complex. This reactivated housing strategy strengthened community relations and increased residents' sense of belonging. Questions also arise about the flexibility offered by housing units to adapt to the changing needs of users, market fluctuations, housing production models or phenomena such as shrinking cities, in which depopulation requires repurposing strategies. In other words, the question is: what are we doing to encourage flexible housing that is adaptable and reconfigurable enough to ensure that it can accommodate diverse uses and programs? In different places, the same problem has been addressed in a variety of ways. In some cases, in order not to overhaul the entire infrastructure, obsolete structures are refurbished using individual parts. The Courtyard Plugin House, designed by People's Architecture Office, builds temporary spaces within the old *hutong* of Beijing thanks to a new construction method based on a modular, lightweight system of panels. Designed as a temporary solution, these make the deteriorated buildings of the Chinese capital's downtown area habitable once again. These self-supporting panels come equipped with the structure, insulation and interior and exterior finishings. Repurposing existing housing through this infilling process allows the urban center to be kept alive while generating the necessary conditions for the investment and reconversion of the historic center. A key part of this strategy is the idea that, although it is important not to interfere with historical heritage until there is a clear consensus on how to preserve the history and memory of such places, it is even more important to seek ways to ensure that the activation of urban spaces is not paralyzed.

To intervene in the urban fabric of city centers, it is often

necessary to develop high-density housing. This typology is frequently characterized by uninspiring architecture and aesthetics, in islands of greater density than that of the surrounding neighborhoods, and faces a host of problems related to maintenance, high construction costs and poor management. These factors commonly result in the crippling of the local community and a high turnover of residents. SkyVille @ Dawson is a public housing project containing 960 homes completed in 2015 for the Housing and Development Board of Singapore. The development demonstrates that high density can be a great advantage for community life. This project challenges the traditional form of modern skyscrapers with their central core of compressed circulation space, which are not conducive to social interaction. The design takes advantage of Singapore's temperate climate to create spaces within and between high-rise towers for community interaction. Each home is part of a Sky Village of eighty units that share a protected community terrace garden. Other common areas include a linear public park with a supermarket, cafeteria and commercial areas, community living rooms on the ground floor overlooking a landscaped park and community halls for weddings and funerals, play areas and tennis courts.

Similarly, problems of scale pose their own challenges. These include how to address the need for large quantities of housing without necessarily resorting to a cookie-cutter solution that fails to allow for variations or, in other words, how to find strategies to replicate functional typologies without neutralizing the identity of the communities that will make use of them. How do we come up with a replicable housing model that is not only capable of presenting large projects to cover the housing deficit, but also maintains the variability required by the urban fabric in order for it to be active and provide quality of life? The Asian Coalition for Community Action Program (ACCA) is a program run by the Asian Coalition for Housing Rights (ACHR), which supports a process to replicate good practices in community-led urbanization. This ambitious plan has been something of a regional experiment operating in 19 countries and 215 cities. Its main functions are to support, establish and strengthen collaboration mechanisms at various levels to build networking, learning and cooperation structures even after the ACCA projects are completed. It also establishes links with other organizations such as the Community Architects Network (CAN). So far, 146 housing projects implemented with the support of ACCA have benefited 49,356 poor urban families. Small improvement projects (such as footbridges, drains, toilets, water supply, community centers

REGIONAL HOUSING DEFICIT IN LATIN AMERICA AND THE CARIBBEAN
2009 (percentage of households)

National 37%

Urban 32%

Rural 60%

The housing crisis relates to the current unprecedented transition from rural to urban life: around 70 million new residents are added to urban areas each year. In terms of planning and design, the urbanization of rural populations was historically seen as the solution to eradicating poverty. However, the notion that the urban and the rural are separate and competing realities is outdated. Current patterns of urbanization show indivisible sequences of human settlements at different scales, characterized by multi-directional flows of people and resources.

and solid waste systems) that have been implemented in 2,021 poor communities are benefitting 342,399 families. Together, these families collectively develop practical solutions to the immediate problems they face, leading to greater collaboration with their local governments.

We have also analyzed cases that help us think about the idea of housing-related resilience. The concept of resilience is increasingly used to describe how well urban areas respond to crises. Prominent organizations such as UN-Habitat have popularized the idea of urban resilience and have advocated it as a condition to which cities can aspire. In general, the concept of resilience has been used to consider cities as a whole but has not often been employed from the perspective of social housing and the regularization of informal settlements. However, in the current context of climate change, accelerated urbanization and political-territorial conflict, it is essential to think about the ways in which the principles of resilience can be combined with habitat production for the most vulnerable sectors. The housing industry generates large volumes of waste that tend to have far-reaching environmental consequences. In order to investigate alternative approaches to reducing this problem, a number of teams have explored ways to move ahead with pilot projects. Questions, for example, about how housing can contribute to human health, invite us to establish a more direct dialogue with other sectors such as health and transportation; to factor in to the housing unit mobility-related issues or to try out new materials that link the housing unit directly to the biological unit of the user, their physical body and their vital needs in order to create healthy housing; or, finally, to produce housing that seeks to enhance mental and physical health conditions by improving conditions in the residential units. In this regard, how do we create housing in line with the recommendations of the Pan American Health Organization, which promotes healthy homes and environment as an environmental action strategy and recognizes that every person requires a decent environment in which to grow physically, mentally and emotionally, with the home being a space that is essential to their well-being? Developing safe and healthy housing becomes a primary objective when the perspective of children's rights is incorporated. The SOS Children's Village designed by Urko Sánchez Architects shows how the design not just of houses but also of public spaces can play an important role in ensuring safe and healthy habitats even in unfavorable climatic and social conditions. As it is a medina for children, the narrow streets sometimes open out into squares of various sizes where

community activities take place. These open spaces are safe for children to play in, since cars are prohibited from entering the project. Through a design incorporating optimal distances between homes, each open space becomes an integral part of the house, a private area in which there is a close relationship between the interior and exterior. This permeability enables an organic supervision by the SOS mothers throughout town and strengthens the essential relationship of each house with its private and open space.

Another example of the power of architecture and design to transform society in conjunction with creating sustainable communities can be seen in the case of housing for teachers in Gando, Burkina Faso. These homes demonstrate that resilience principles can be included by using local materials and construction techniques that support the local development of communities and homes, particularly in semi-urban or rural areas. The firm Kéré Architecture redesigned traditional building systems to promote the use of earth as a sustainable and durable construction material. The houses were built as a series of adaptable modules, each of comparable size to the traditional round huts typically found in this region of the country. The use of local construction techniques, together with the enthusiastic participation of the people of Gando, was the key to the success of this project. The villagers not only acquired new skills, but also a sense of responsibility, awareness and sensitivity toward both the traditional and innovative aspects of the construction. In this same vein, other initiatives are able to scale up and offer solutions for climate change-resistant infrastructure systems. As part of a collaboration between the IDB and MIT, a workshop organized in Georgetown, the capital of Guyana, addressed the challenges of providing housing that both strengthens the community and affords safe, hygienic and resistant shelter, improving existing infrastructure with a focus on the sustainable management of the city's irrigation canals and droughts. The aspects explored included public infrastructure, open spaces and community development in relation to housing in the Sophia neighborhood, located approximately three miles east of downtown Georgetown. Built on former agricultural land between a network of irrigation canals, homes in Sophia are often of poor quality, lacking in adequate infrastructure and hit by severe flooding. The proposals included strategies for incremental construction, improved sanitation and resilience in the development of new types of housing and public spaces, along with infrastructures designed to be resistant to floods and storms as well as the high tempera-

QUALITATIVE DEFICIT OF HOUSING BUILT WITH WASTE MATERIALS
2009 (percentage of households)

Argentina	9%
Bolivia	27%
Brazil	2%
Chile	1%
Colombia	7%
Costa Rica	5%
Ecuador	14%
Mexico	9%
Nicaragua	33%
Paraguay	13%
Peru	34%
Uruguay	4%
Venezuela	13%

Bridging the qualitative materials gap in the region would require an investment of at least USD 30 billion, with an investment of USD 3,000 per household.

tures common in the city.

The aim of the Comprehensive Quebrada Juan Bobo Neighborhood Upgrading and Environmental Recovery Plan, which was carried out within the framework of the Integral Urban Projects (PUI), in Medellín, was housing consolidation and environmental remediation in a neighborhood where the physical and functional safety of existing buildings, pollution of the environment and water sources, and social welfare were all found to be in a critical condition at the time of the territorial diagnosis. The site is part of a program carried out by the Empresa de Desarrollo Urbano, which worked with a multi-sectorial team to provide the neighborhood with adequate infrastructure, relocating those homes at risk of demolition and creating a system of public spaces. The project delivered 85 improved homes and 29 replacements for heavily deteriorated homes that were put back in the same place in order to preserve the existing urban structure and help provide an asset for families. An estimated 1,240 residents benefited from this work, which transformed the ravine into a sustainable habitat.

Incorporating new standards to ensure that housing consumes less energy and has less of an impact on the environment is a long process that needs to be encouraged by public policy in collaboration with the private sector. The EZ HOUSE apartment complex, built in the Nowon district, is the first zero-energy housing complex in South Korea, and was devised in 2012 by Professor Myuongju Lee, of the College of Architecture at Myongji University, and the district head, Sunghwan Kim. The district government and the university embarked on the construction of three apartment buildings even though their budget of USD 4.5 million only covered one-sixth of the total resources needed. The decision was thus taken to set up a consortium, led by Myongji University, the government of the Nowon District, the metropolitan government of Seoul, the construction company KCC E & C and the SH Urban Research Institute. Dozens of new technologies were applied in different building components, 15 of which were used for the first time in the country, for example, in the connection of heating, cooling and hot water pipes through a geothermal system. EZ HOUSE is expected to achieve much more than its goal of zero energy. Modeling data and monitoring results show that, in fact, it will end up producing an energy surplus over the year. Eventually, we may see residential buildings becoming power plants within cities. In Latin America, the Hipoteca Verde (Green Mortgage) program was created in 2007 with the aim of improving the quality of life of mortgage holders by reducing household expenditure

and at the same time contributing to the efficient use of natural resources and the reduction of greenhouse gas emissions into the atmosphere. The program consists in granting an additional amount on top of the mortgage credit to enable beneficiaries to acquire homes with efficient technologies that reduce energy and water consumption. Thus, in addition to promoting family savings and reducing the environmental impact of housing, it helps foster other processes such as technological innovation: the aim, then, is to be a platform for the development and implementation of new technologies that encourage efficient use of energy and water in homes. Calculations for the Hipoteca Verde initiative show a decline in light and gas consumption of up to 50% and a reduction in water waste of about 5,000 liters per year. Efficiency translates into greater or lesser economic savings depending on the area in which the home is located. Another case from Mexico is that of the hybrid house produced by Vinte, a real estate developer whose subsidiaries are engaged in developing, promoting, designing, building and selling social and middle-income housing. This year, the company has achieved one of the most promising proposals for domestic savings through its Casa Híbrida/Cero Gas (Hybrid/Zero Gas House), the first stage of a program of investment in innovation focused on achieving productive homes. Casa Híbrida/Cero Gas is designed to eliminate the use of this fuel and produce the energy required to meet basic needs such as cooking and bathing. Equipped with an induction range, solar and electric heater and solar generator, a family can stop using gas and thus save on fuel bills. But actions to achieve environmental sustainability relate not just to the finished product, but also to the construction process. In recent years, the developer PROCSA has taken a proactive stance on promoting environmental protection on site during construction. For example, a waterproof space is provided for the maintenance of machinery and equipment, to prevent oil and/or grease leaking into the subsoil, and waste is stored individually in closed containers that prevent spills and are collected by companies specialized in such materials.

The concept of resilience can be applied to both cities as well as rural and semi-urban areas, where environmental management is also a fundamental issue, linked to the livelihood capacity of families. Housing construction plays a vital role in the management of urban peripheries, especially for those families in areas at risk that have to be relocated. Productive housing highlights the need to connect housing policy with a strategy to help local economies and families to carry out their economic activities within the home. To

OVERCROWDED HOUSING
2009 (percentage of households)

Argentina	6%
Bolivia	23%
Chile	1%
Colombia	4%
Costa Rica	1%
Ecuador	8%
Mexico	5%
Nicaragua	28%
Paraguay	9%
Peru	11%
Uruguay	3%
Venezuela	6%

Overcrowding is measured by the ratio between the number of people in a dwelling and its surface area or number of rooms (in terms of bedrooms, rooms, or square meters). In Latin America, overcrowding is generally measured by the ratio between the number of people in a dwelling and the number of rooms available or potentially usable for sleeping (ECLAC/UNICEF, 2010):

a) moderate overcrowding: three or more people per bedroom;

b) severe overcrowding: five or more people per bedroom

this effect, the Umusambi House was developed by a group of graduate students from the Massachusetts Institute of Technology, led by Professor Rafi Segal, in collaboration with the Rwandan Housing Authority and SKAT Consulting to offer a suitable architectural response to the housing plan proposed by the national government. The state policy aims to provide “a house with a cow,” or another non-monetary subsistence mechanism (chickens, tools, seeds, land) to the farmers and ranchers dispersed across the hills while establishing a land organization system to facilitate the introduction of critical infrastructure and social services geared towards the socio-economic development of rural and semi-rural areas. This case highlights the important link between housing policy goals and architecture as its final product. In Mexico, for, example, the FOMIN social entrepreneurship program) Assisted Integral Improvement (MIA) seeks to benefit some 17,000 new families in a number of Mexican states including Oaxaca, Tabasco, Zacatecas, Morelos, Guerrero and Chiapas. These families live in peri-urban and rural areas, and most endure inadequate housing conditions, with ceilings and walls made of materials such as metal sheeting or chipboard, cardboard, windows without panes, dirt floors, lack of running water indoors, overcrowding and other significant deficiencies. As has happened with MIA in the past, over half of the population benefiting from this project is expected to be women.

Lastly, in order to apply policies relevant for environmental adaptation and improved energy use with high quality construction, it is necessary for residents to have secure tenure of the land they inhabit. The 2030 Agenda for Sustainable Development contains goals and indicators related to land (SDG 1, 2, 5, 11 and 15). With this in mind, the objective of the Mexican Titling Program was to provide property to low-income families. The need for the project arises from the fact that 25% of the country’s homes do not have property titles (six million households). The program was able to distribute more than 100,000 deeds in 2016 through a subsidy and financing scheme. As part of the project, the National Housing Commission (CONAVI) subsidized 40% of the cost of regularization, and Commission for the Regularization of Land Tenure (CORETT) offered to finance 40% of the value, while the beneficiary paid just 20%. Along the same lines, in a partnership with the IDB, the program implemented by the Land Settlement Agency (LSA) sought to provide secure and formal land tenure and homes for 7,000 families living in informal settlements in Trinidad and Tobago. The formali-

zation process was extended to the construction and paving of roads, the construction of drains and water storage facilities, the installation of drinking water supply and hydrants, and the regularization of the electricity supply. In addition, measures were taken to regularize the land tenure of the site occupants through an innovative and incremental legal approach to achieving a city with equitable housing.

On a final note, we have explored the concept of housing affordability, in the traditional understanding of the term, from a financing perspective, but also by incorporating other dimensions that can help us think about housing in more productive way. Affordability is a concept frequently used to describe public and private efforts to help low-income individuals purchase homes. Typical programs include below-market interest rates or minimum down payments, so programs are usually limited to reducing costs on construction quality, land or infrastructure coverage. However, in recent years, we have witnessed significant advances in the development of alternative models that seek to build quality affordable housing.

One of the main drivers of these alternative mechanisms is the construction industry, which sees a great opportunity in lower-income markets and is, therefore, looking for solidarity-based ways to facilitate access to cheaper and better-quality stock. The examples of Amiscus Horizon Limited, in The Gambia, and Patrimonio Hoy (CEMEX), in Latin America, illustrate the active role that the private sector, in this case the construction industry, can play in developing alternative modalities for economical and socially-oriented housing. Such schemes are based on making construction materials more affordable for customers without access to formal financing. The companies involved propose a purchasing system based on progressive savings, while offering technical and financial assistance. Amiscus Horizon proposes to build the structure of the house itself on a “pay-as-you-go” basis whereby the cement blocks and their storage are paid for in small monthly installments. When the client acquires sufficient building blocks for their house, the company takes care of transporting the material to the construction site free of charge. In the case of Patrimonio Hoy, the firm also offers a basic micro-financing model of the “solidarity group,” whereby clients join in groups of three families and enroll in the local Patrimonio Hoy office. The companies also provide an engineer and an architect to supervise the participants’ construction project. The cost of materials remains fixed throughout the work to protect customers from price fluctuations and other macro-economic instabilities. The impact of this model is not that of

HOUSING WITH AN INFRASTRUCTURE DEFICIT
2009 (percentage of households)

Argentina	13%
Bolivia	32%
Brazil	22%
Chile	2%
Colombia	9%
Costa Rica	1%
Ecuador	19%
Mexico	8%
Nicaragua	52%
Paraguay	25%
Peru	29%
Uruguay	4%
Venezuela	5%

Bridging the qualitative infrastructure gap in the region would require an investment of at least USD 107 billion, representing an investment of USD 5,000 per household.

a mere construction scheme, since it helps to address multi-dimensional problems related to poverty: the family has more room and privacy and can use the newly-built space to develop their own businesses, as 29% of the participants do, thereby resulting in a more dynamic economy.

It is important to address both the demand and supply in order to ensure that the value chain operates in an efficient cycle and affordable costs can be achieved for all market sectors. The HOME Project in Haiti is a program financed by USAID and the IDB and promoted by the private sector through incentives and technical assistance to support affordable housing projects. HOME works with Haitian companies on supply (construction) and demand (finance) in the housing value chain. On the supply side, HOME is collaborating with developers and landowners to encourage commercially driven affordable housing projects. Through pay-for-performance mechanisms, HOME creates incentives for developers to target lower-income segments of the population, go to the market, whet their appetite for risk, and build and sell faster, while reducing the selling price of homes. On the demand side, HOME encourages larger banks to increase their mortgage loan portfolios while expanding to downstream market segments. Through this same pay-for-performance mechanism, financial institutions are offered incentives to increase their client base while maintaining a low-risk rate and increasing the participation of female-headed households. Self-produced housing breaks down the limits between producer and user and opens up a range of alternative financing possibilities.

Another way to make housing more affordable is to consider the concept of incremental building, a strategy based on a progressive construction system, in which the housing unit is not fully built but is inhabitable, allowing the residents to complete their houses by their own means. In this way, users are empowered, and initial investment resources can be earmarked for elements that produce greater capital gains for the inhabitants, such as purchasing land or providing adequate wet core pods. How do we make best use of the incremental potential of housing production? How do we manage to think not only about the potential of the unfinished physical unit—an aspect which has already been extensively tested and documented—but also about the incrementality of financial structures, subsidies and maintenance? How do we redefine the housing production value chain from a progressive perspective?

One of the main problems in Kenya and the rest of the Global South is access to credit and to affordable urban land. Savings and credit cooperative organizations

(SACCO) are non-profit financial cooperatives that grant short or medium-term non-mortgage credits for incremental construction. While SACCOs grant loans to finance housing, housing cooperatives sell land to their members and sometimes act as developers. The National Cooperative Housing Union (NACHU) has 200,000 members organized into 210 cooperatives and serves as a provider of non-profit housing and financial services and as a coordinating organization representing housing cooperatives throughout the country. It also develops commercial housing and real estate projects to supplement its income. NACHUs produce social plots, since they are the ones responsible for parceling, urbanizing, titling and distributing land among their members.

The history of cooperativism also has roots in Latin America and the Caribbean, as in the case of the Uruguayan Federation of Mutual Aid Cooperatives (FUCVAM), a trade union organization set up in 1970. Thanks to the cooperative model, members share both land tenure as well as the power to make decisions on any housing projects carried out. In addition to housing, the cooperatives also design and build community centers, public spaces, construction material production facilities and commercial areas. In Costa Rica, meanwhile, the NGO Fundación Promotora de Vivienda (Housing Promotion Foundation, or FUPROVI) offers a variety of housing programs for low-income families that include community development, income generation and institution building. FUPROVI helps take advantage of national financing and government housing subsidies to supply construction materials and provide training and technical assistance to the community. In Nazareth, besides providing affordable loans for low-income families, it also managed consulting services, technical assistance and training throughout the life of the project. The foundation provides a technical instructor, an administrative and social coordinator and an architect to supervise its projects. In the Nazareth project, a building technique was invented that could adapt to the region's climate, as well as to Caribbean cultural values and the socioeconomic conditions of families there. The FUPROVI model is based on the belief that low-income families and individuals must actively invest their time and energy in identifying their own problems and solutions to housing.

Cross-subsidy mechanisms also offer self-financing alternatives once the communities own the land. The case of the NGO Nagari Nivara Parishad (NNP) shows how both for and non-profit developers that build affordable housing can use the proceeds from the sale or rental of homes and units for commercial use at market prices to subsidize the costs of

LACK OF SECURE TENURE

Argentina	16%
Bolivia	11%
Brazil	7%
Chile	14%
Colombia	10%
Costa Rica	6%
Ecuador	13%
Mexico	15%
Nicaragua	10%
Paraguay	10%
Peru	21%
Uruguay	22%
Venezuela	6%

As defined by the Economic Commission for Latin America and the Caribbean (ECLAC), secure land tenure entails:

a) the perception of having secure rights to land and property on a continual basis;

b) a tenure that is free from unreasonable interference by outsiders;

c) the ability to reap the benefits of labor and capital invested, either when in use or when leased or rented to a third party.

affordable housing. After mobilizing the community to set up a fund to pay the government for the cost of the subsidized land, NNP took out a loan for the initial development of the project by mortgaging some of the residential plots. The project was carried out in four phases. In 1992, after obtaining the land, NNP built a portion of the homes and stores in commercial residential buildings, which were then sold to invest the returns into developing the rest of the housing complexes. The successful completion of the whole enterprise depended on the management of commercial land sales and demonstrated the potential of self-financed housing even among low-income populations.

Affordability must be guaranteed for all sectors of society, even those that do not need permanent housing. To address the shortage of student accommodation in Johannesburg, the real estate developers Citiq have converted abandoned grain silos in the city center into affordable student housing. Mill Junction comprises 375 individual temporary housing apartments for university students, in addition to a series of study facilities, libraries, classrooms, and computer rooms. By repurposing buildings and using non-traditional construction techniques like cargo containers, it was possible to cut costs and increase the budget to incorporate materials that could help reduce energy use, such as double-glazed windows and movement sensors that control room lighting, which led to a 30% reduction in water and electricity consumption and, thus, to lower rental costs.

These cases are just some of those collected for this research and show only a part of the extensive evidence that can be consulted to refresh the imagination when it comes to housing production. We hope that this compilation of examples will serve to spark new and productive conversations that can put the issue of housing back at the heart of urbanism and city building, by effectively linking up specific knowledge from disciplines that, for some reason, appear to operate in isolation. How do we finance housing? How do we design it? How do we take ownership of it? These are just some of the questions that we will be better positioned to answer if we can think more holistically, broadening our spectrum of concerns and the repertoire of mechanisms and strategies we deploy to intervene in the residential fabric of cities.

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ACCESS TO IMPROVED DRINKING WATER SOURCES
2015 (percentage of urban population)

Argentina	99%
Chile	98%
Colombia	71%
Costa Rica	90%
Ecuador	74%
Mexico	43%
Nicaragua	59%
Peru	50%

The percentage of people who obtain drinking water from an improved and accessible source that is available as needed and is free of chemical and fecal contamination. Improved water sources include piped water, borehole, tube or protected dug well, protected springs and packaged or delivered water.

EXHIBITION

PABLO ROQUERO





EXHIBITION HOUSING, WHAT'S NEXT?

PABLO ROQUERO

By creating an open and dynamic space, this show's design aims to reflect a live platform of projects and practices that help make strategic use of what we have learned; it helps us to imagine new solutions and possibilities for housing and the city in Latin America and the Caribbean.

This exhibition is, operationally, ephemeral and itinerant. It aspires to interact with many different spatial environments and disciplines. For that reason, its design is based on autonomy, flexibility, and replicability. Those three premises provide, first, a means of abstraction from the specificities of the different environments to be occupied and, second, a means of adapting to the limitations and needs that those different environments might impose in terms of audience, scale, and character.

The exhibition, then, sets out to operate in two dimensions, the dimension of space and of time. By means of its static organization in space and its multimedia contents, the show conveys contents that allow cases to be addressed individually or jointly in exercises of comparison, supplementation, and debate.

The show is laid out in a circle, building a sort of universe inside the venue; a series of screens acts as the content's main support. The screens are placed in pairs radially to assemble an interface between the show's exterior and interior. The outer ring is a sort of quick conveyor of content that can act as a bridge for people just walking through the venue; the inner ring aims to communicate the specific subjects of each case and city—a sort of mosaic that tells a visual story and provides relevant information in detail.

Planet Earth, a substratum with origin at the circle's center, is represented by a rug on which the cases included in the collection are mapped. A new layer of transversal relations between cases is constructed, and possible ways to explore the show insinuated.

In the temporal dimension, the exhibition is basically structured around three sections. In the first, all the pieces in the show work together as a unit. In the second, the evolution in the shortage of quality housing in cities in Latin America and the Caribbean over the course of the last two decades is presented in map form. The third section presents case studies on projects and best practices in the Global South, including the contexts of their production, their impact and—mostly—the lessons they have to offer.

These cases will be laid out in the show to reflect their place on the housing value chain. This will then provide the basis for a linear conceptual exploration of the exhibition's periphery. At the same time, the cases will be associated with a set of traits geared to constructing new visions through the creation of multifaceted trajectories within the show, generating an experience that oscillates between the specific and the general, between the housing unit and the city.



In the second, the evolution in the shortage of quality housing in cities in Latin America and the Caribbean over the course of the last two decades is presented in maps done by the Centro de Inteligencia Territorial. Each screen represents one city.



The third section presents the 38 case studies on projects and best practices in the Global South. Each ring in the inner circle presents one case and topic associated to housing.

HOUSING
CHALLENGES:
ACCESS TO
THE CITY

HOUSING CHALLENGES: ACCESS TO THE CITY

New Methodologies for Characterizing the Urban Housing Deficit

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In Latin America and the Caribbean, the struggle to access housing is mainly an urban problem: over 130 million families in LAC live in cities—equal to approximately eight out of every ten inhabitants—making it the most urbanized region in the developing world (UN, 2018). Adequate housing for families has been recognized as a universal human right (UN, 1948). As housing is the predominant feature of the urban canvas, it is also one of the key issues of the New Urban Agenda (UN, 2017).

Cities today are shaped and reshaped at a faster rate and on a larger scale than ever before. However, urban planning and design are still based on patterns and models that have been outdated for almost a century (Closs et al., 2010). As a result, people's lives have been affected by the loss of control over territorial conditions, and the confrontation and tensions between private interests and public goods, speculation and planning.

So far, much of the discussion on urbanization has focused on the configuration of housing, work, recreation and transportation processes as separate components; that reasoning still serves as the basis for urban spatial models. The logic behind this is that each component is defined and organized differently. As a result, to improve employment quality, business centers and other, less-developed business areas are upgraded; to improve recreation, more green spaces are planned; and with regards to transport, infrastructure is expanded. In the case of housing, the aim is to provide better homes, end overcrowding, eliminate the need for informal settlements and reduce the housing deficit.

The process of city growth has thus been one of land speculation and increasing segregation. The zoning regulations that determine the amount and specific type of development in cities have become mechanisms to replicate and multiply the conditions that make for polarized cities. At the same time, urban housing has been homogenized, which has resulted in the destruction of neighborhoods and increased displacement and resettlement in peripheral districts that lack urban features, services and amenities, and which are located in areas with diminished access to goods and services. The changing urban conditions that shape cities have led to the exponential increase in urbanization, and their transformation has produced a dramatic rise in inequality, which has impacted the dynamics of urban growth. These inequalities, coupled with the lack of coordination between policies on housing, transport access, social infrastructure and land use, have resulted in the socio-spatial fragmentation characteristic of Latin American and the Caribbean cities (UN, 2016).

In contrast to this vision, a new approach has emerged based on the right to the city, a paradigm that recognizes the complex territorial dynamics of urban land access and use (CIPPEC, 2016). Urbanization patterns now demand a new framework to ensure that planning practice responds to the realities and functional needs of inhabitants. This new space is none other than the environment in which housing is situated—a more flexible, open, malleable and incremental space where the services and amenities that communities require are found. The housing problem thus needs a new approach. The qualitative deficit refers not only to housing provision and access to basic services, but also includes access to attributes of cities that are key to social development and quality of life: employment opportunities, education and public spaces. The physical and social urban housing environment has become as important an element as housing itself.

How can we understand and comparatively analyze the urban housing deficiencies in Latin America and the Caribbean? This is undoubtedly a challenge of great complexity, one which involves identifying and comparing the shortfalls beyond just provision or access to the housing unit, so as to incorporate those aspects that are essential to accessing the functional dynamics and opportunities offered by cities. Although the housing deficit has long been studied, we are still lacking a conceptual and methodological approach to the challenge of the urban deficit, especially if we consider that traditional tools do not include the right variables to measure it in all its complexity (MINVU, 2009).

PROPOSAL

This study provides an initial, multidimensional approach to the configuration of the urban habitat in a sample of Latin American and the Caribbean cities. Within this framework, and based on the comparative information available, the article seeks to understand the various urban environment conditions that affect quality of life and the residential habitat in the region. This new approach is related to the capability theory developed by Amartya Sen, whose perspective emphasizes individual functional abilities. The capability theory is a broad framework for evaluating individual and social well-being. The core focus of this approach is on the individual's capabilities, as measured by their freedom to achieve that which they value. When applied to the urban environment, the capacity approach recognizes that cities—as realms of capabilities—provide space

for an extremely diverse range of opportunities that vary due to the combination of physical and social characteristics. Housing and communities thus become enablers or inhibitors of access to capabilities and the freedoms necessary for the well-being of urban life. A relevant question, therefore, is how those conditions of opportunity are distributed in urban settings, particularly in residential areas.

To achieve that aim, this study proposes an innovative methodology to construct a Synthetic Urban Quality Index (SUQI) that uses big data and geospatial analysis tools. In recent years, the exponential growth in the production of digital information and the substantial improvement in computing capacity have turned geotechnologies into instruments that help different actors involved in land management. Tools such as geographic information systems (GIS), remote sensing and spatial simulation models open up hitherto unknown potential in the production, exchange and monitoring of information related to city life, as well as the opportunity to characterize complex urban phenomena and anticipate change scenarios (Pfeffer, 2015). This is undoubtedly a valuable resource for countries when it comes to formulating, applying and monitoring their urban policies, as well as strengthening land planning, management and governance mechanisms in a sustainable, resilient and inclusive manner. For the purposes of this study, a methodology was designed to identify evidence in cities based on remote information (satellite images) and using common, readily-available tools, without the need for field work—a critical component, particularly if we are to identify and characterize the urban housing deficit in the region in a systematic and comparable manner.

This paper proposes a methodology based on three estimations related to territorial dimensions in order to determine the size and expansion of the main cities of Latin America and the Caribbean over the last two decades, along with their urbanization features. The three estimations are the following:

1. The size and expansion of the cities in the period 2000/2010/2018.
2. Urban environmental comfort in relation to vegetation cover and annual temperature range.
3. Levels of accessibility to facilities and services.

STUDY SAMPLE

The sample of this study is made up of the cities and metropolitan areas of IDB member countries in Latin America and the Caribbean, with at least two cities selected for each IDB member country. The selection criteria were the following (in order of application):

1. Most populated city/metropolitan area in the country
2. Intermediate city: last city admitted to the IDB's Emerging and Sustainable Cities (ESC) Program.
3. In those cases in which the last city admitted to the IDB's ESC program was also the most populated in the country, the second most populated city was chosen as the second city to be analyzed in that country.¹
4. In those cases in which the cities selected according to criterion 1, 2 or 3 did not have available satellite images for at least two of the periods within the study timeframe (2000-2010-2018), the next most populated city in each country in question was selected.

It was not possible to analyze some of the sample of countries/cities due to the lack of unobstructed satellite images (without cloud cover). This was the case with islands such as Barbados, Trinidad and Tobago or countries with abundant cloud cover throughout the year (e.g. Guyana).

Table 1 shows the cities selected according to the abovementioned criteria.

METHODOLOGY

Determination of the Consolidated Urban Area (CUA) 2000-2018

The methodological proposal for this stage consists of four phases: in phase one, information is collected, the input is pre-processed and the base coverages used for modeling the surface area of the cities are created; in phase two, the training sites or areas that will be used to obtain the spectral signatures² corresponding to the land cover are constructed; in phase three, a supervised classification is made of the spectral

COUNTRY	CITY	TYPE OF CITY
ARGENTINA	Buenos Aires Metropolitan Area Greater Mendoza	most populated IDB emerging
BAHAMAS	Nassau Freeport	IDB emerging 2nd most populated
BARBADOS*	Bridgetown* Speightstown*	IDB emerging 2nd most populated
BELIZE	Belize City San Ignacio	IDB emerging 2nd most populated
BOLIVIA	La Paz-El Alto Cochabamba	most populated IDB emerging
BRAZIL	São Paulo Metropolitan Region Goiania	most populated IDB emerging
CHILE	Greater Santiago La Serena-Coquimbo	most populated IDB emerging
COLOMBIA	Barranquilla Ibague	** IDB emerging
COSTA RICA	San José Puntarenas	IDB emerging 2nd most populated
ECUADOR	Guayaquil Cuenca	most populated IDB emerging
EL SALVADOR	San Salvador Santa Ana	most populated IDB emerging
GUATEMALA	Guatemala City Quetzaltenango	most populated IDB emerging
GUYANA*	Georgetown* Linden*	IDB emerging 2nd most populated
HAITI	Port-au-Prince Gonaives	most populated 2nd most populated
HONDURAS	Tegucigalpa and Comayagüela San Pedro Sula	IDB emerging 2nd most populated
JAMAICA	Kingston Montego Bay	most populated IDB emerging
MEXICO	Mexico Valley Metropolitan Area Lazaro Cardenas	most populated IDB emerging
NICARAGUA	Managua* León	IDB emerging 2nd most populated
PANAMA	Panama City* David	IDB emerging 2nd most populated
PARAGUAY	Greater Asunción Greater Ciudad del Este	IDB emerging 2nd most populated
PERU	Lima Cusco	most populated IDB emerging
DOMINICAN REPUBLIC	Santo Domingo* Santiago de los Caballeros	2nd most populated IDB emerging
SURINAME*	Paramaribo* Nieuw-Nickerie*	IDB emerging 2nd most populated
TRINIDAD AND TOBAGO*	Chaguanas* Port-of-Spain*	2nd most populated intermediate
URUGUAY	Montevideo Salto	IDB emerging 2nd most populated
VENEZUELA	Maracaibo Barcelona	** IDB emerging

* Cities/countries without suitable satellite information for the period 2000-2010-2018

** Special cases. Refer to point 4 on selection criteria

Table 1. List of countries and cities selected for the study.

Source: CIT, own elaboration

bands³ produced by satellite images; and finally, in phase four, a process of cartographic delimitation and refinement is carried out. These stages are sequential, as can be seen in Figure 1.

The methodology for obtaining data on the urban areas is based on a combination of remote sensing tools and geographic information systems (GIS), the basic inputs for which are images from the Landsat 5 and 7 platforms (2000, 2006 and 2012) and the Landsat 8 platform (2018) obtained by the Operational Land Imager (OLI) sensor using the GLOVIS platform hosted by the US Geological Survey (USGS). The Landsat images have a spatial resolution of 98 ft., which makes them ideal for delimiting medium-sized cities and large metropolises.

The next step involved constructing the training sites that were used as a basis for the supervised classification of the land cover (water, vegetation, bare soil, impervious surfaces). The supervised classification methodology used was the maximum likelihood classifier.⁴ The spatial delimitation of the continuous urban areas was carried out using the Delineate Built-up Areas tool, which allows a group of polygons or previously detected built-up areas to be automatically delimited by following a set of rules on topological vicinity. Through the detection of the impervious surfaces associated with urban and industrial use, it was possible to obtain the representative areas for constructing the polygons associated with urban nuclei.

Based on these parameters, the areas of urban sprawl for each city were obtained using the inputs for all the years analyzed. The delineation of each urban expanse takes into consideration only the consolidated urban area and leaves out satellite settlements that are not connected to the main city by a continuous urban area.

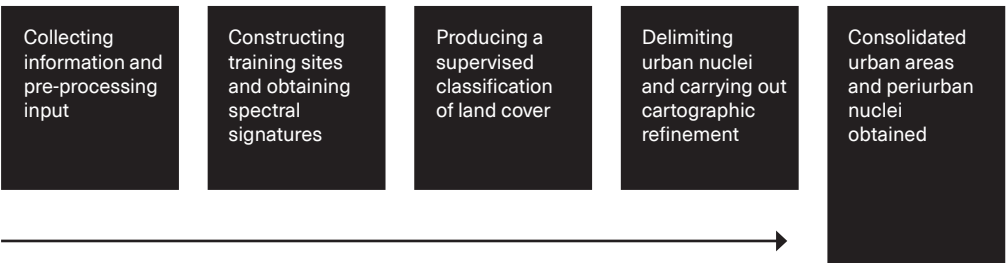


Figure 2. Methodological Process for Determining the Size, Expansion and Territorial Shape of Cities.
Source: CIT, 2018

Urban Climate Comfort Index (UCCI)

The second stage of this study seeks to analyze environmental comfort in the selected cities. For this a comfort indicator was

constructed using two environmental indicators: annual vegetation-covered area and annual temperature range. Both indicators are generated by processing the inputs from the Landsat and MODIS satellite platforms,⁵ which are synthesized into two physical variables of the urban environment: the normalized difference vegetation index (NDVI)⁶ and land surface temperature (LST).

In practical terms, satellite imagery offers considerable advantages over on-the-ground methods for estimating the urban biomass index quickly and effectively, especially when covering large areas and different temporalities. Following this procedure, the vegetation-covered area is obtained using the NDVI as a base. A specific sample is taken from the NDVI comprising places with different types of urban vegetation at different times of the year. When selecting satellite images that correspond to the maximum amplitude of the vegetation index in the winter and summer seasons, it is also necessary to consider the initial and middle phases of the phenological cycles of urban vegetation. In this way, a point coverage is obtained that is used to extract the values of each NDVI estimated for the cities selected in the study. The NDVI coverage is then used to obtain the annual vegetation-covered urban area (VCUA).

To estimate the land surface temperature (LST), the algorithm created by Jiménez-Muñoz and Sobrino (2003) is used owing to its flexibility in terms of diverse atmospheric conditions and its adaptability to different types of sensors. For the LST estimation, five fundamental magnitudes are needed, including the atmospheric water vapor content (obtained using the MODIS sensor). Once the LST has been estimated, the next step is to obtain a composite of the seasonal average using the winter and summer surface temperatures. In this way, it is possible to obtain the urban environmental indicator resulting from the annual temperature range (A_t) or the difference between the average summer and winter surface temperature.

The synthetic urban climate comfort indicator (UCCI) is obtained from the spatial integration of environmental indicators, which are constructed based on the surface biomass and the land surface temperature (LST) and by using the urban blocks of each city as a reference for spatial analysis. Those block clusters with a low percentage of vegetation-covered area and high annual temperature range are given a lower score, while, in contrast, urban block clusters with greater vegetation cover and lower annual temperature range are given a higher score. In formal terms, at the urban block level, the UCCI is obtained using the following expression:

$$UCCI_i = \text{Annual Temperature Range}_i + \text{Annual Surface Biomass}_i$$

Where $UCCI_i$ is the UCCI obtained for the urban block i . The coverage of polygons corresponding to the urban blocks characterized by the UCCI is processed and spatially reclassified. This is done using the information summarized in Table 2.

Accessibility to urban services

During this stage, the accessibility to public services and urban facilities in the delimited areas was evaluated. An innovative methodology is needed to assess accessibility due to the type of information handled, the way it is processed, and the final results achieved. These are indicators designed around inhabitants' interactions with the city; they are adapted to local realities, which allow phenomena to be graphed and thereby make the subsequent analysis and comparison between localities easier. Complications such as the modifiable area unit problem⁷ and the ecological fallacy can also be avoided through this method.⁸

To calculate the accessibility of public services and amenities in the urban areas studied, point coverages were created from the locations of each of the types of services and amenities analyzed (employment center-historic center, education and health) using as a reference information obtained via Open Street Maps, Wikimapia, Google Earth and Google Maps.

From that point on, the network analysis methodology was applied to the effective link between the user and urban infrastructure and its different methods of transport. Accessibility to urban services and amenities is defined as the average time

UCCI CATEGORIES	CLIMATE CONFORT
Block clusters with high values	High
Blocks with high values surrounded by blocks with low values	Medium high
No statistically significant spatial clusters	Medium
Blocks with low values surrounded by blocks with high values	Medium low
Block clusters with low values	Low

Table 2. Categories Assigned to the UCCI Clusters
Source: CIT, authors' compilation, 2018

it takes the population to reach those points (Figure 3).

Accessibility to health and education services was calculated based on a walking speed of 2.2 mph (average speed taking into account traffic lights and pedestrian crossings), with local amenities in mind. For accessibility to employment centers, travel time by car was calculated at different speeds according to the type of road, due to the lack of information on official speeds for each city.

To evaluate accessibility, the following expression was used:

$$IASE_i = \frac{\sum_{j=1}^{j=n} TE_{ij}}{n}$$

Where $IASE_i$ corresponds to the indicator of accessibility to urban services and amenities for the urban block i , TE_{ij} corresponds to the travel time from block i to amenity j . On this basis, origin-destination matrices were then constructed to estimate pedestrian accessibility to urban services and facilities, and accessibility by private transport to employment centers. A maximum travel time of 30 minutes was considered in the case of health/education



Figure 3. Basic Diagram for Calculating Accessibility
Source: CIT, 2017

facilities, while, in the case of employment/historical centers, no time limit was set since the entire population of the city is understood to travel there.

Synthetic Urban Quality Indicator (SUQI)

The Synthetic Urban Quality Indicator was obtained by reclassifying, assessing, scoring and zoning the analyzed variables (accessibility and environmental comfort). The calculated accessibilities were reclassified using the Moran scatterplot (Anselin, 1993). In the case of accessibility, blocks with longer commute times received a lower score and those with shorter travel times, a higher score. In terms of environmental comfort, blocks with greater comfort received higher scores. Finally, all the points obtained were totaled.

RESULTS

In the initial categorization, the 42 cities studied in the region were divided based on their surface area in 2018 into three groups using the natural breaks method: large cities (area >386 sq. mi.), medium-sized cities (between 116 and 386 sq. mi.) and small cities (< 116 sq. mi.). On this basis, just three cities are classified as large: São Paulo, Brazil; Buenos Aires, Argentina; and Mexico City, Mexico. The group of medium-sized cities is comprised of the following five: Greater Santiago, Chile; Lima, Peru; Greater Asunción, Paraguay; Goiania, Brazil; and San José, Costa Rica. The remaining 34 cities are classified as small.

On the basis of geographical location, the entire selection of 42 cities can be divided into two large groups: North, which includes Mexico, Central America and the Caribbean and South, made up of South America. The first group is mainly made up of small cities since the only large city is the Valley of Mexico and the only medium-sized city is San José, Costa Rica. The second group contains the large cities of São Paulo, Brazil and Greater Buenos Aires, Argentina, as well as the medium-sized cities of Greater Santiago, Chile; Lima, Peru; Greater Asunción, Paraguay; Goiania, Brazil; and 15 small cities. With the exception of San José, Costa Rica, the cities in Central America and the Caribbean are almost entirely small.

The analysis of the consolidated urban area (CUA) shows that, on average, the cities expanded by 51% between 2000 and 2018. Of the 42 cities, 12 exceed the regional average. Four of the cities have doubled their surface area in less than 20 years: Santa Ana, El Salvador (136%); Goiania, Brazil (134%); and Greater Asunción (118%) and Greater Ciudad del Este,

Paraguay (111%). Moreover, two of the three most populated and largest cities in the region have also undergone enormous changes in terms of territorial impact: Greater Buenos Aires, Argentina, increased its urban area by 87% between 2000 and 2018, and São Paulo by 57%. Meanwhile, the Metropolitan Area of Mexico City grew by 29% in that period, placing it below the regional average.

The analysis of the results from the Synthetic Urban Quality Indicator (SUQI) integrates the metrics obtained by the indicators of accessibility to health, education and employment and the Climate Comfort Indicator. The SUQI was analyzed through both:

1. A comparative analysis of extreme results, that is, the category that represents the best quality of urban life and the one that represents the poorest quality of urban life.
2. A comparative analysis of the distribution of the SUQI, to observe phenomena related to the relative weight of the categories in the urban configuration.

Of the total urban areas analyzed in the 42 cities in the region, only 27% of the surface area could be classified as urban habitat of high or medium-high quality. Only five cities in the sample have a higher percentage of high and medium high SUQI than the rest of the SUQI categories: Salto, Uruguay (57%), León, Nicaragua (54%), San Ignacio, Belize (49%), Lázaro Cárdenas, Mexico (46%) and Cusco, Peru (40%) display these characteristics in 40% to 57% of their urban area. They are all very small cities, that is, they have an urban footprint of less than 19 sq. mi., much less than the other cities in the region.

In contrast, 44% of the urban areas in the region exhibit characteristics associated with a low or medium-low habitat quality. In over half (28) of the cities analyzed, 40% or more of the surface area has a low or medium low SUQI, which in some cases represents more than half of the city: Montego Bay, Jamaica (70%), Freeport, Bahamas (65%), David, Panama (54%), Barcelona, Spain (53%), Santa Ana, El Salvador (53%), Greater Asunción, Paraguay (50%), Nassau, Bahamas (50%) and Quetzaltenango, Guatemala (50%). These are all small cities with urban areas of less than 39 sq. mi., with the exception of Greater Asunción (medium-sized city, 164.8 sq. mi.).

The three largest cities in the region are among the most populated on the planet and exhibit characteristics associated

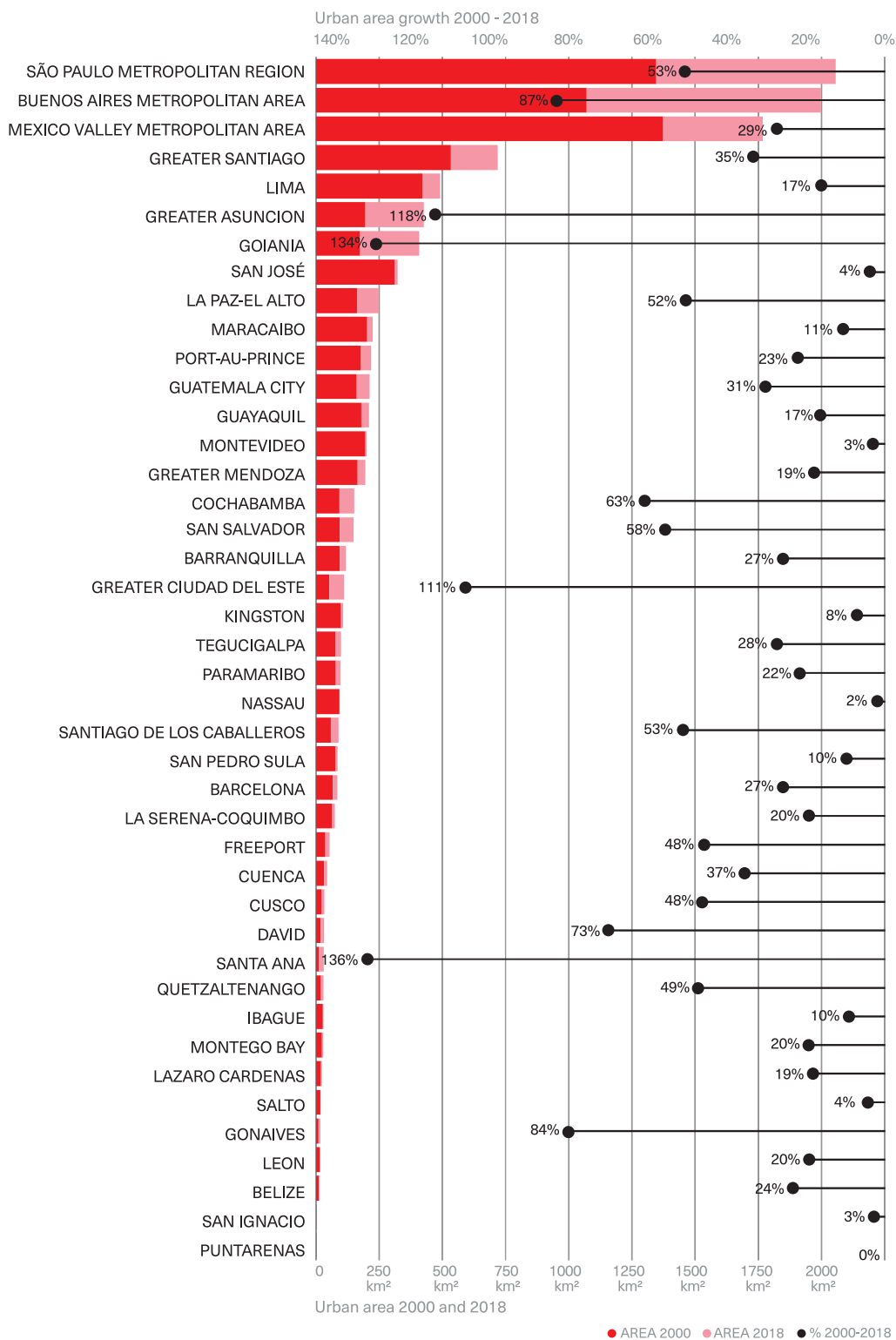


Figure 4. Surface Area of Cities in 2000 and 2018, in sq. km. and percentage of a growth.
Source: CIT, own elaboration, 2018.

with a low-quality urban habitat. All three have very high percentages of urban area with a low or medium-low (40-50%) SUQI. When the configuration of the SUQI is broken down according to the variables analyzed, the following characteristics are observed: (1) in environmental terms, all have large urban areas of high environmental quality (45% or more of the city); (2) in terms of accessibility to health services and historical/employment centers, in all cases, 40% or more of the city has low accessibility (with travel times of 30 minutes or more); (3) in terms of access to educational services, 35% of the São Paulo Metropolitan Region has very low accessibility (of 30 minutes or more on foot), compared to 19% in the Metropolitan Area of Mexico City and 13% in the Metropolitan Area of Buenos Aires. In summary, if the distribution of the SUQI is observed in relation to size, it can be concluded that there is no clear correlation between urban size and quality of life.

It is also interesting to analyze the results of the SUQI in terms of the homogeneity and heterogeneity of the distribution of the indicator categories in the region. Figure 6 shows the percentages of urban area covered by the extreme SUQI categories: high/medium-high and low/medium-low, arranged according to the difference between the two extremes.

For example, in the city of Salto, Uruguay, 57% of the area has a high or medium-high quality of urban life and 22% a low or medium-low quality, leaving 23% of the area in the medium category. On the other hand, in the city of San Pedro Sula, Honduras, 34% of the area falls into the high or medium-high category and 34% is classified as low or medium-low, which means that 32% is in the regular category. The city of Salto proves to be more heterogeneous than San Pedro Sula, since a high percentage of the urban area is in a single category. In contrast, the city of San Pedro Sula presents a more homogeneous distribution, since the percentages are very similar for the three categories.

Based on this graph, three urban quality-related phenomena can be observed in the cities studied:

1. Polarization. At the extremes we find the cities with the largest area covered by a high or low SUQI, while also showing a marked difference between the two categories. This indicates cities with an urban habitat quality that is heterogeneous, in other words, where there is a significant polarization of the territory in terms of accessibility and environmental quality. On the left are the cities whose urban quality is predominantly high: the

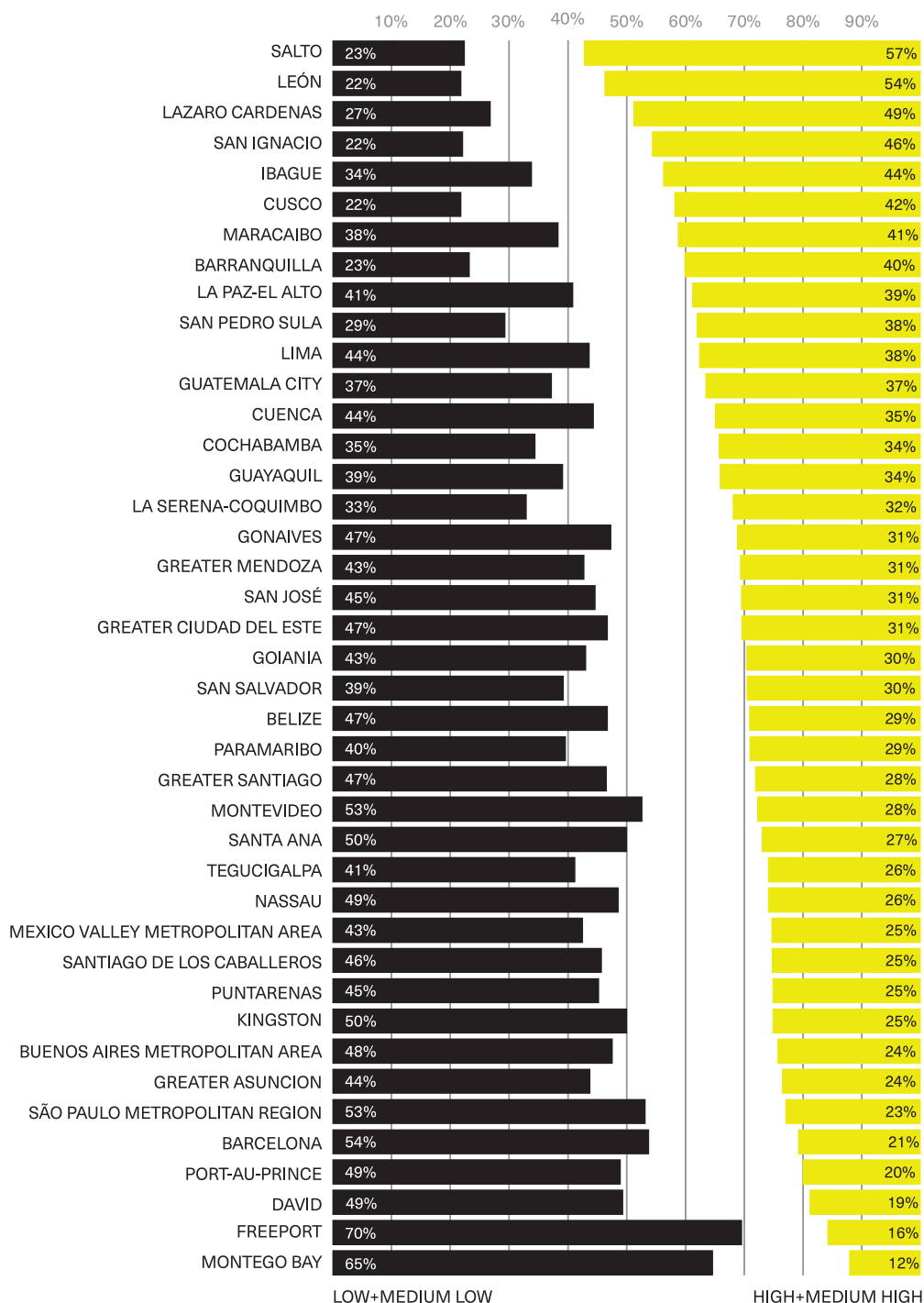


Figure 5. Distribution of the Urban Quality Synthetic Indicator High/Low.

two cities where this phenomenon is most evident are Salto, Uruguay and León, Nicaragua. In both cities the proportion of the urban area with a high quality of life exceeds 50%. On the right are the cities with the largest area covered by a low quality of urban life: the two cities where this phenomenon is most pronounced are Montego Bay, Jamaica, and Freeport, Bahamas. In both cities, the percentage of the urban area with a low quality of life exceeds 50%.

2. “Homogeneous” cities. The second phenomenon is observed in cities where the percentages of high and low SUQI are very similar. This can be seen most clearly in the cases of San Pedro Sula, Honduras, Lima, Peru and Guatemala City. In all three cases, moreover, the amounts are close to 35%, which means that the three ranges (high, medium and low) cover more or less the same area of the city. This results in a city that is homogeneous in terms of the distribution of urban quality of life.

3. Criticality. The third phenomenon is observed in almost half of the cities studied, where at least 45% of the area has a low or medium low SUQI. This includes large cities, such as São Paulo, Brazil (49%) and Buenos Aires, Argentina (45%), as well as medium-sized cities such as Greater Asunción, Paraguay (50%). The highest percentages are observed in small cities, such as Montego Bay, Jamaica (70%), Freeport, Bahamas (65%) and David, Panama (54%). Furthermore, eight of the 42 cities show a low SUQI in at least 20% of their urban area, which, in cases such as Guayaquil, Ecuador, or Freeport, reaches 28% of the city. These phenomena reflect the precariousness of the urban habitat in the region's cities, which gives rise to critical conditions in terms of urban quality of life, such as very low accessibility to sources of employment, health and education services and a quality urban environment.

On a final note, the Latin America and the Caribbean region has undergone an unprecedented process of urbanization in recent decades that has made it, along with North America, one of the top two most urbanized regions in the world. As we have seen, this process has resulted in a huge spread of cities, which in some cases doubled their urban expanse in just 20 years. These phenomena are accompanied by an increase in the costs of building and maintaining basic infrastructure: it is estimated that an unplanned city can increase its basic investment expenses by over 100% compared to a properly planned and executed scenario. This also leaves the cities in

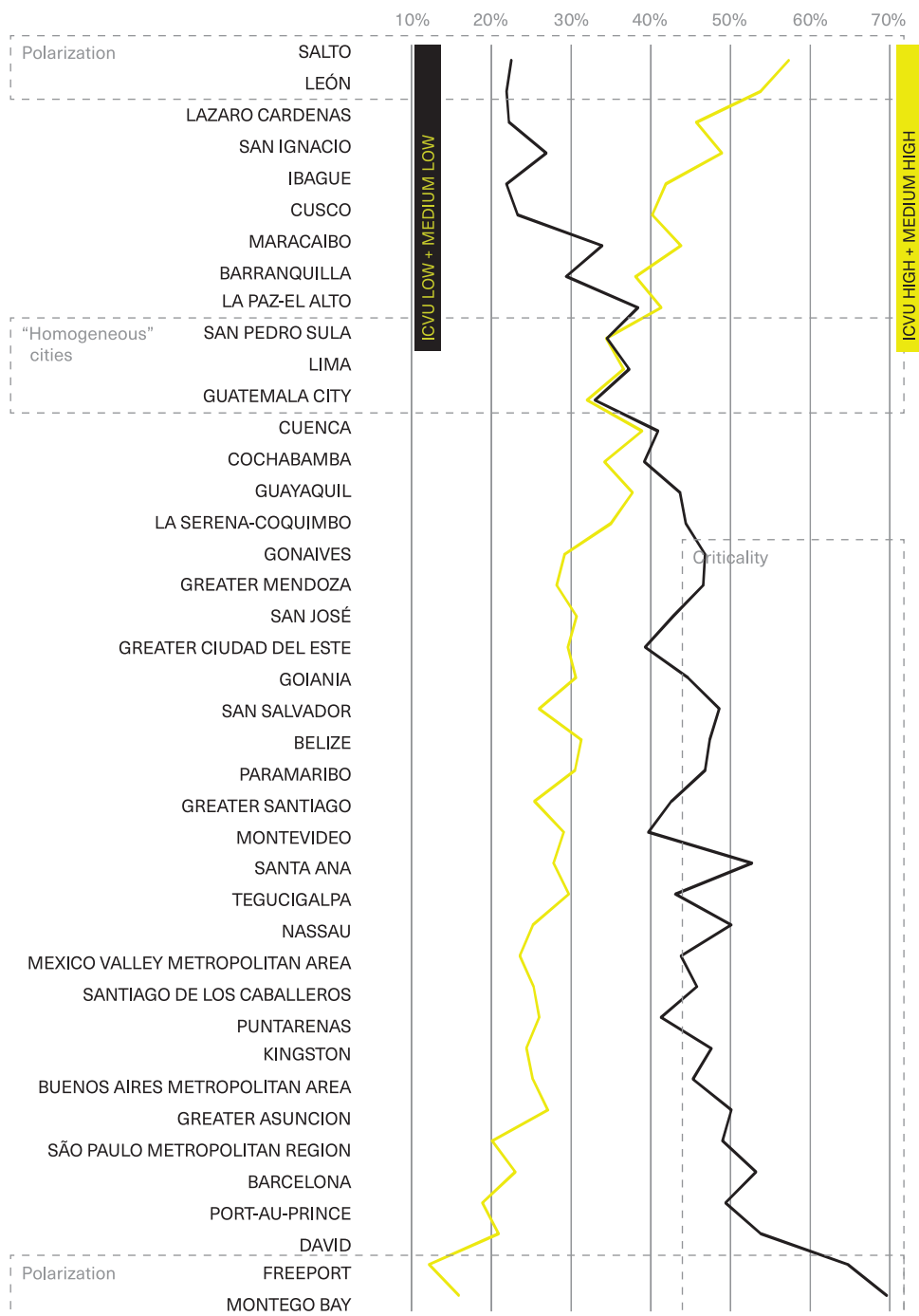


Figura 6. Comparison of the Urban Quality Synthetic Indicator High/Low according to the distance between extremes.

the region more exposed to natural hazards. This trend has led to a situation in which our urban centers are facing enormous challenges. Failure to address these challenges in a timely and adequate manner may compromise sustainable development and quality of life in the cities across the region.

Although rapid urban growth in intermediate cities has created opportunities for millions of people, it also poses great challenges for the governments of the region. The New Urban Agenda adopted at Habitat III frames urbanization as a driver for sustainable development and a tool for social integration and equity. The present study has provided the opportunity to comparatively explore and confirm the presence of significant intra-city segregation in terms of access to urban facilities and services. These phenomena cut across the entire region of Latin America and the Caribbean and are observed in cities of all sizes. This situation should thus be urgently addressed by strategies of spatial justice that are central to the right to the city, thereby strengthening the processes involved in constructing the urban residential habitat so as to guarantee all citizens can access its services and benefits.

1 – In the case of Haiti, the first and second most populated cities in the country were selected, since there are no Haitian cities participating in the ESC program.

2 – The spectral signature is the reflectance of a material with respect to wavelengths. Every material takes a unique form and thus the spectral signature can be used to classify materials and land coverage. (NASA, 2013)

3 – The spectral band is the capacity of a satellite (e.g. LANDSAT, METEOSAT, NOAA, SPOT) to receive information in a specific range of the electromagnetic spectrum. The various spectral bands are determined by the fraction of luminous intensity transmitted by a given wavelength. In this way, each band captures particular characteristics of the urban soil.

4 – The Maximum Likelihood Classification methodology based in statistical adjustments in the classification of pixels with the maximum likelihood in relation to their neighboring pixels, integrating the spectral bands of the visible range to the near-infrared (NIR) and the shortwave infrared. As a result, it generates a coverage in a raster format with each of the pixels reclassified according to all of the classes of soil coverage identified.

5 – Moderate Resolution Imaging Spectroradiometer, available at <http://ladsweb.nascom.nasa.gov>

6 – The normalized difference vegetation index, also known as NDVI is used to estimate the quantity, quality, and development of vegetation based in a measurement of the intensity of the radiation of certain electromagnetic spectral bands that the vegetation emits or reflects.

7 – Modifiable area unit problem (MAUP) is a problem that occurs when the results of the average data from a spatial analysis differ from those resulting from the same analysis applied to the same data, but using different averages and weights. (Clark & Scott 2014; Zhang & Kukadia, 2005)

8 – Ecological fallacy: possible argumentative errors produced by a misinterpretation of data from a sample, in which it has been assumed that all members would have the same characteristics. (King, 2013)

URBAN EXTENT

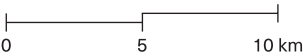


An urban extent is the continuous extension of urban land in a given year, without taking into account satellite settlements outside urban centers. When analyzing the interannual spatial variation of the metropolitan area, an estimation is made for the percentage of growth of the urban areas. These percentages were calculated for the periods 2000-2010, 2010-2018 and 2000-2018, depending on the availability of relevant data for each year analyzed.

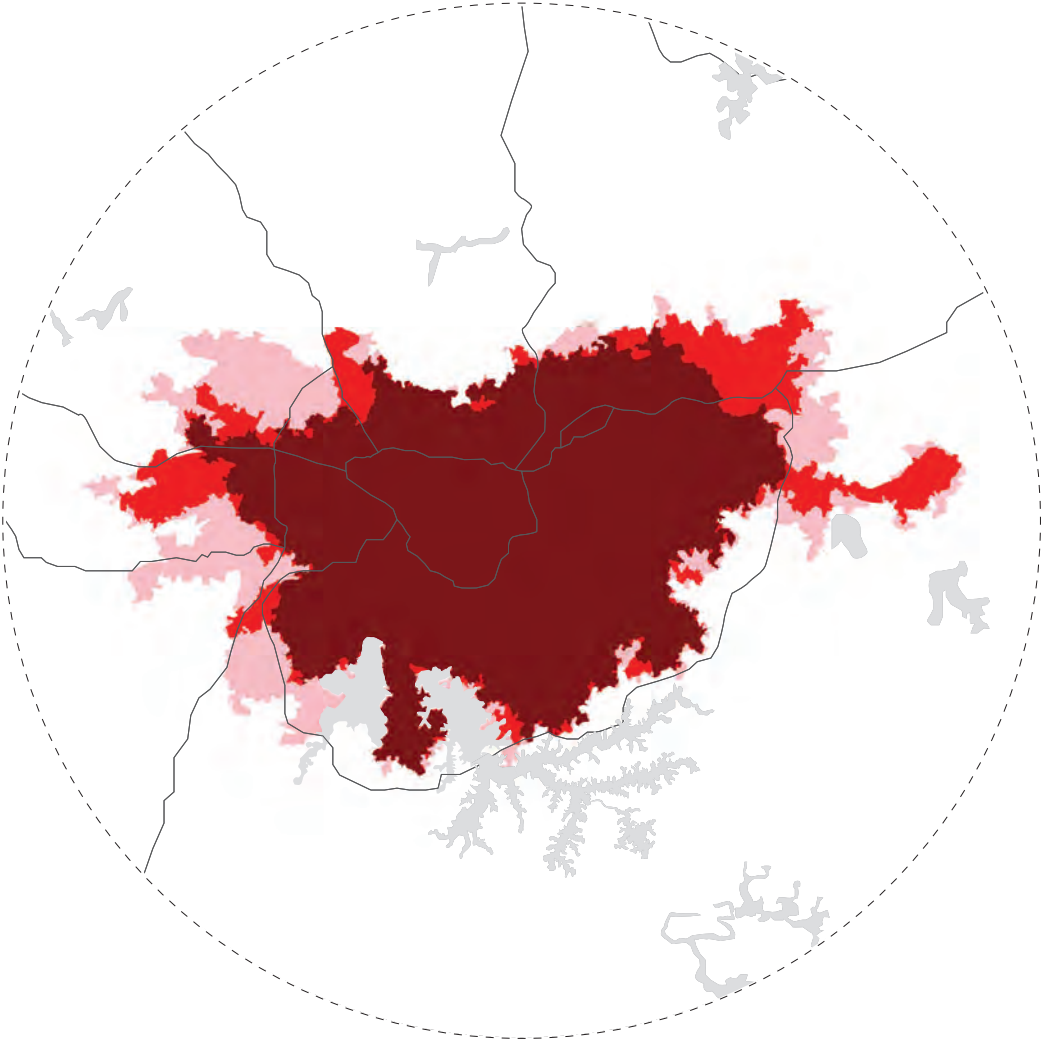
LARGE CITIES
> 1000 km²

Urban Extent Growth
Years 2000 - 2018

- Year 2000
- Year 2010
- Year 2018

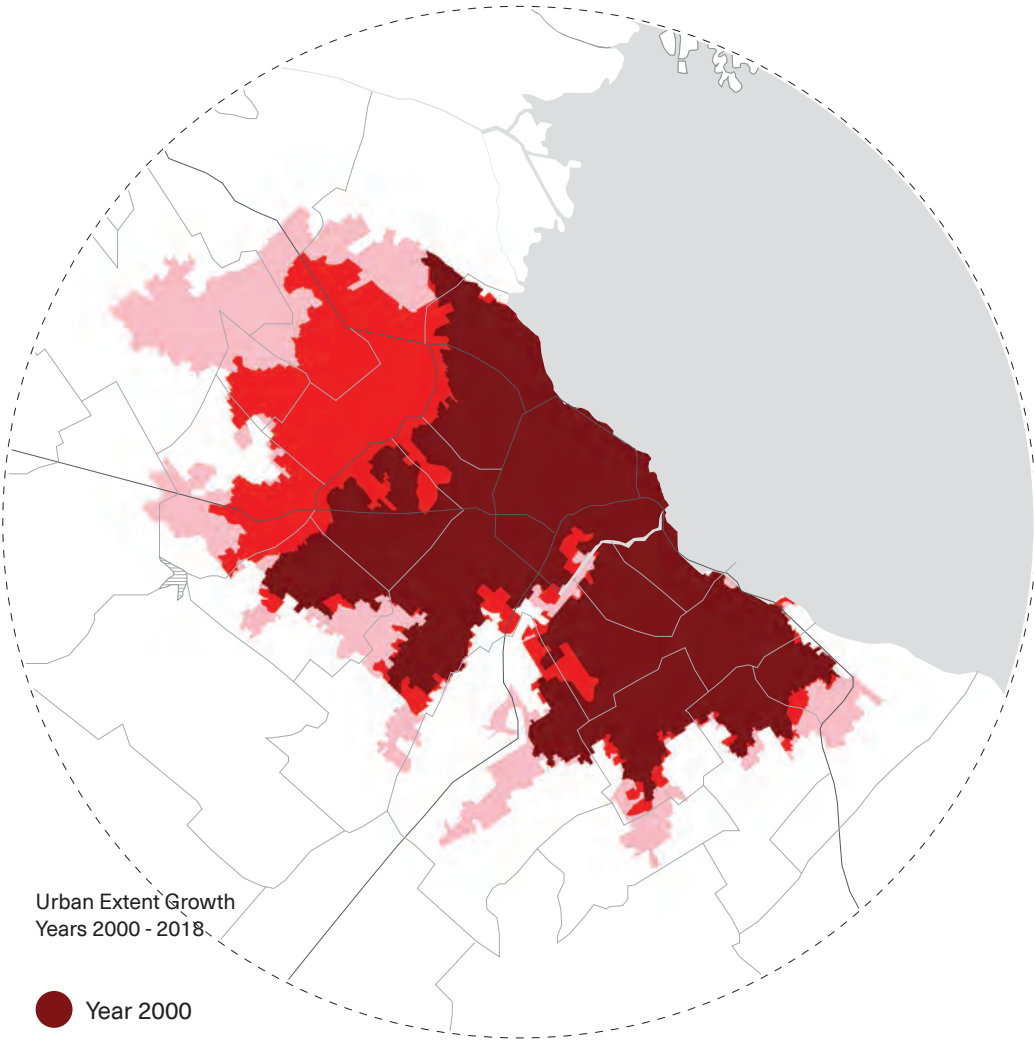


SÃO PAULO METROPOLITAN REGION
Brazil, 2056 km²



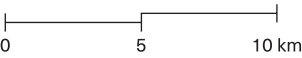
URBAN EXTENT

BUENOS AIRES METROPOLITAN AREA
Argentina, 1997 km²

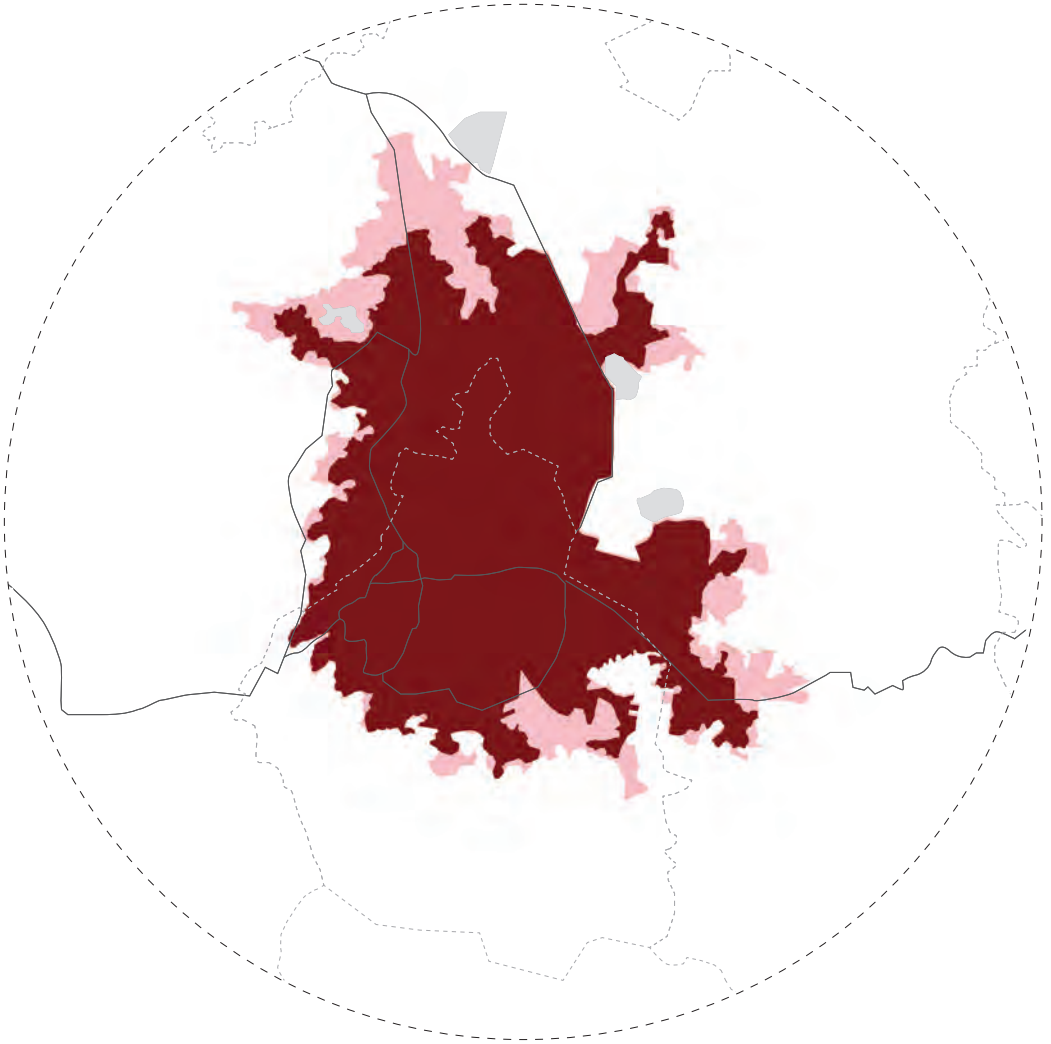


Urban Extent Growth
Years 2000 - 2018

- Year 2000
- Year 2010
- Year 2018



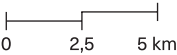
MEXICO VALLEY METROPOLITAN AREA
Mexico, 1768 km²



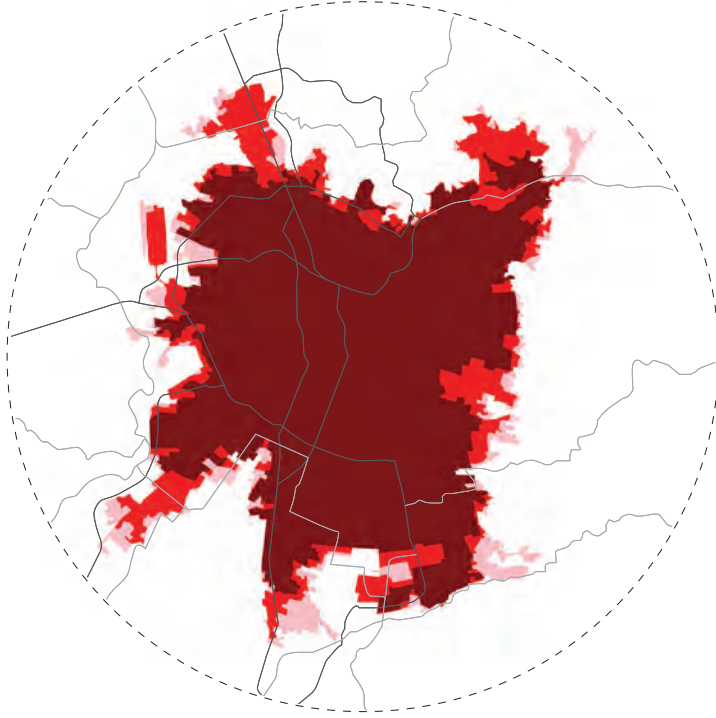
MEDIUM-SIZED CITIES

300 to 1000 km²

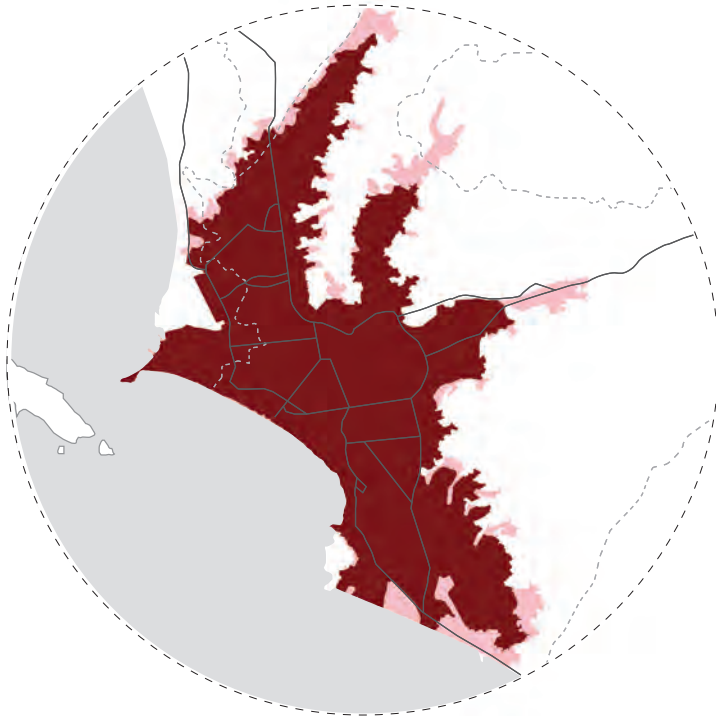
Urban Extent Growth
Years 2000 - 2018



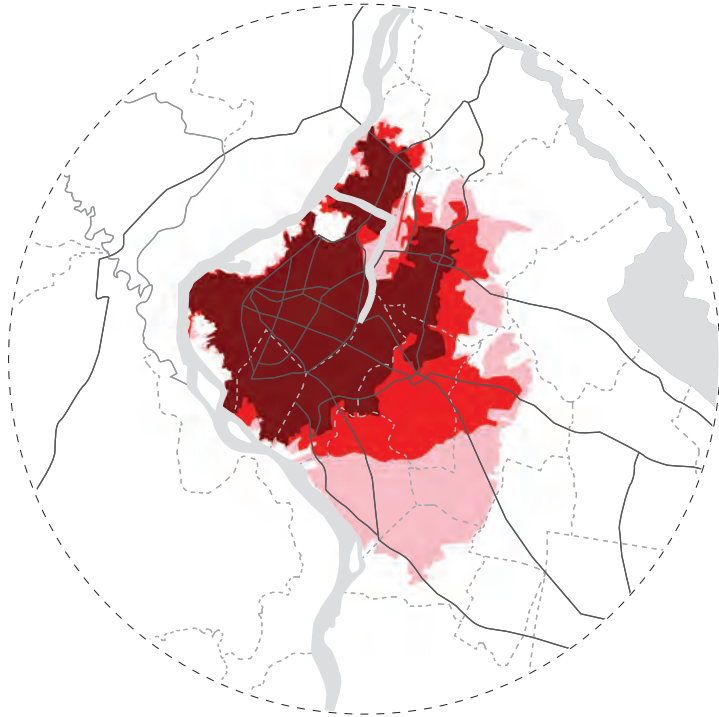
GREATER SANTIAGO
Chile, 719 km²



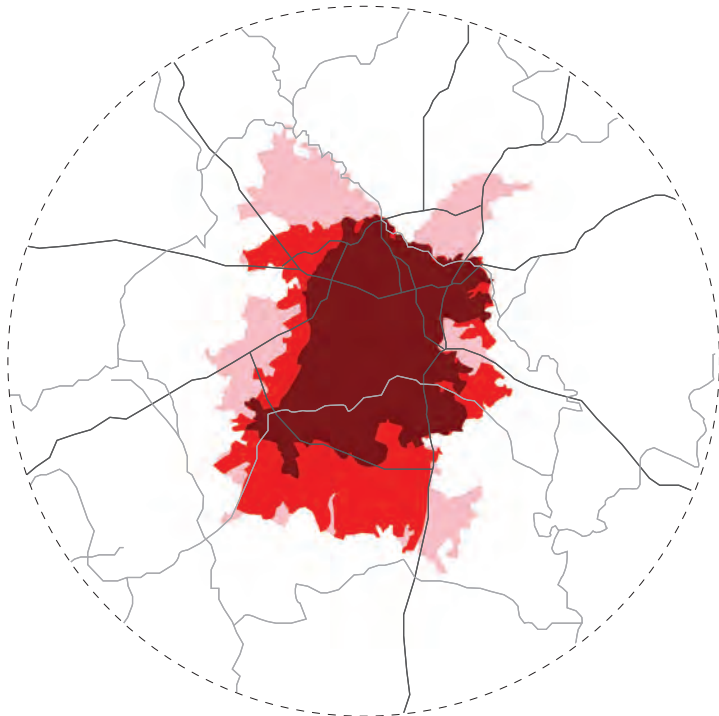
LIMA
Peru, 491 km²



GREATER ASUNCION
Paraguay, 427 km²



GOIANIA
Brazil, 409 km²

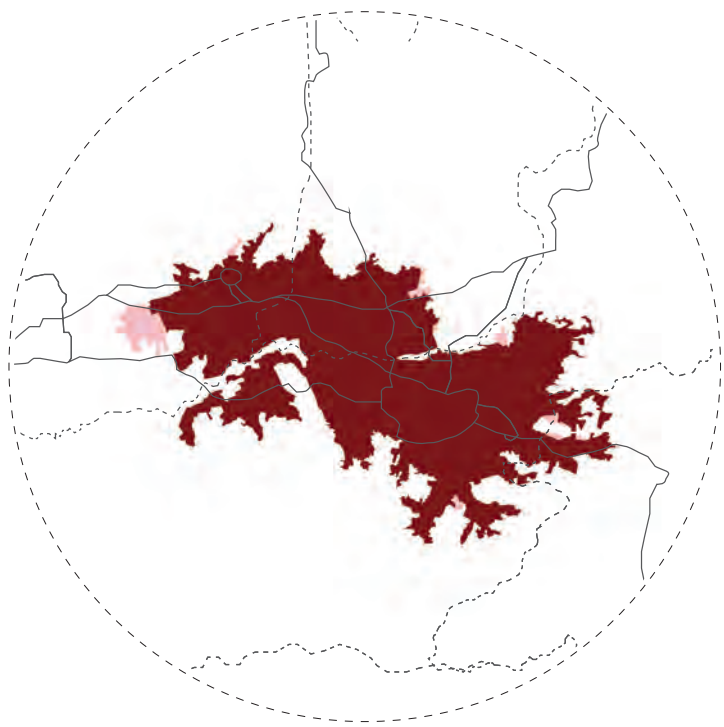


Urban Extent Growth
Years 2000 - 2018

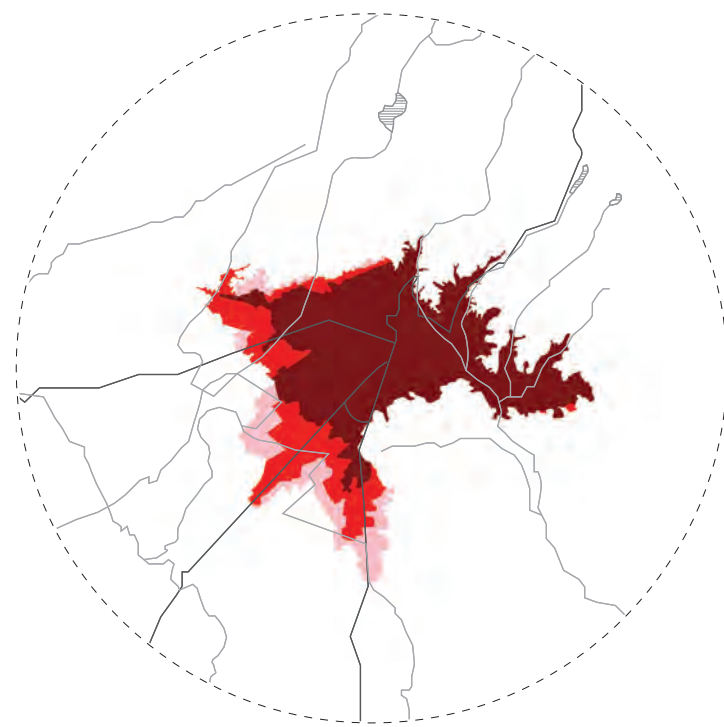
- Year 2000
- Year 2010
- Year 2018

0 2,5 5 km

SAN JOSÉ
Costa Rica, 324 km²

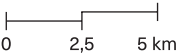


LA PAZ - EL ALTO
Bolivia, 248 km²

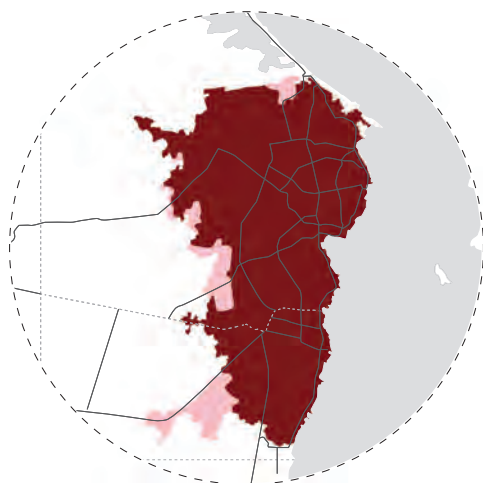


SMALL CITIES
< 300 km²

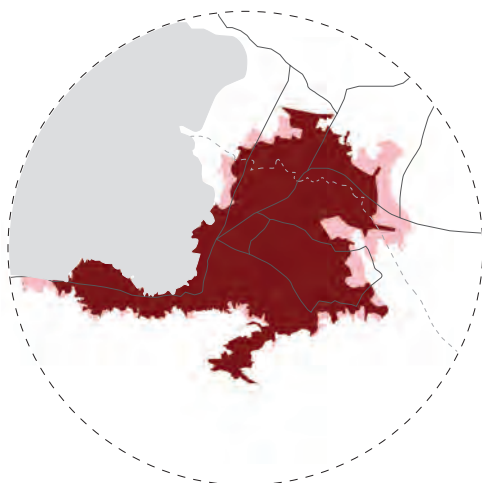
Urban Extent Growth
Years 2000 - 2018



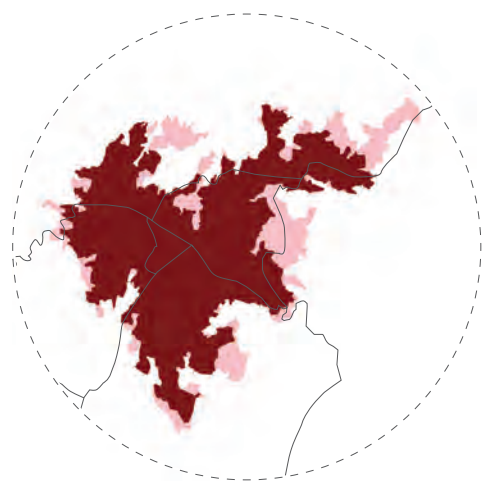
MARACAIBO
Venezuela, 225 km²



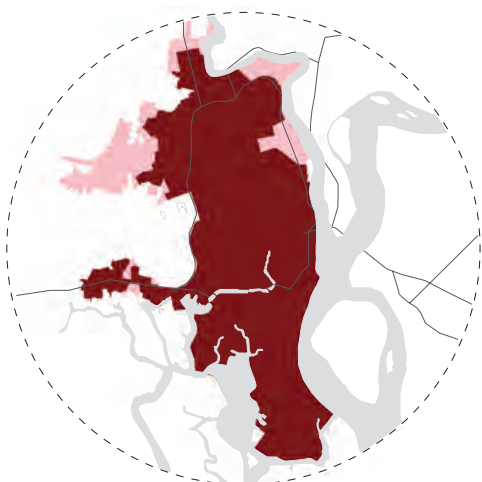
PORT-AU-PRINCE
Haiti, 218 km²



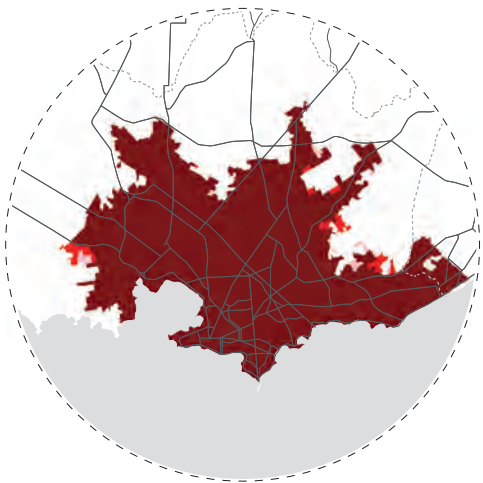
GUATEMALA CITY
Guatemala, 213 km²



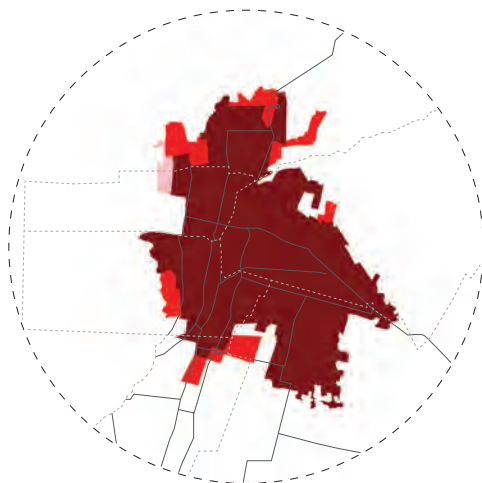
GUAYAQUIL
Ecuador, 210 km²



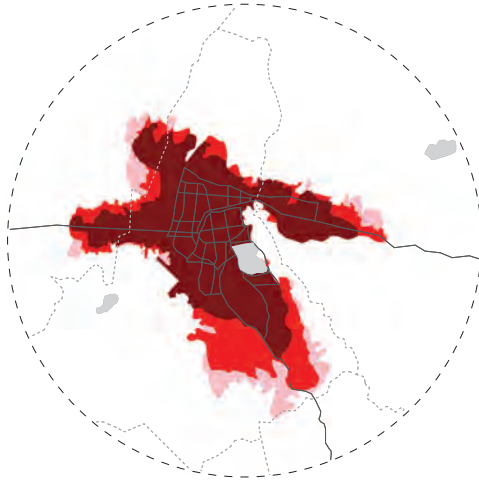
MONTEVIDEO
Uruguay, 201 km²



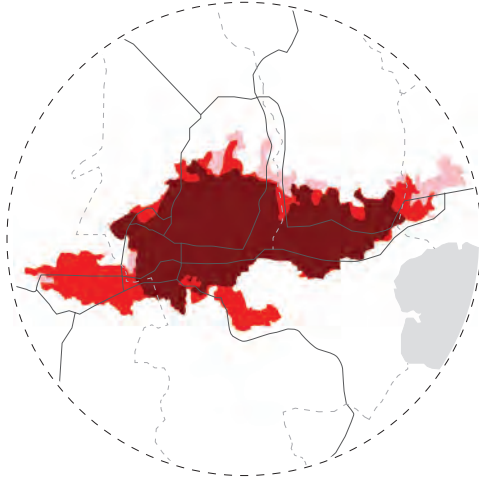
GREATER MENDOZA
Argentina, 195 km²



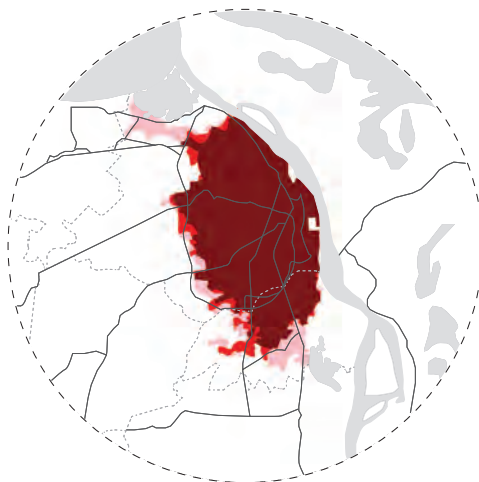
COCHABAMBA
Bolivia, 151 km²



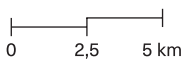
SAN SALVADOR
El Salvador, 149 km²



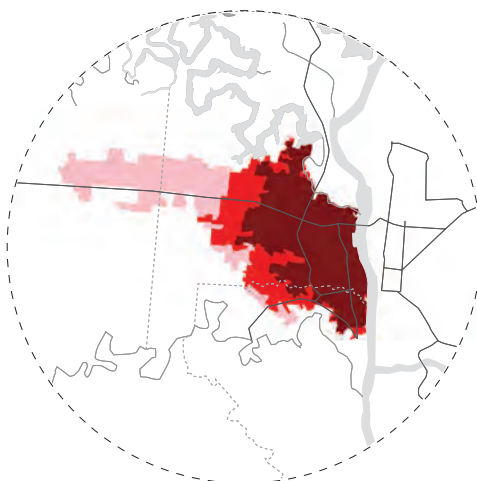
BARRANQUILLA
Colombia, 119 km²



Urban Extent Growth
Years 2000 - 2018



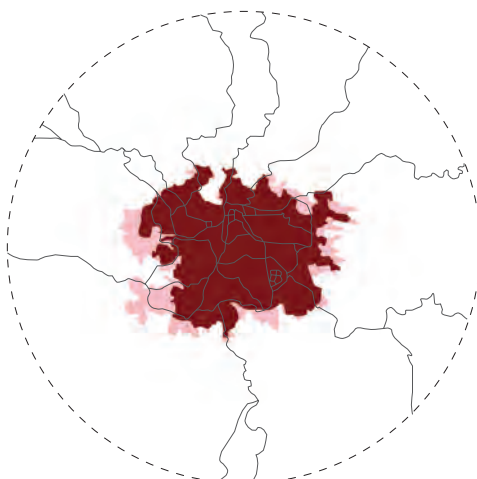
GREATER CIUDAD DEL ESTE
Paraguay, 111 km²



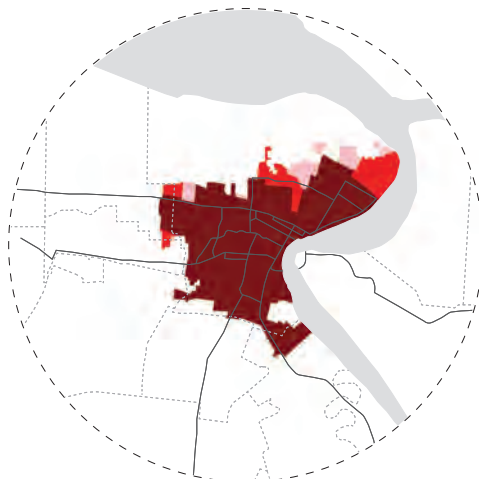
KINGSTON
Jamaica, 107 km²



TEGUCIGALPA AND COMAYAGÜELA
Honduras, 99 km²



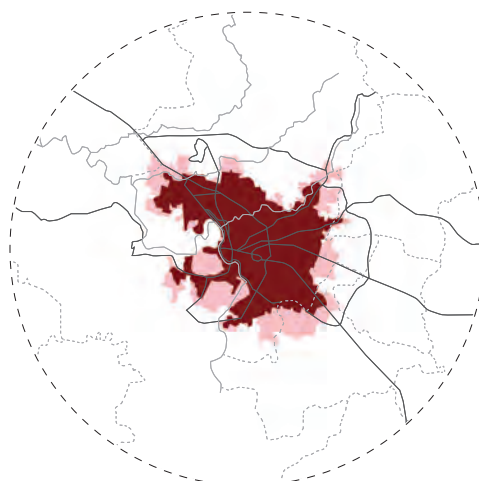
PARAMARIBO
Suriname, 96 km²



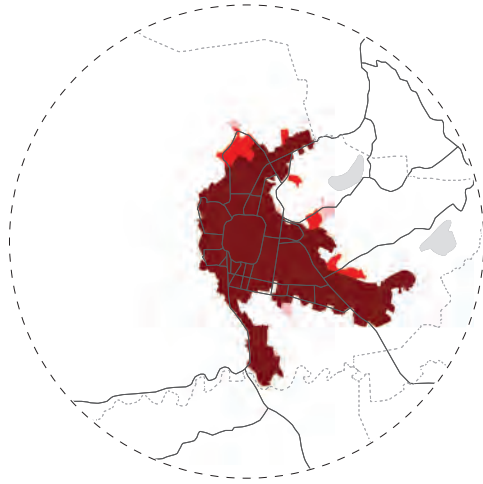
NASSAU
Bahamas, 95 km²



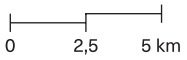
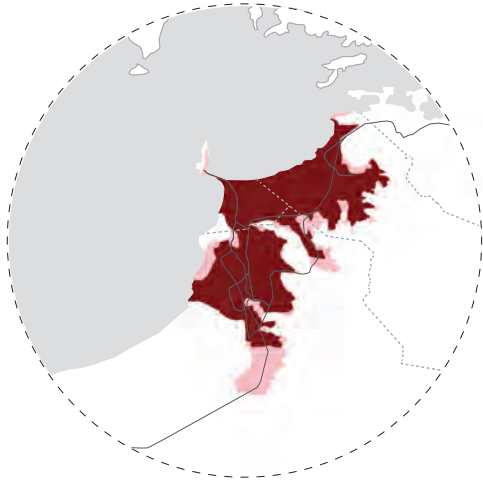
SANTIAGO DE LOS CABALLEROS
Dominican Republic, 89 km²



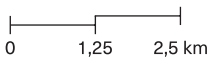
SAN PEDRO SULA
Honduras, 85 km²



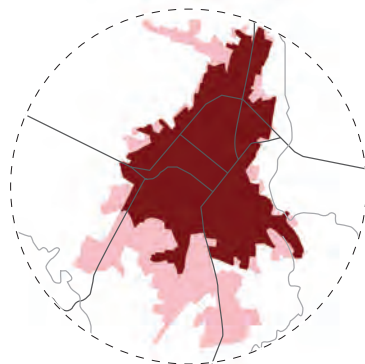
BARCELONA
Venezuela, 84 km²



Urban Extent Growth
Years 2000 - 2018



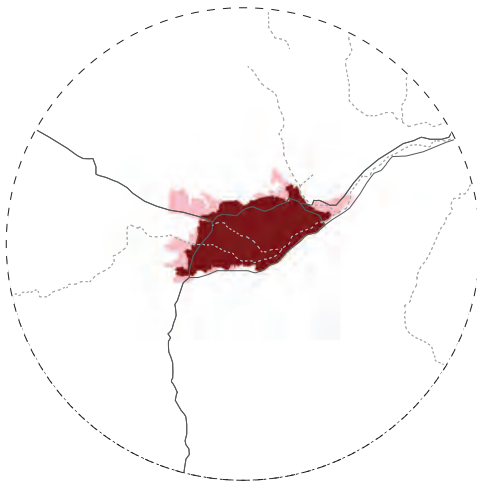
DAVID
Panama, 32 km²



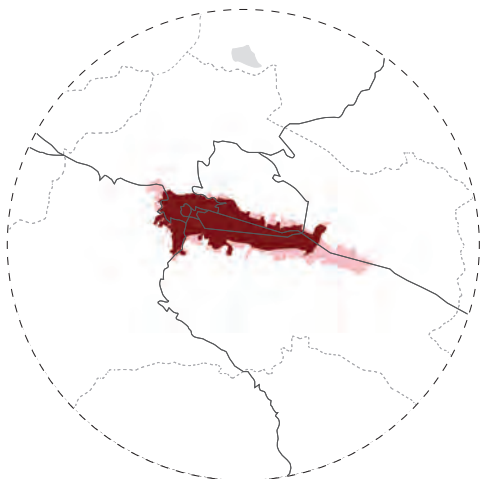
FREEPORT
Bahamas, 54 km²



CUENCA
Ecuador, 44 km²



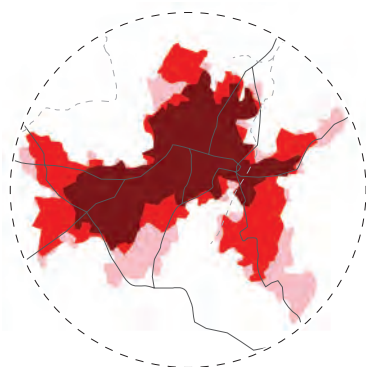
CUSCO
Peru, 33 km²



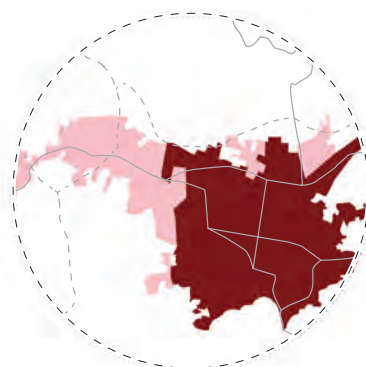
LA SERENA - COQUIMBO
Chile, 74 km²



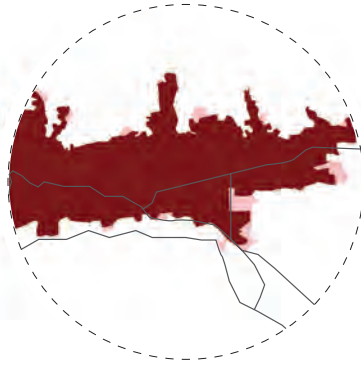
SANTA ANA
El Salvador, 31 km²



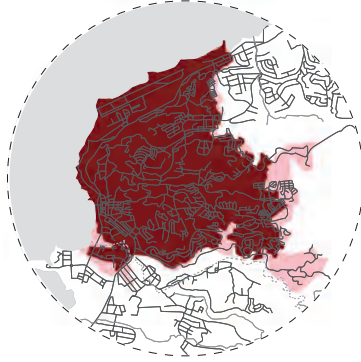
QUETZALTENANGO
Guatemala, 30 km²



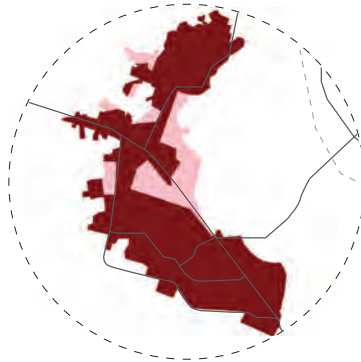
IBAGUE
Colombia, 30 km²



MONTEGO BAY
Jamaica, 28 km²

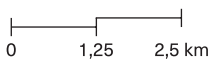


LAZARO CARDENAS
Mexico, 24 km²

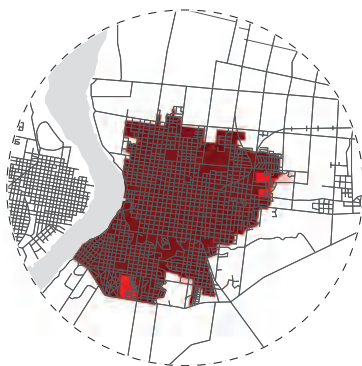


Urban Extent Growth
Years 2000 - 2018

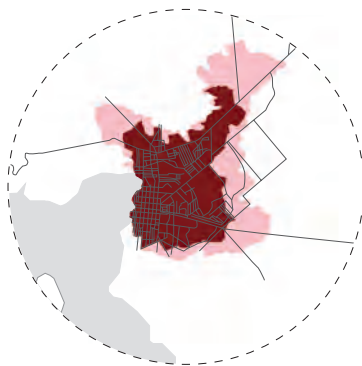
- Year 2000
- Year 2010
- Year 2018



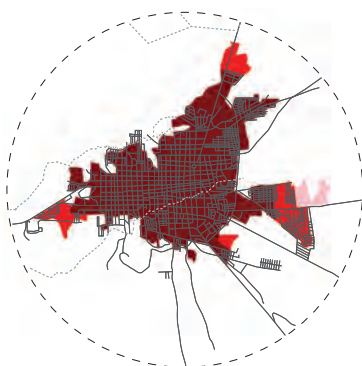
SALTO
Uruguay, 19 km²



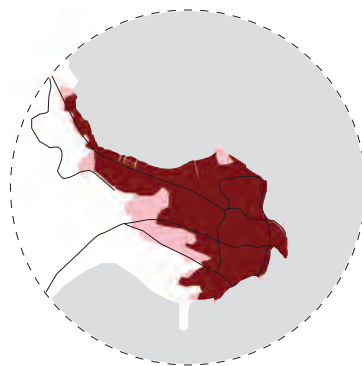
GONAIVES
Haiti, 18 km²



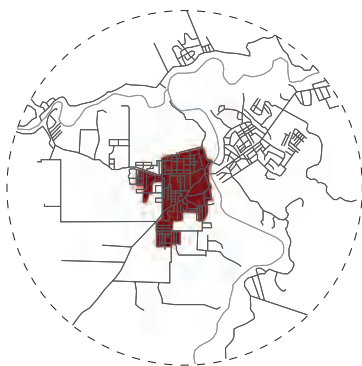
LEON
Nicaragua, 18 km²



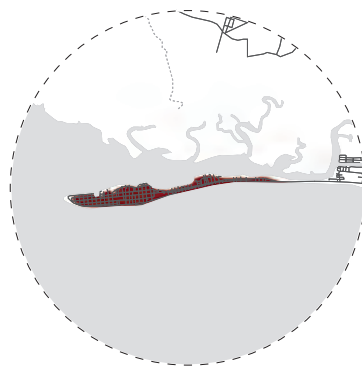
BELIZE CITY
Belize, 14 km²



SAN IGNACIO
Belize, 3 km²



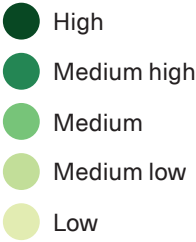
PUNTARENAS
Costa Rica, 2 km²



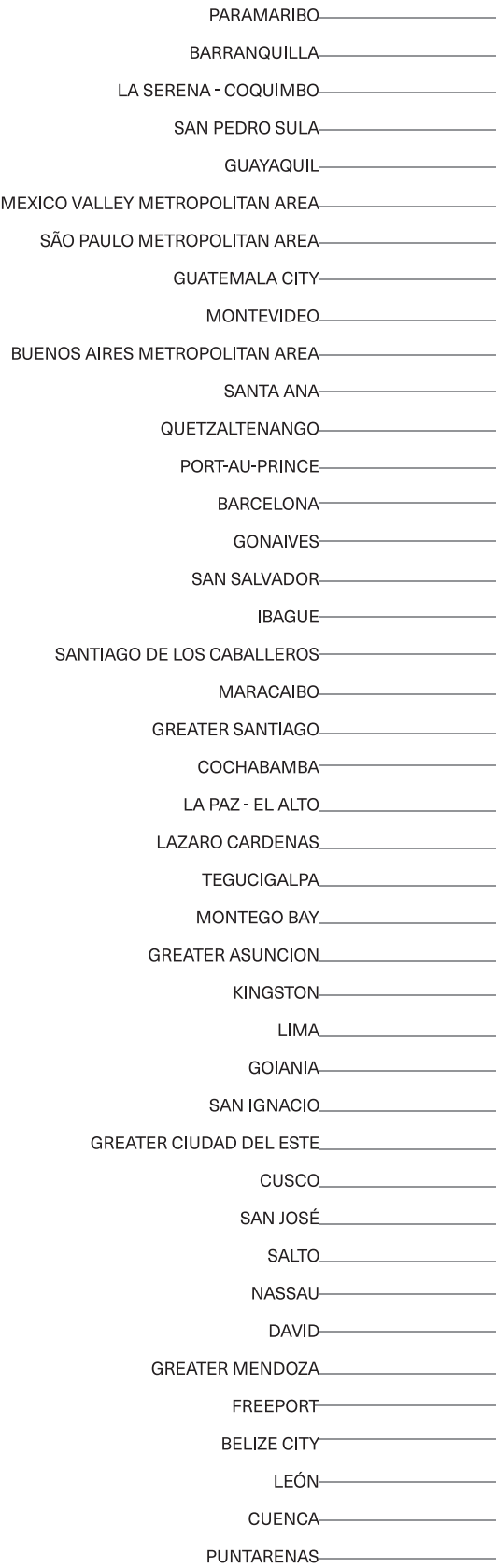
Environmental comfort corresponds to the geostatistical analysis and spatial modeling of two environmental indicators, the annual vegetation-covered urban area (VCUA) and the annual temperature range (TR). A high level of environmental comfort corresponds to a block cluster with high VCUA and low TR values, that is to say, a large amount of vegetation and little annual temperature variation, while a low level of environmental comfort corresponds to a block cluster with low VCUA values and high TR, i.e., little vegetation and wide variations in temperature.

ENVIRONMENTAL COMFORT INDICATOR IN LATIN AMERICA AND THE CARIBBEAN

Environmental Comfort
Indicator
Year 2018



Height of each city slab is proportional to its urban area (km)



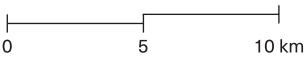


ENVIRONMENTAL COMFORT
INDICATOR IN LATIN AMERICA
AND THE CARIBBEAN

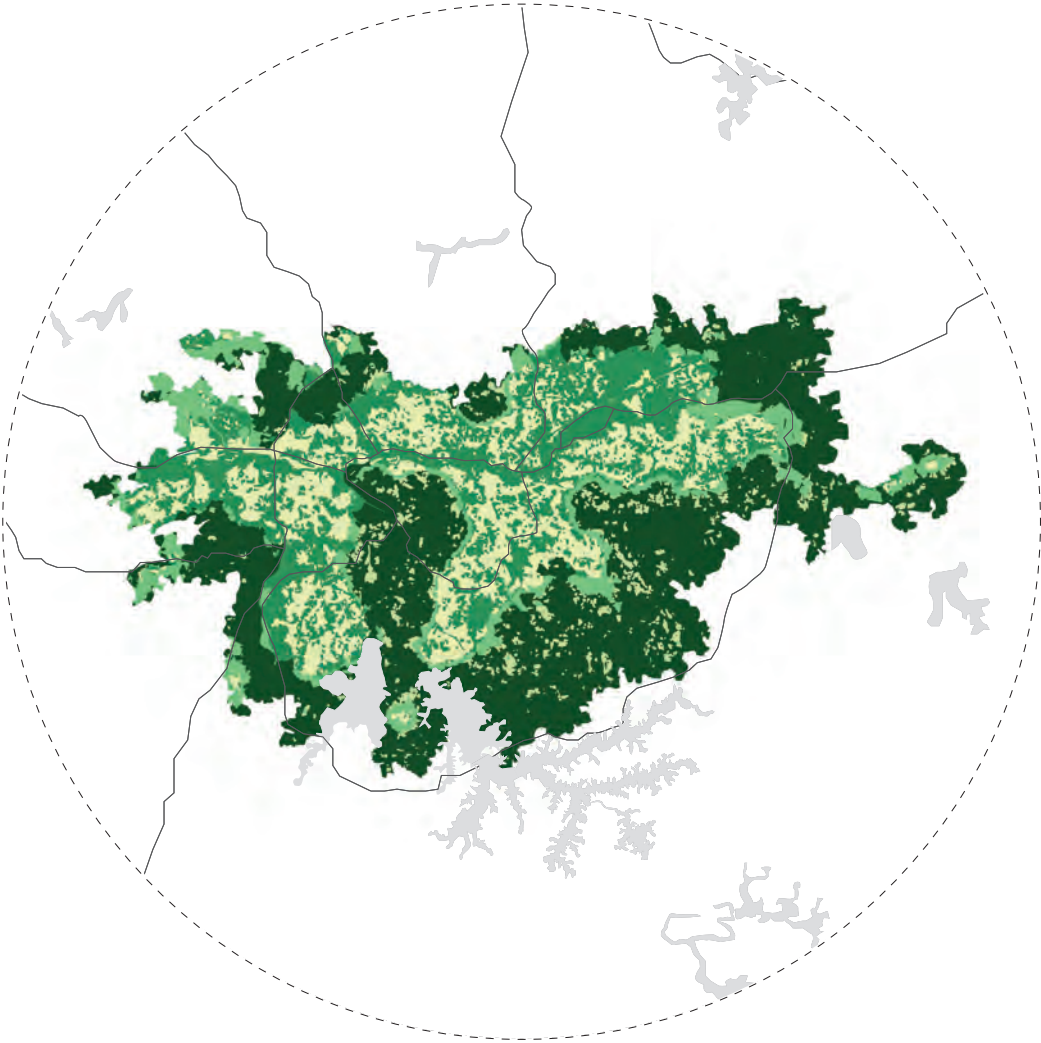
LARGE CITIES
> 1 000 km²

Environmental Comfort
Indicator
Year 2018

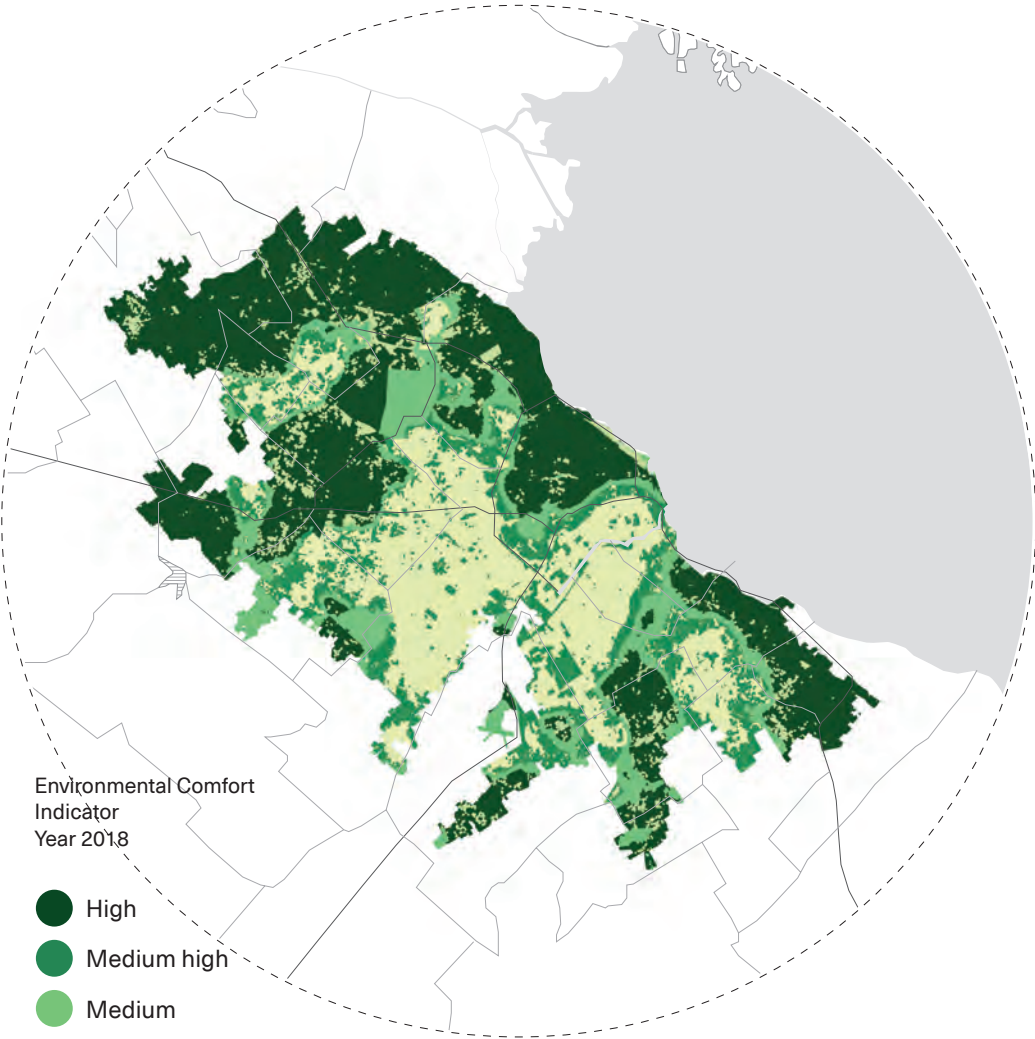
- High
- Medium high
- Medium
- Medium low
- Low



SÃO PAULO METROPOLITAN REGION
Brazil, 2056 km²

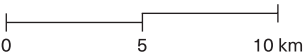


BUENOS AIRES METROPOLITAN AREA
Argentina, 1997 km²

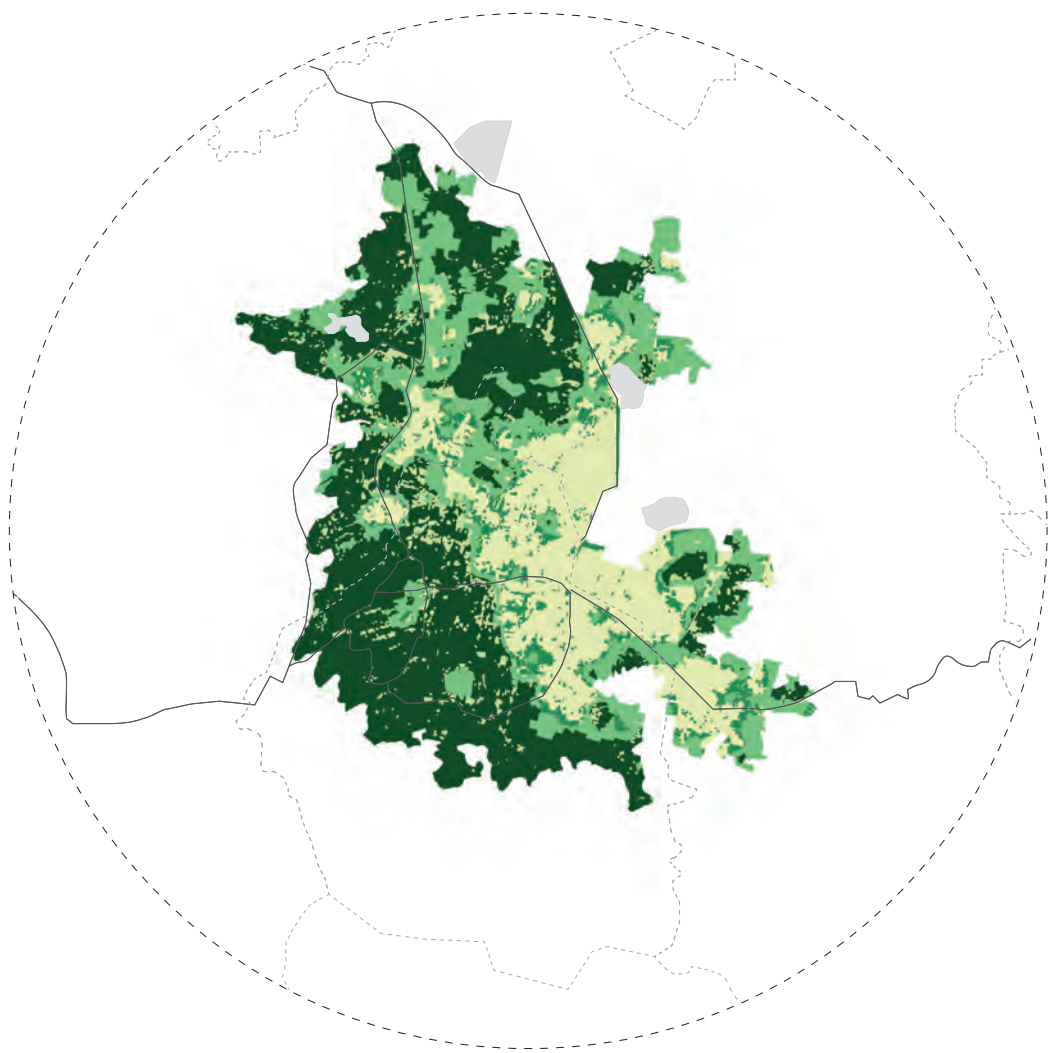


Environmental Comfort
Indicator
Year 2018

- High
- Medium high
- Medium
- Medium low
- Low



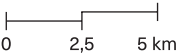
MEXICO VALLEY METROPOLITAN AREA
Mexico, 1768 km²



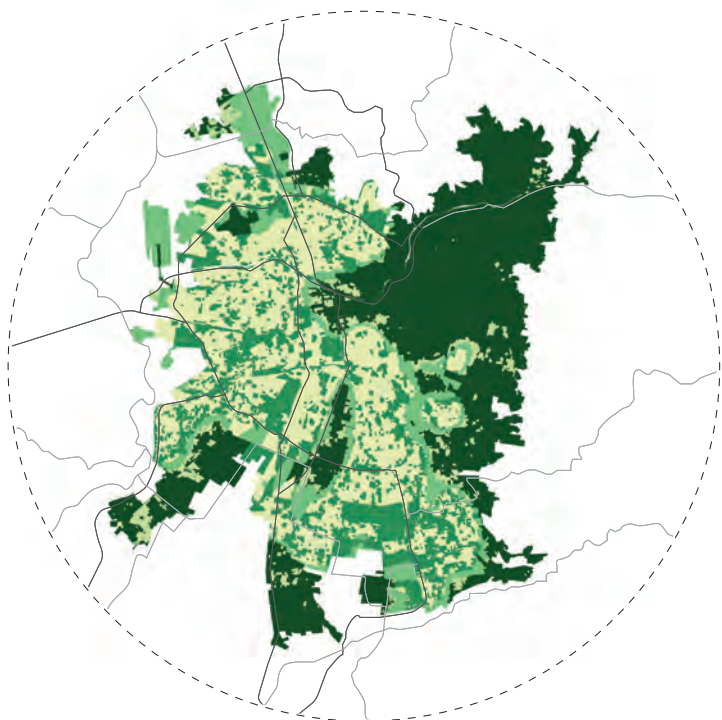
MEDIUM-SIZED CITIES
300 to 1 000 km²

Environmental Comfort
Indicator
Year 2018

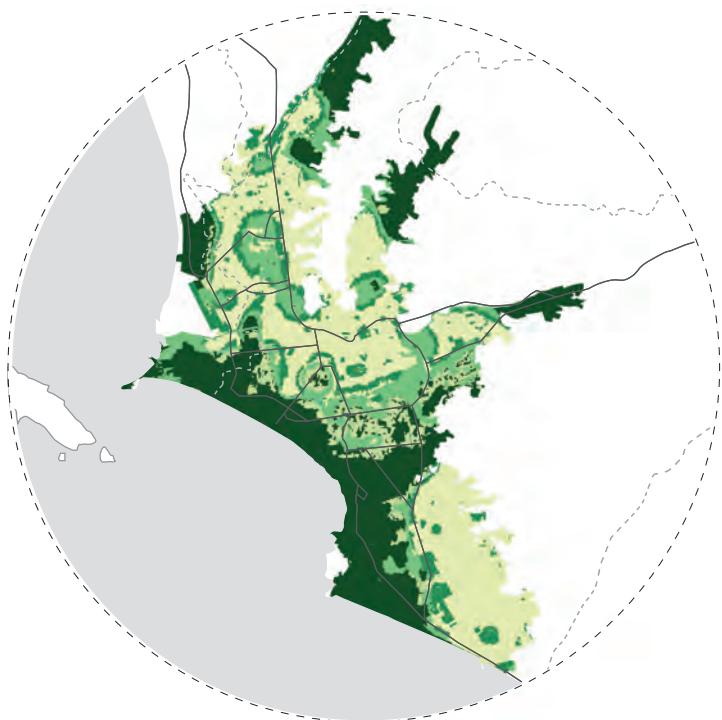
- High
- Medium high
- Medium
- Medium low
- Low



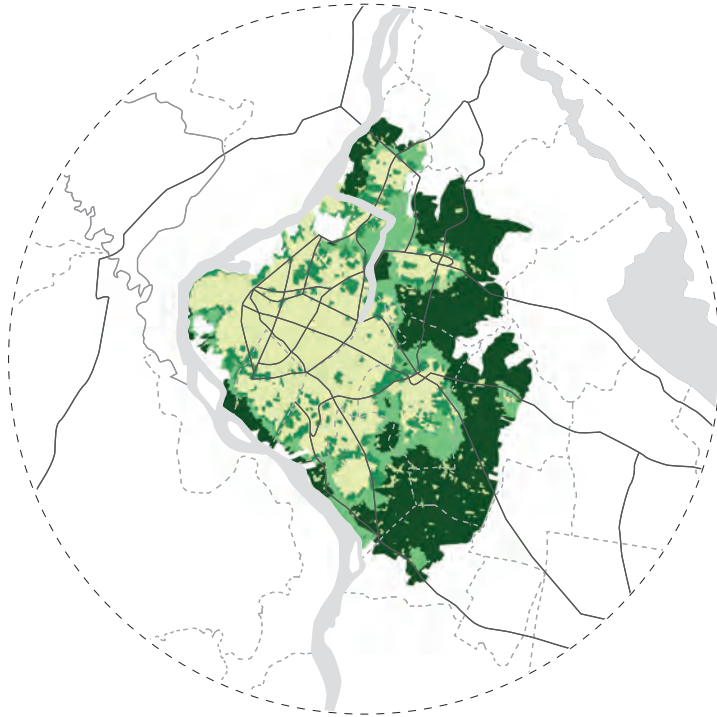
GREATER SANTIAGO
Chile, 719 km²



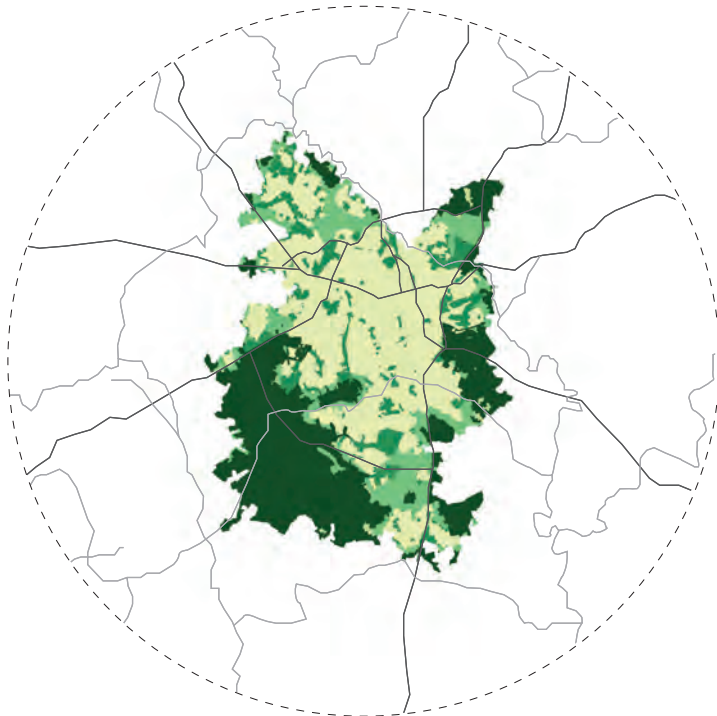
LIMA
Peru, 491 km²



GREATER ASUNCION
Paraguay, 427 km²



GOIANIA
Brazil, 409 km²

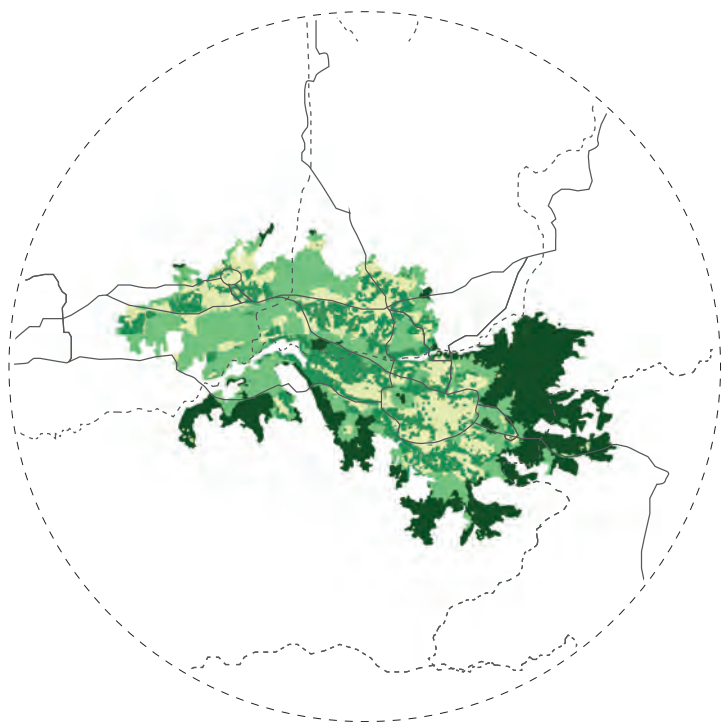


Environmental Comfort
Indicator
Year 2018

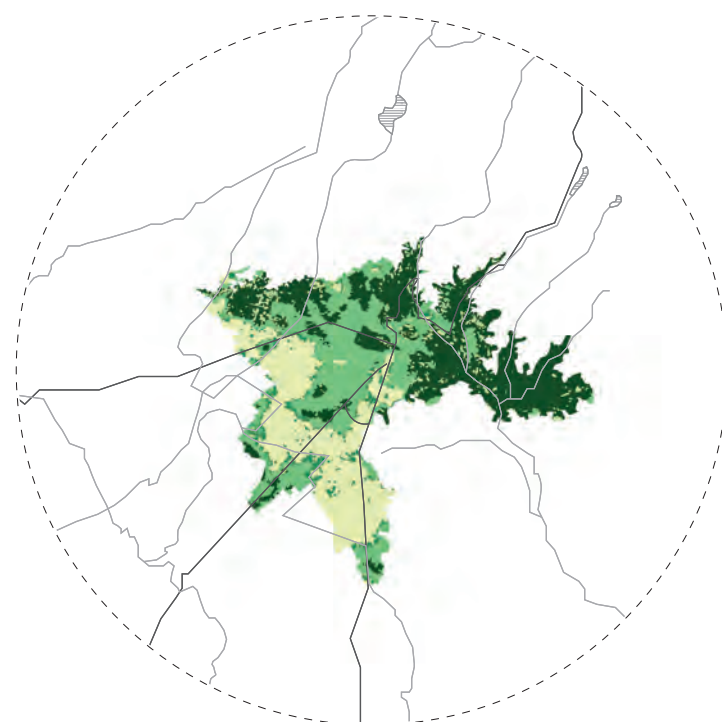
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0 2,5 5 km

SAN JOSÉ
Costa Rica, 324 km²



LA PAZ - EL ALTO
Bolivia, 248 km²

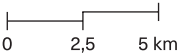


ENVIRONMENTAL COMFORT
INDICATOR IN LATIN AMERICA
AND THE CARIBBEAN

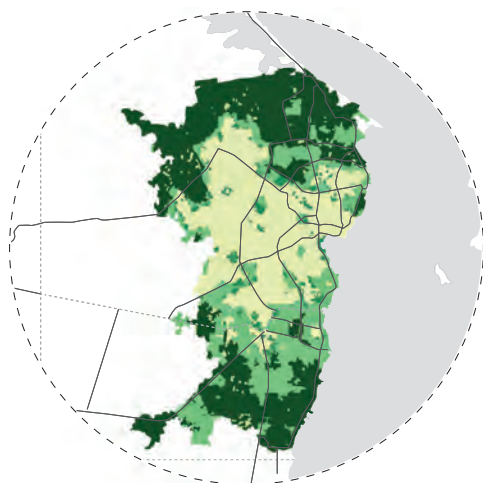
SMALL CITIES
< 300 km²

Environmental Comfort
Indicator
Year 2018

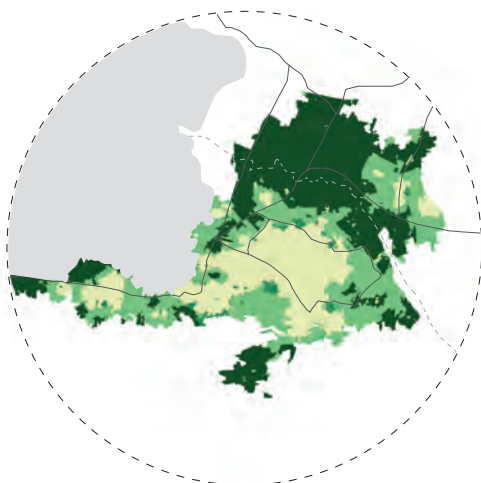
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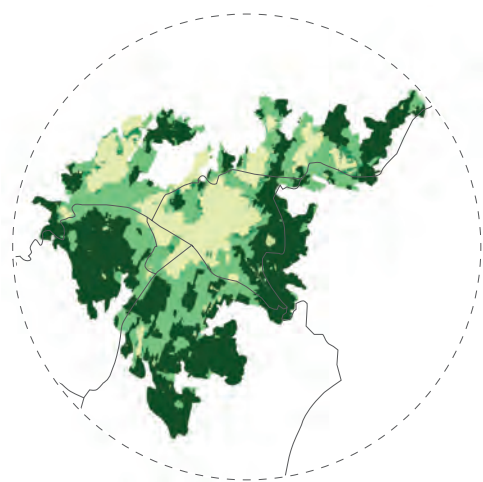
MARACAIBO
Venezuela, 225 km²



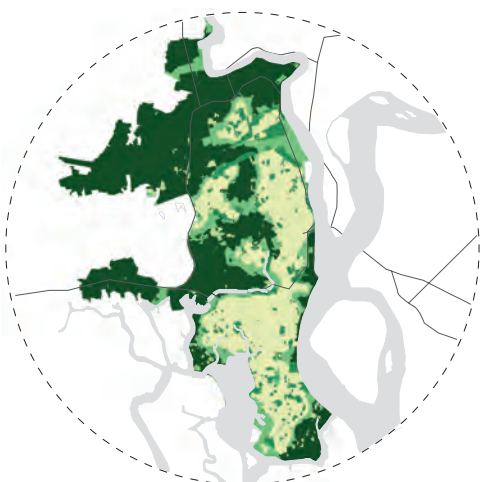
PORT-AU-PRINCE
Haiti, 218 km²



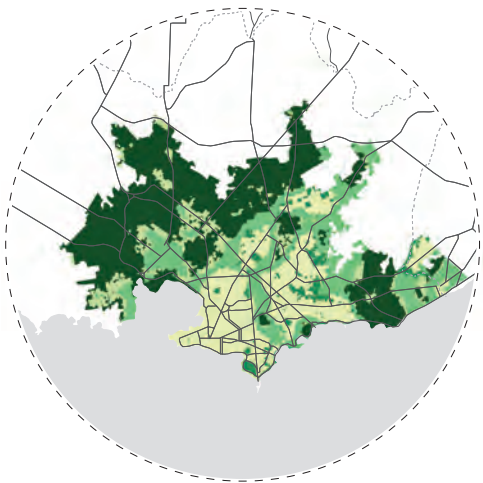
GUATEMALA CITY
Guatemala, 213 km²



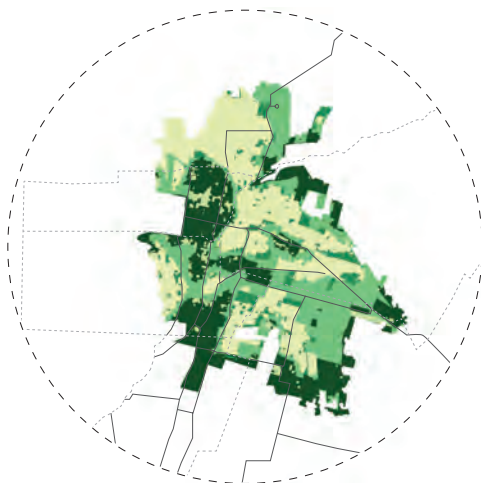
GUAYAQUIL
Ecuador, 210 km²



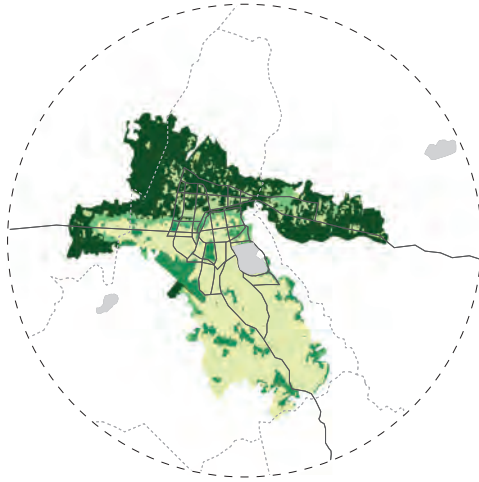
MONTEVIDEO
Uruguay, 201 km²



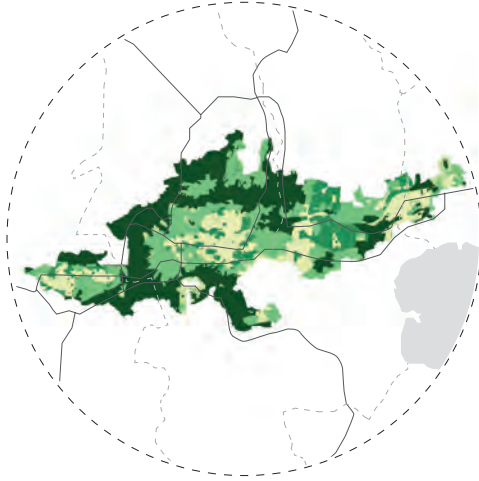
GREATER MENDOZA
Argentina, 195 km²



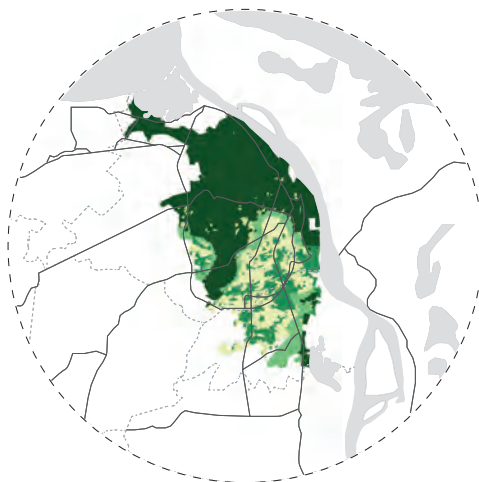
COCHABAMBA
Bolivia, 151 km²



SAN SALVADOR
El Salvador, 149 km²

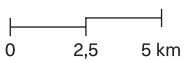


BARRANQUILLA
Colombia, 119 km²

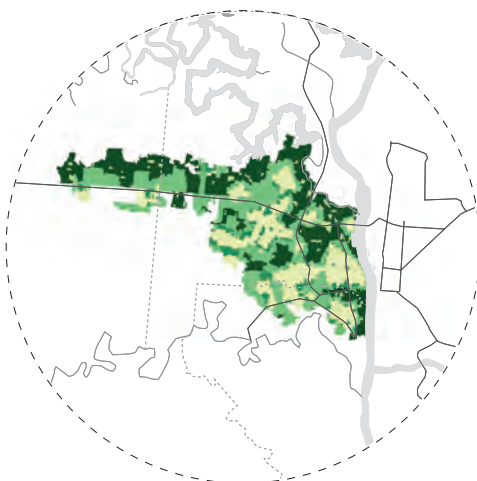


Environmental Comfort
Indicator
Year 2018

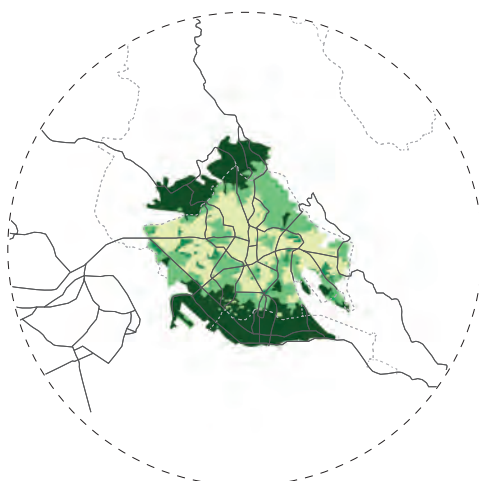
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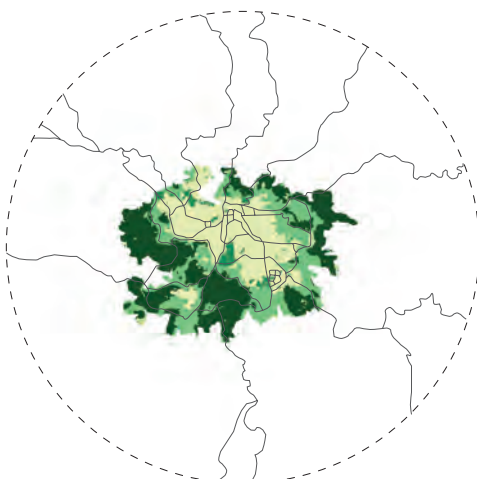
GREATER CIUDAD DEL ESTE
Paraguay, 111 km²



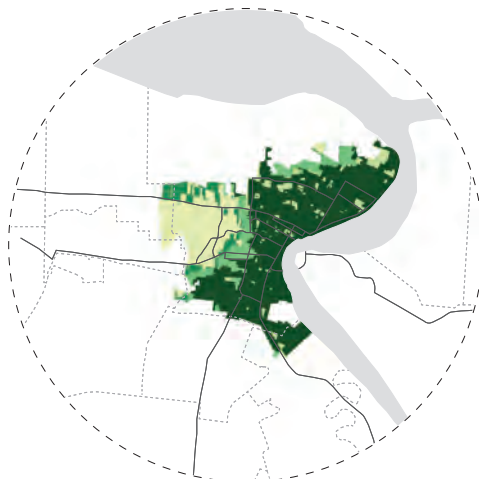
KINGSTON
Jamaica, 107 km²



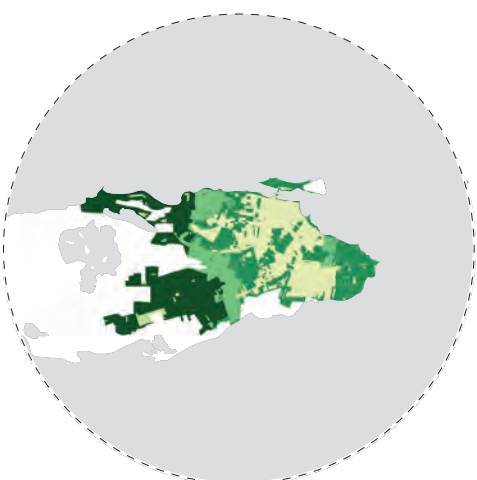
TEGUCIGALPA AND COMAYAGÜELA
Honduras, 99 km²



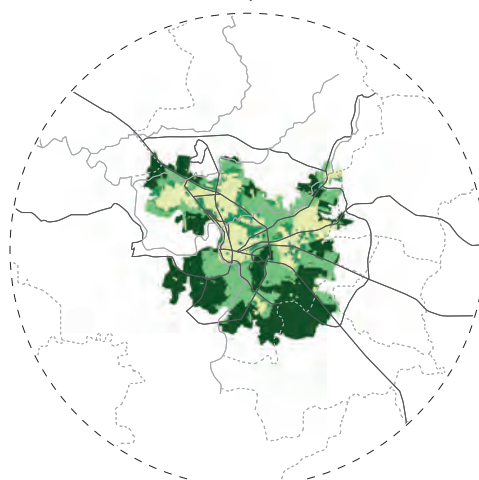
PARAMARIBO
Suriname, 96 km²



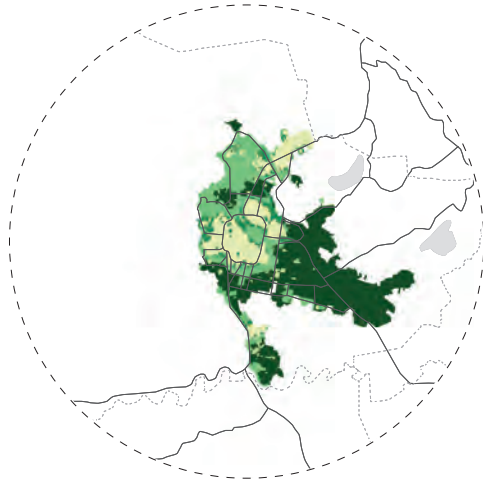
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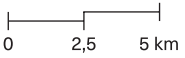
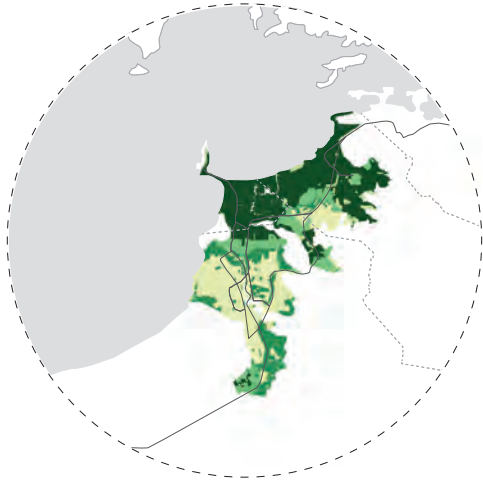
SANTIAGO DE LOS CABALLEROS
Dominican Republic, 89 km²



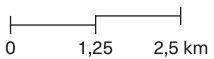
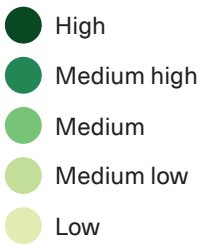
SAN PEDRO SULA
Honduras, 85 km²



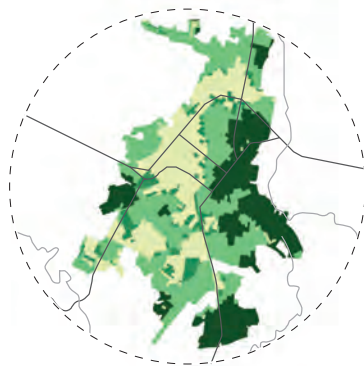
BARCELONA
Venezuela, 84 km²



Environmental Comfort
Indicator
Year 2018



DAVID
Panama, 32 km²



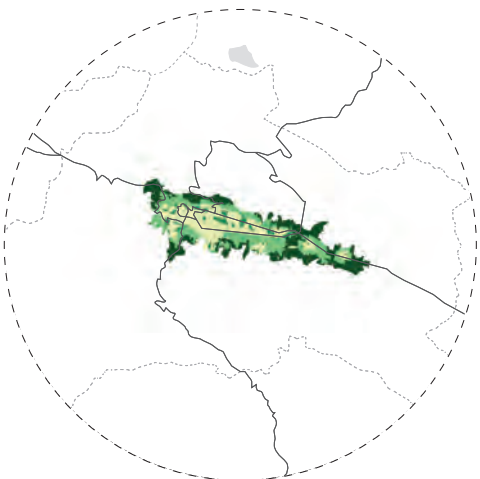
FREEPORT
Bahamas, 54 km²



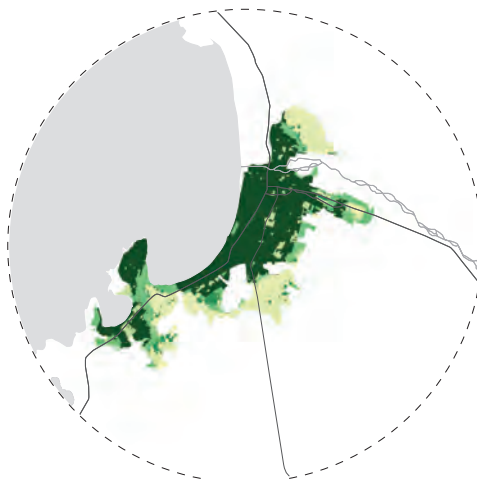
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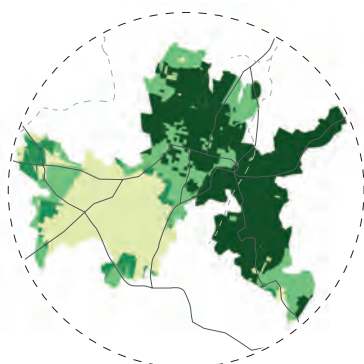
CUSCO
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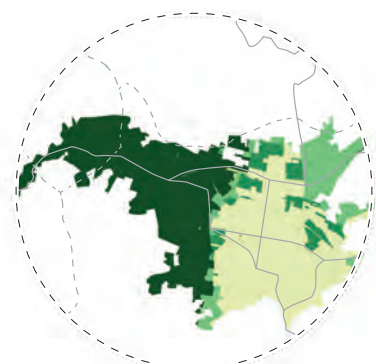
LA SERENA - COQUIMBO
Chile, 74 km²



SANTA ANA
El Salvador, 31 km²



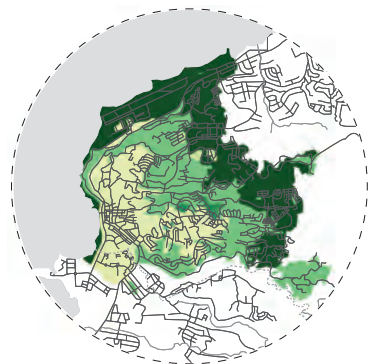
QUETZALTENANGO
Guatemala, 30 km²



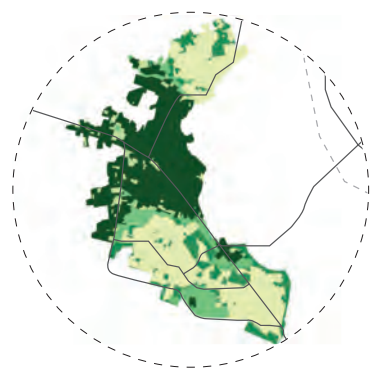
IBAGUE
Colombia, 30 km²



MONTEGO BAY
Jamaica, 28 km²

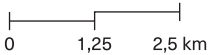


LAZARO CARDENAS
Mexico, 24 km²

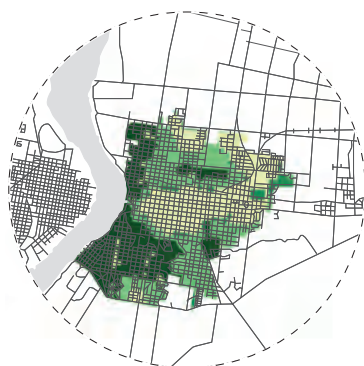


Environmental Comfort
Indicator
Year 2018

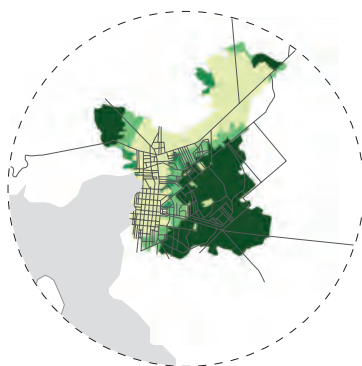
- High
- Medium high
- Medium
- Medium low
- Low



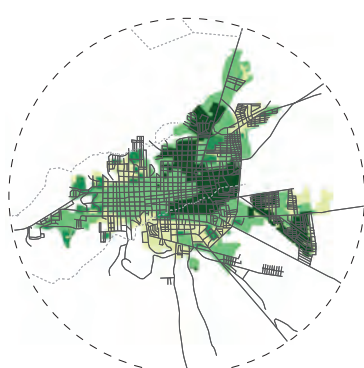
SALTO
Uruguay, 19 km²



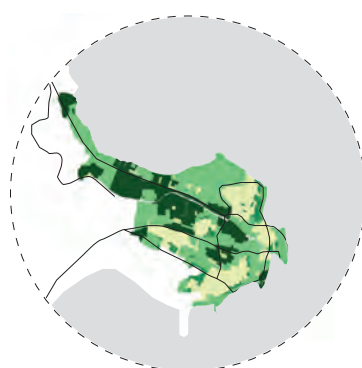
GONAIVES
Haiti, 18 km²



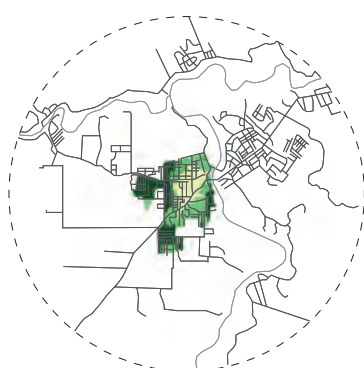
LEON
Nicaragua, 18 km²



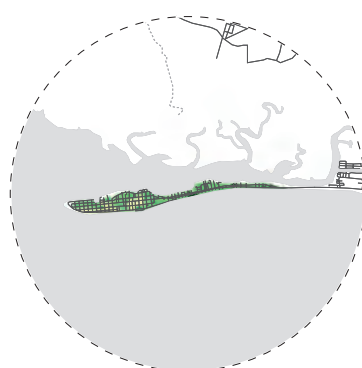
BELIZE CITY
Belize, 14 km²



SAN IGNACIO
Belize, 3 km²



PUNTARENAS
Costa Rica, 2 km²



EDUCATION INDICATOR

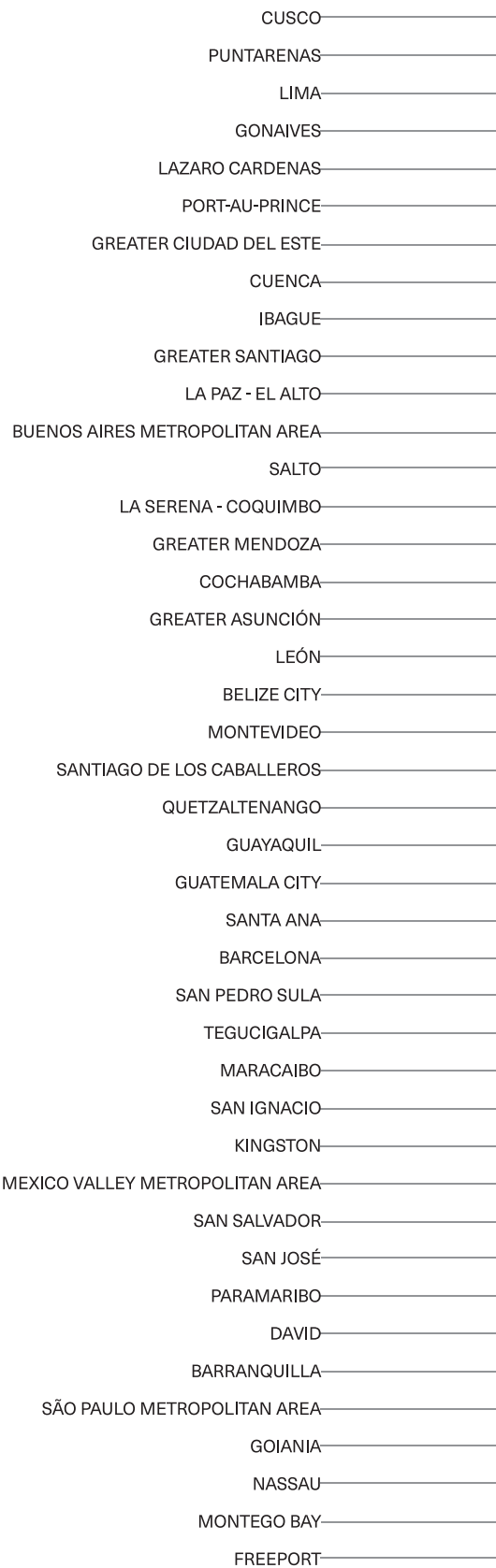
Access to educational institutions was defined as the travel time within the urban area up to a certain time limit. In the case of education, the maximum travel time limit was set at 30 minutes on foot. A concentration of amenities and services in specific areas of the metropolitan zone generates greater access and thus, a larger portion of the urban area with improved accessibility.

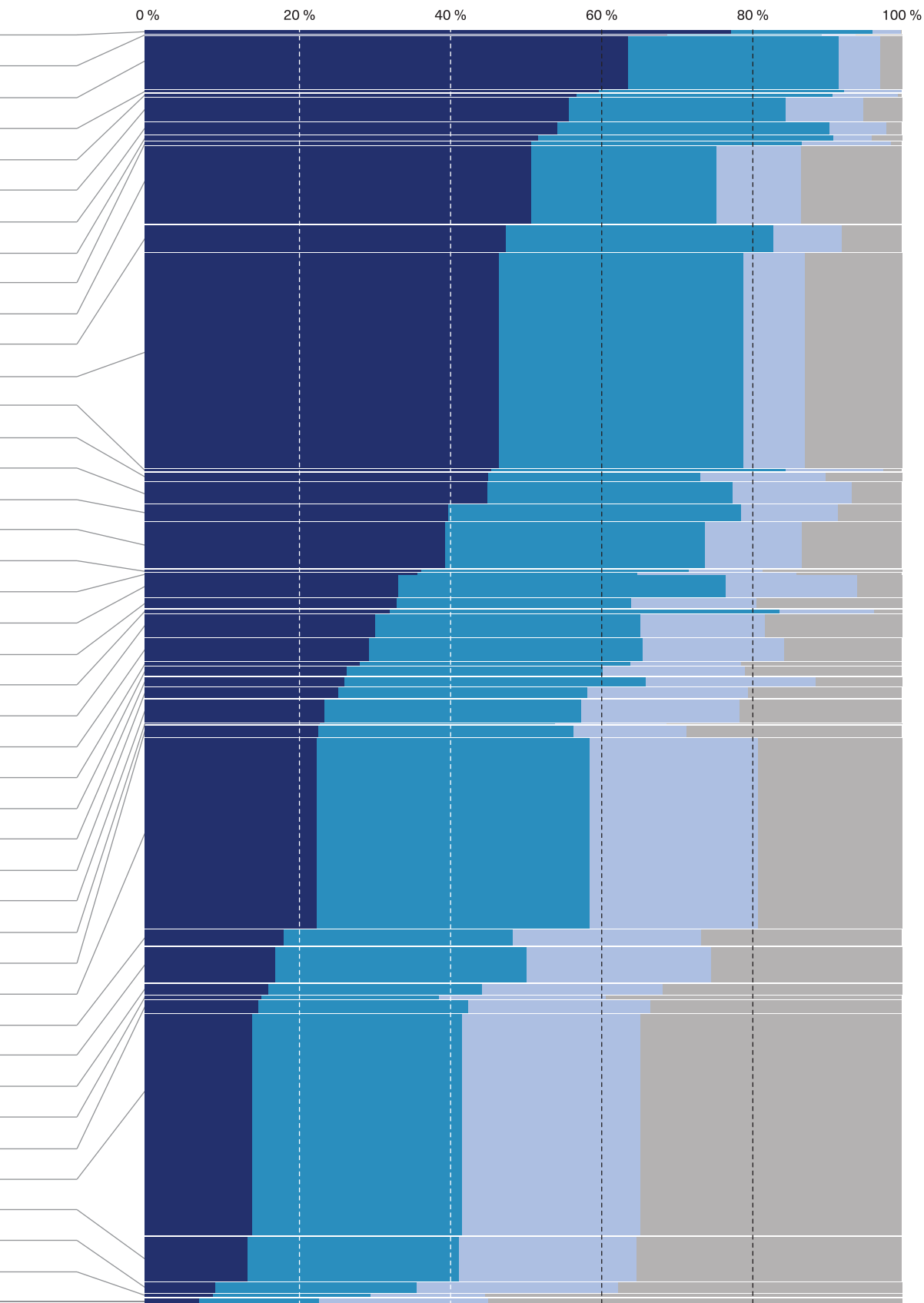
ACCESS TO EDUCATIONAL INSTITUTIONS INDICATOR IN LATIN AMERICA AND THE CARIBBEAN

Average Walking Time to Educational Institutions
Year 2018



Height of each city slab is proportional to its urban area (km²)



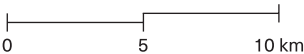


ACCESS TO EDUCATIONAL
INSTITUTIONS INDICATOR
IN LATIN AMERICA AND THE
CARIBBEAN

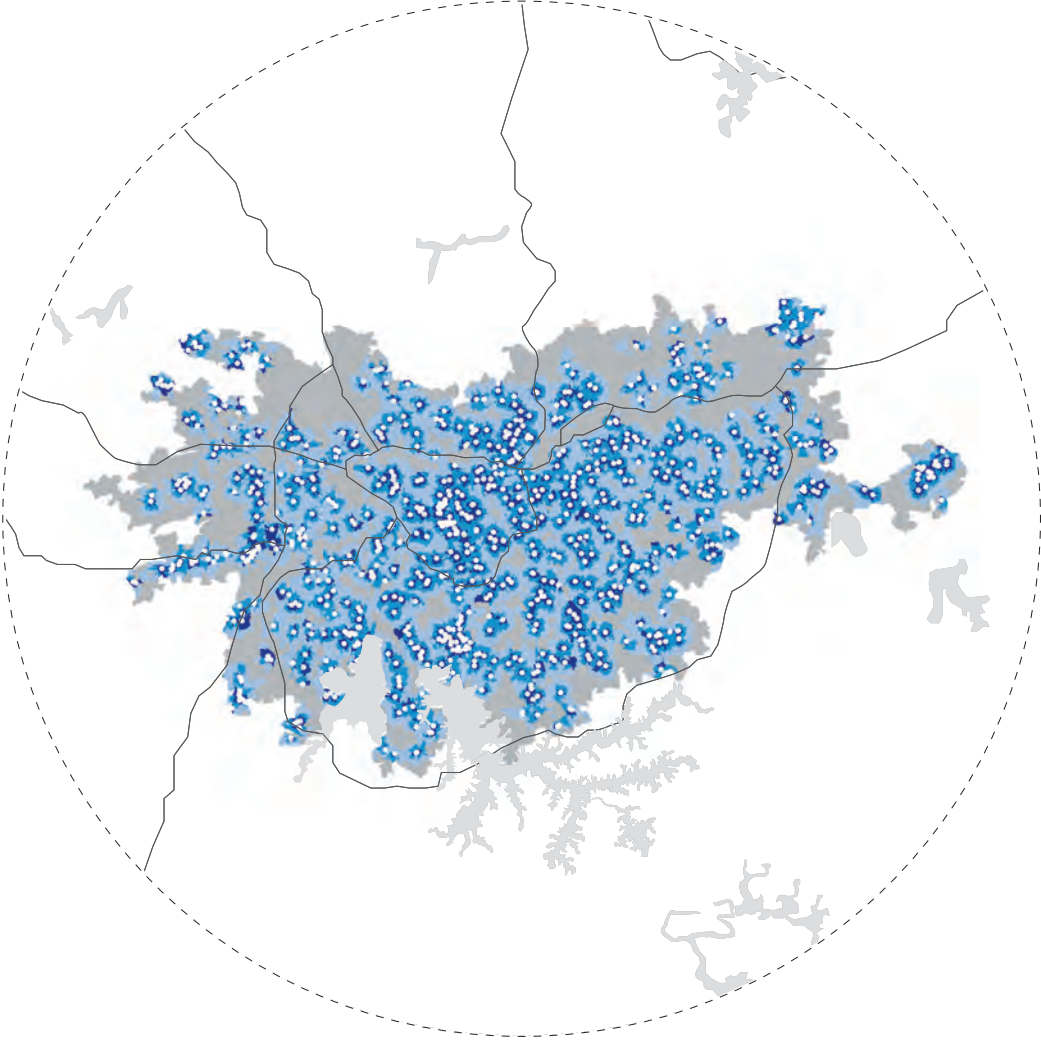
LARGE CITIES
> 1 000 km²

Average Walking Time to
Educational Institutions
Year 2018

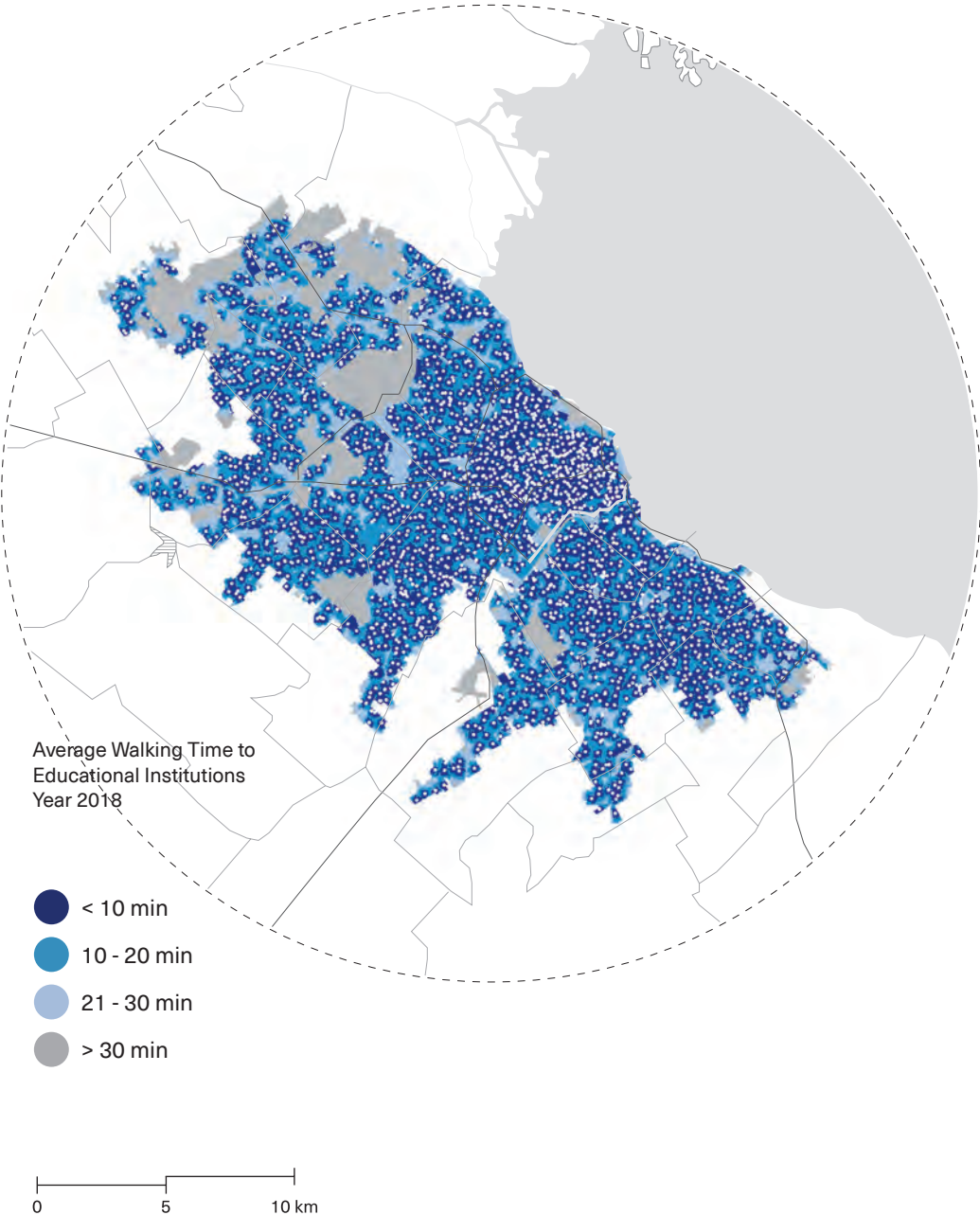
- < 10 min
- 10 - 20 min
- 21 - 30 min
- > 30 min



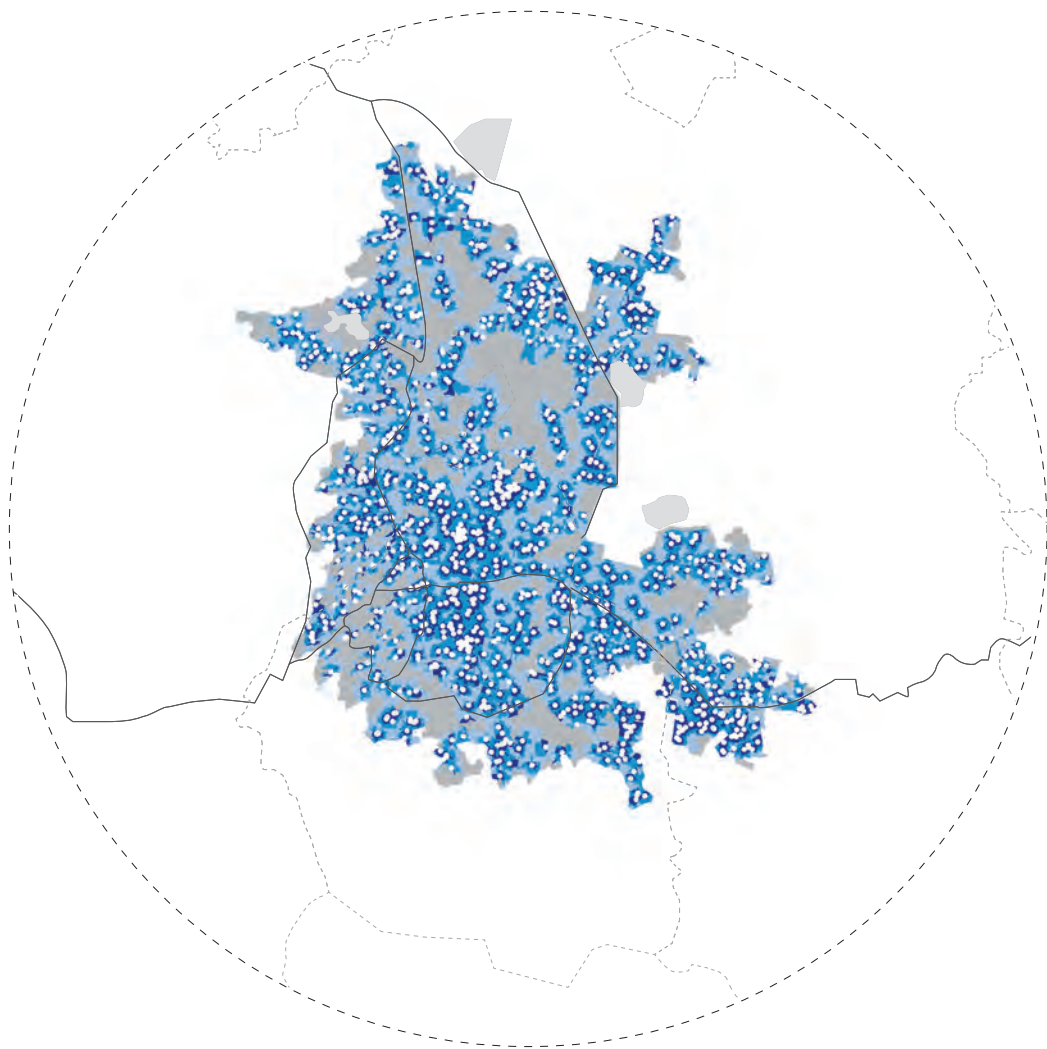
SÃO PAULO METROPOLITAN REGION
Brazil, 2056 km²



BUENOS AIRES METROPOLITAN AREA
Argentina, 1997 km²



MEXICO VALLEY METROPOLITAN AREA
Mexico, 1768 km²

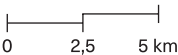


ACCESS TO EDUCATIONAL
INSTITUTIONS INDICATOR
IN LATIN AMERICA AND THE
CARIBBEAN

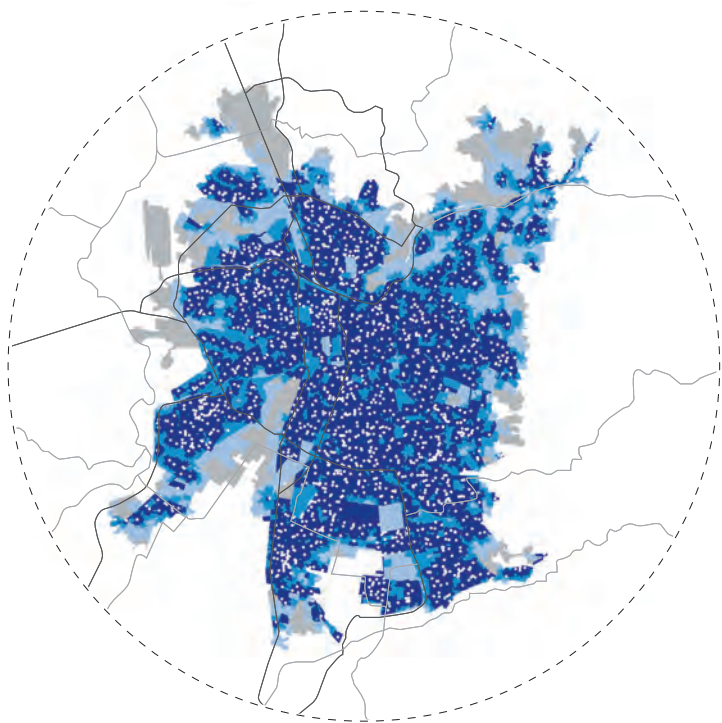
MEDIUM-SIZED CITIES
300 to 1 000 km²

Average Walking Time to
Educational Institutions
Year 2018

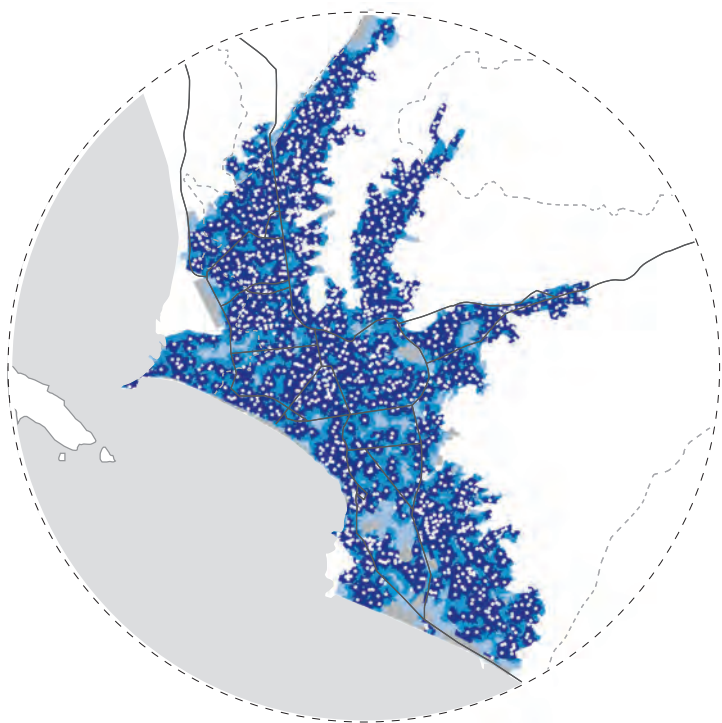
- < 10 min
- 10 - 20 min
- 21 - 30 min
- > 30 min



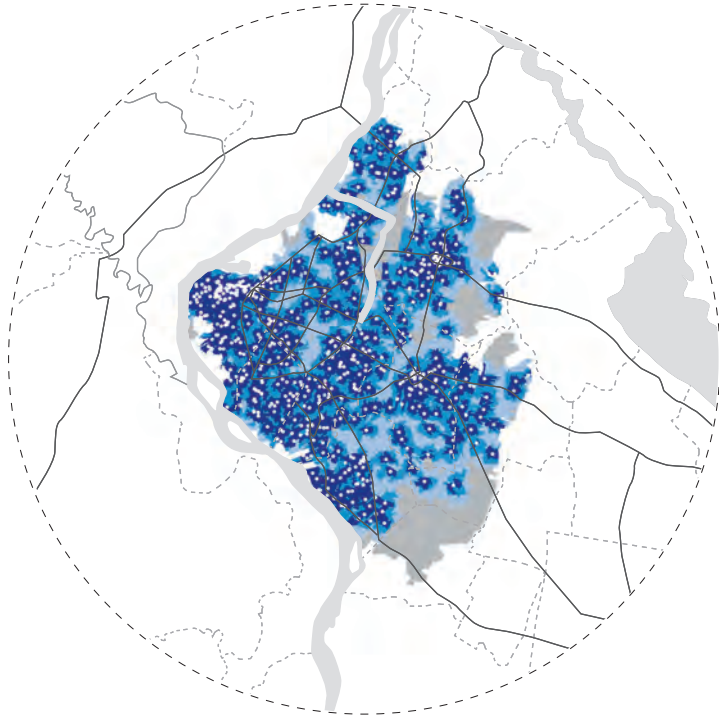
GREATER SANTIAGO
Chile, 719 km²



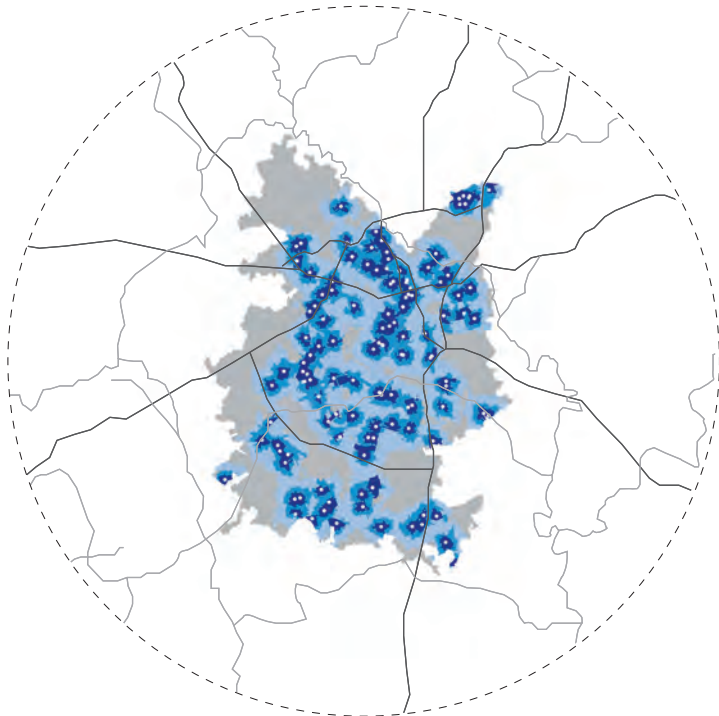
LIMA
Peru, 491 km²



GREATER ASUNCION
Paraguay, 427 km²



GOIANIA
Brazil, 409 km²

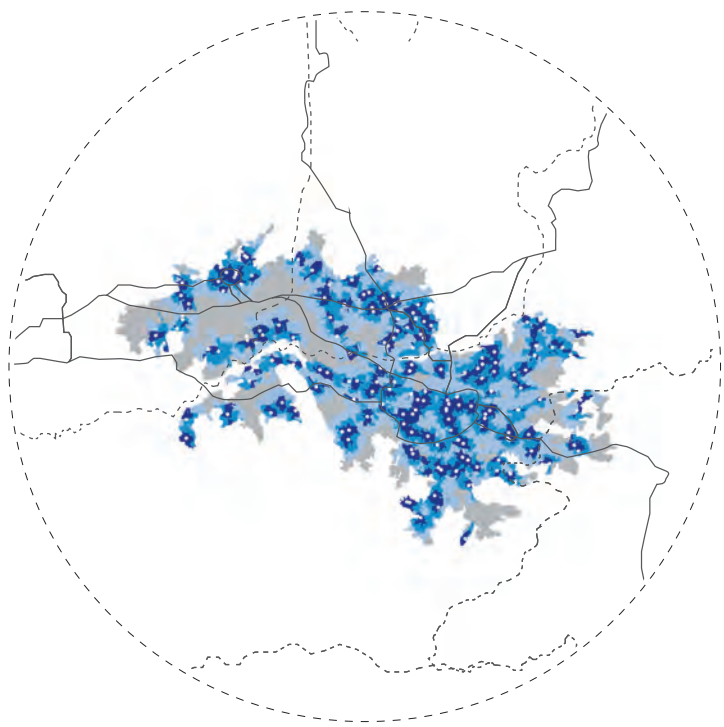


Average Walking Time to
Educational Institutions
Year 2018

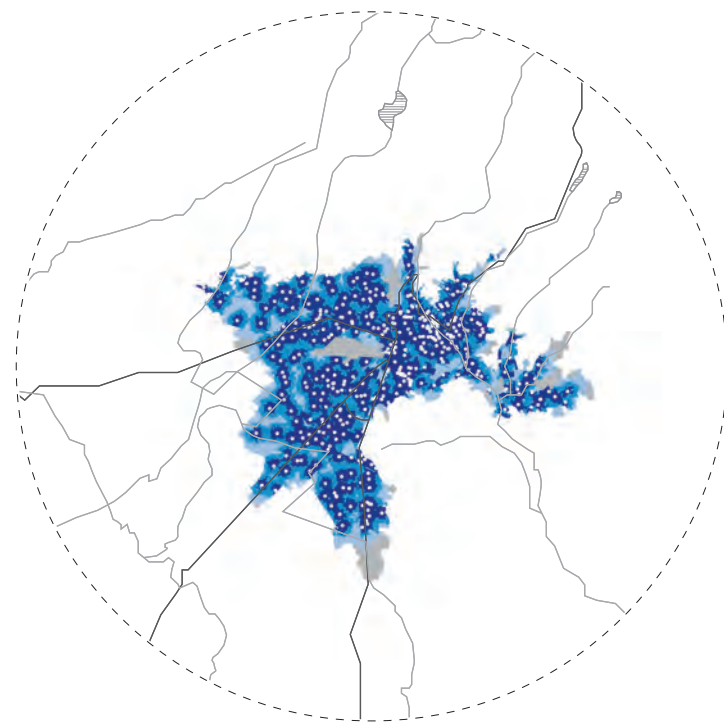
- < 10 min
- 10 - 20 min
- 21 - 30 min
- > 30 min

0 2,5 5 km

SAN JOSÉ
Costa Rica, 324 km²



LA PAZ - EL ALTO
Bolivia, 248 km²

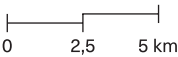


ACCESS TO EDUCATIONAL
INSTITUTIONS INDICATOR
IN LATIN AMERICA AND THE
CARIBBEAN

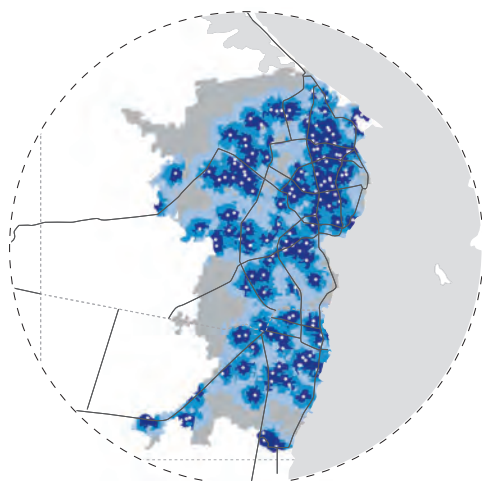
SMALL CITIES
< 300 km²

Average Walking Time to
Educational Institutions
Year 2018

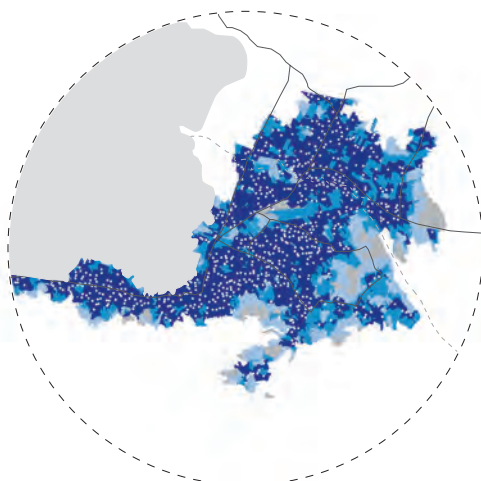
- < 10 min
- 10 - 20 min
- 21 - 30 min
- > 30 min



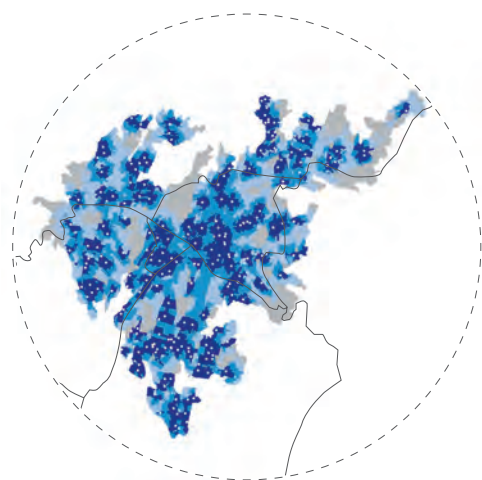
MARACAIBO
Venezuela, 225 km²



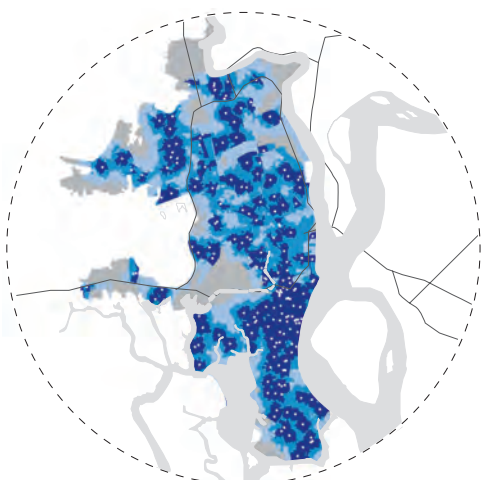
PORT-AU-PRINCE
Haiti, 218 km²



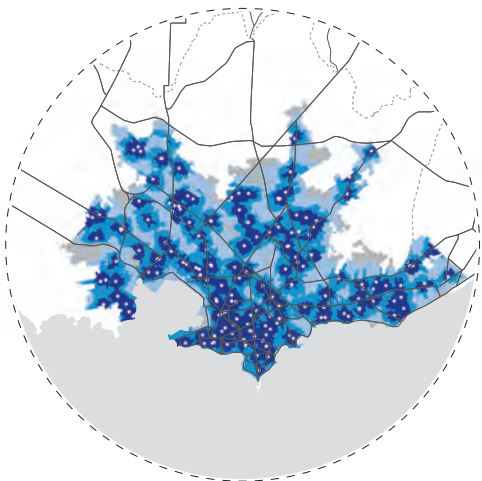
GUATEMALA CITY
Guatemala, 213 km²



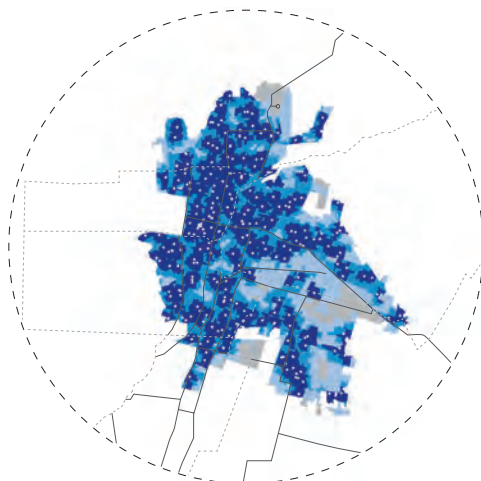
GUAYAQUIL
Ecuador, 210 km²



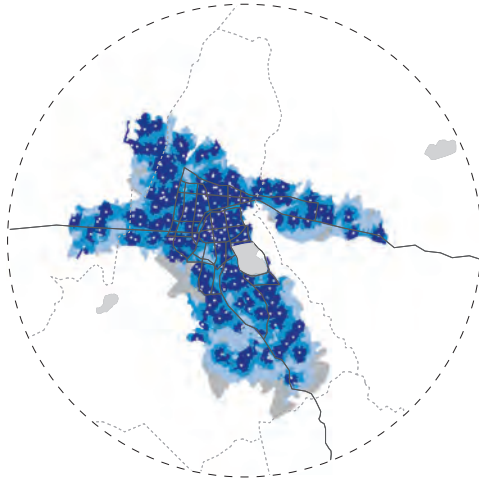
MONTEVIDEO
Uruguay, 201 km²



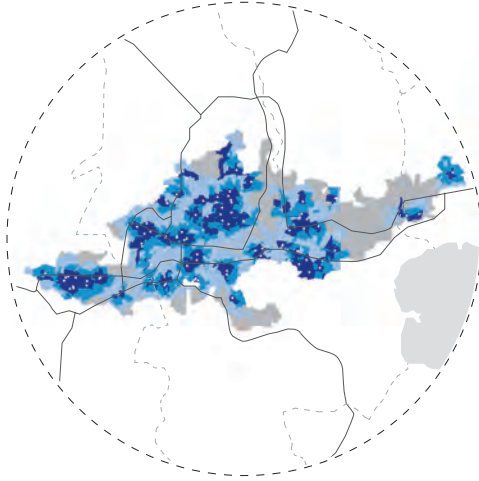
GREATER MENDOZA
Argentina, 195 km²



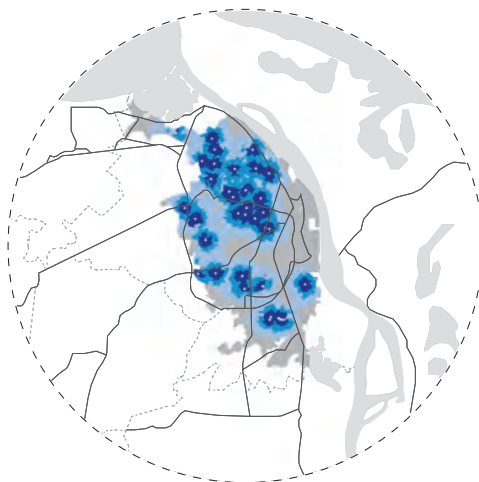
COCHABAMBA
Bolivia, 151 km²



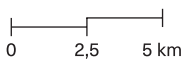
SAN SALVADOR
El Salvador, 149 km²



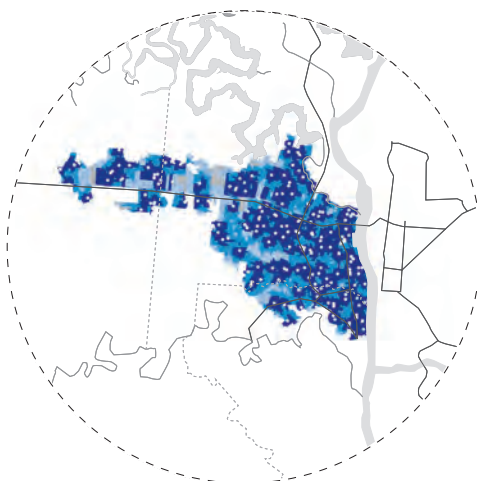
BARRANQUILLA
Colombia, 119 km²



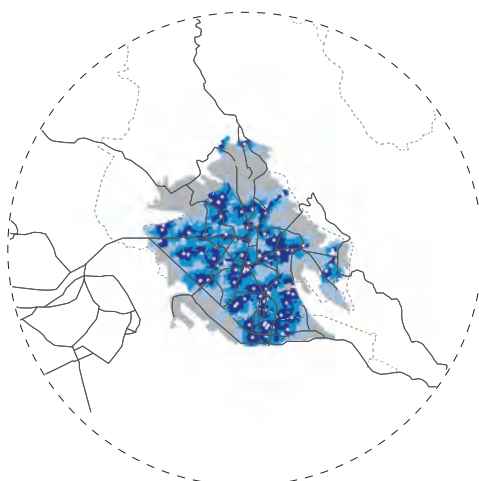
Average Walking Time to
Educational Institutions
Year 2018



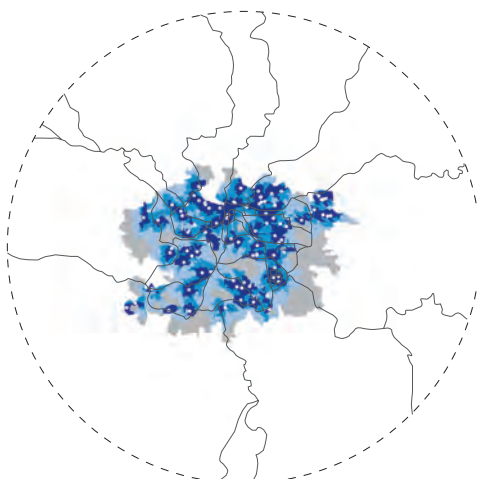
GREATER CIUDAD DEL ESTE
Paraguay, 111 km²



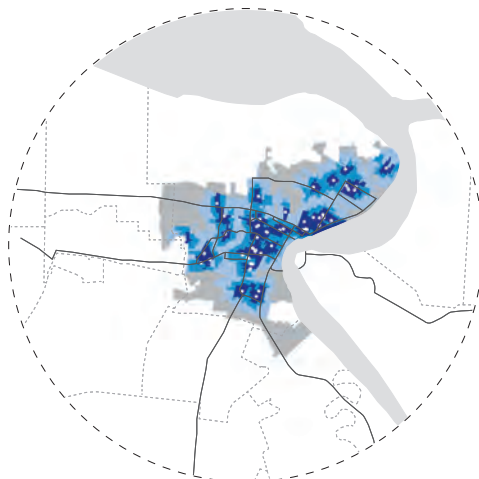
KINGSTON
Jamaica, 107 km²



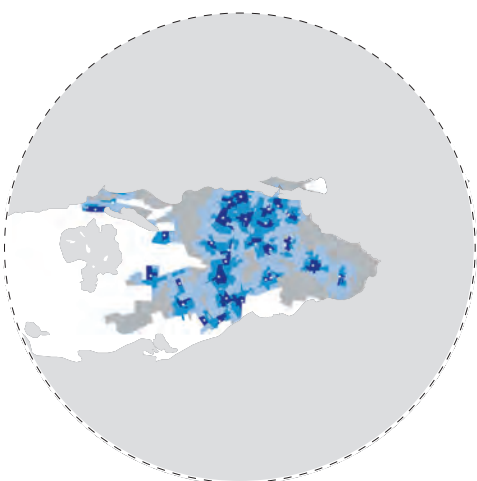
TEGUCIGALPA AND COMAYAGÜELA
Honduras, 99 km²



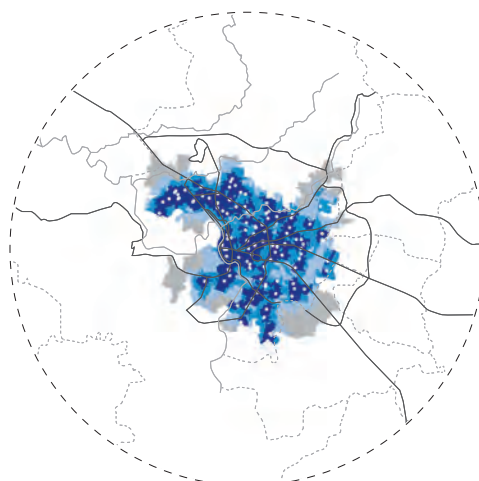
PARAMARIBO
Suriname, 96 km²



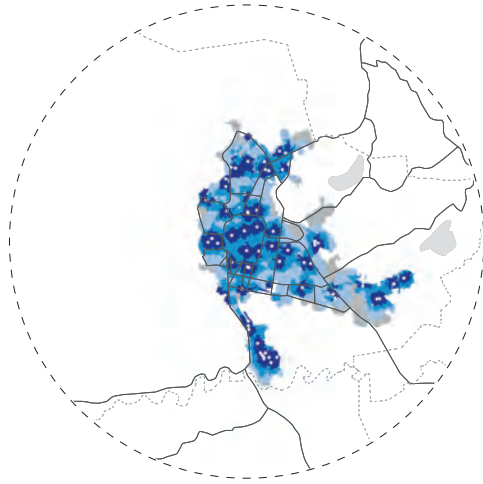
NASSAU
Bahamas, 95 km²



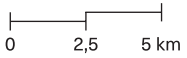
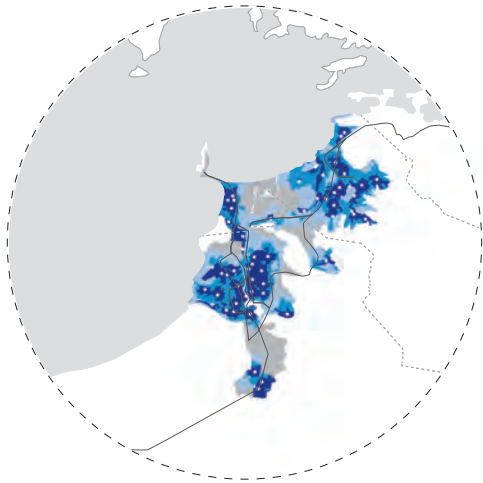
SANTIAGO DE LOS CABALLEROS
Dominican Republic, 89 km²



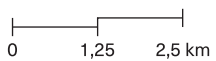
SAN PEDRO SULA
Honduras, 85 km²



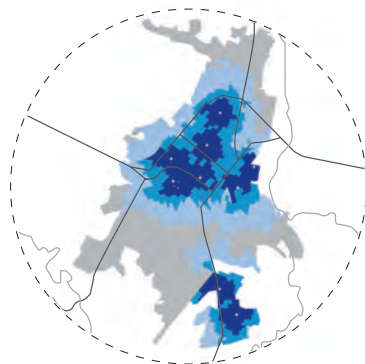
BARCELONA
Venezuela, 84 km²



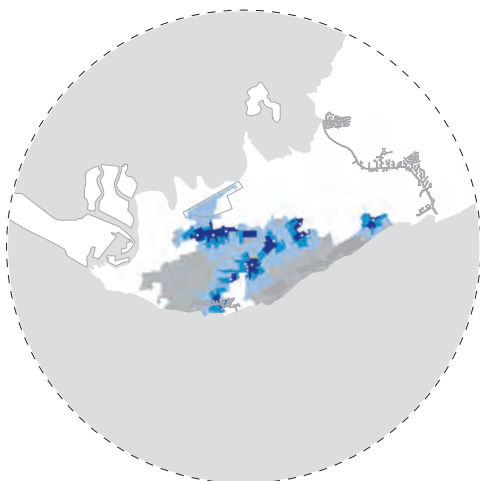
Average Walking Time to
Educational Institutions
Year 2018



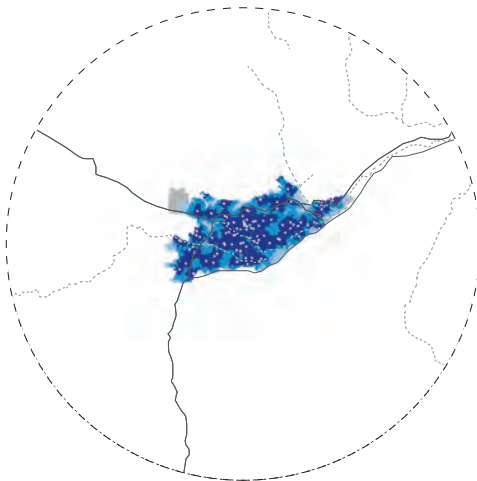
DAVID
Panama, 32 km²



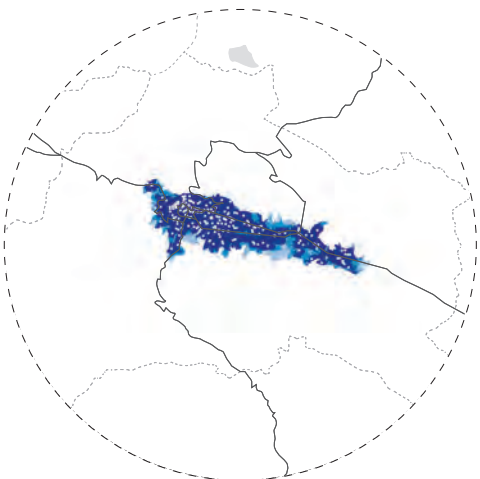
FREEPORT
Bahamas, 54 km²



CUENCA
Ecuador, 44 km²



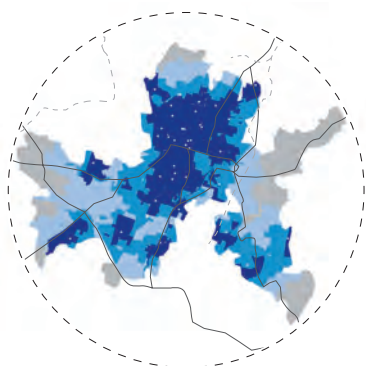
CUSCO
Peru, 33 km²



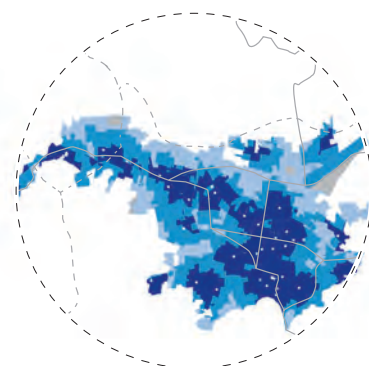
LA SERENA - COQUIMBO
Chile, 74 km²



SANTA ANA
El Salvador, 31 km²



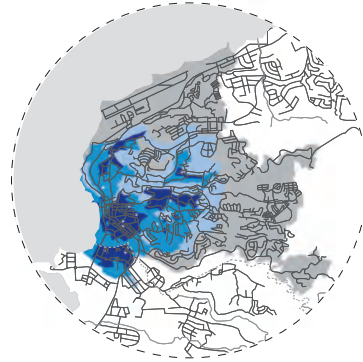
QUETZALTENANGO
Guatemala, 30 km²



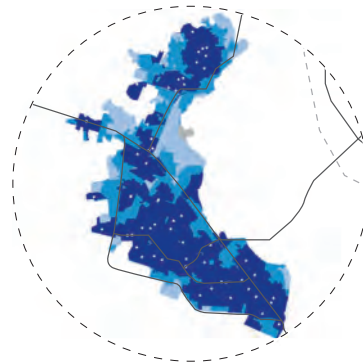
IBAGUE
Colombia, 30 km²



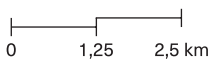
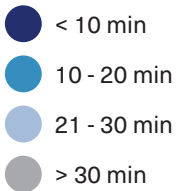
MONTEGO BAY
Jamaica, 28 km²



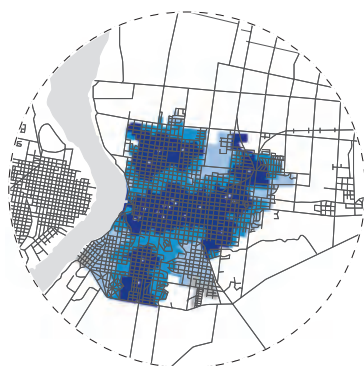
LAZARO CARDENAS
Mexico, 24 km²



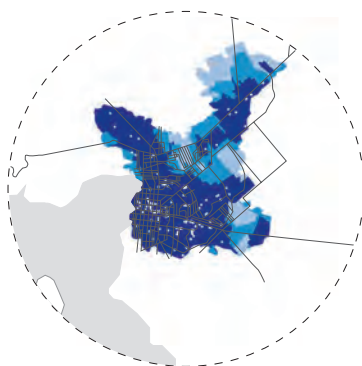
Average Walking Time to
Educational Institutions
Year 2018



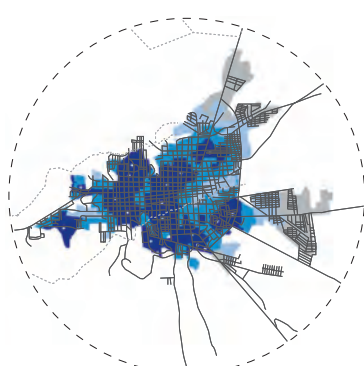
SALTO
Uruguay, 19 km²



GONAIVES
Haiti, 18 km²



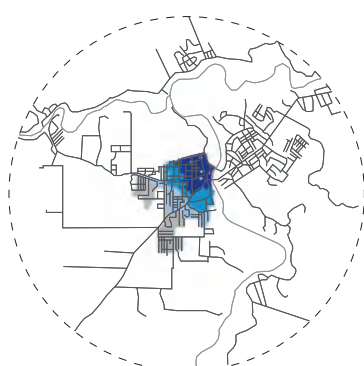
LEON
Nicaragua, 18 km²



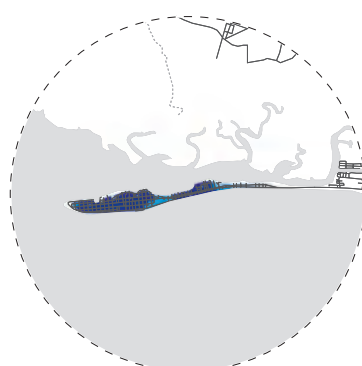
BELIZE CITY
Belize, 14 km²



SAN IGNACIO
Belize, 3 km²



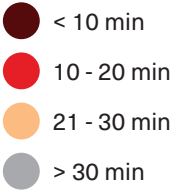
PUNTARENAS
Costa Rica, 2 km²



Access to health centers was defined as the travel time within the urban area up to a certain time limit. In the case of health, the maximum travel time was set at 30 minutes on foot. A concentration of amenities and services in specific areas of the metropolitan zone generates greater coverage of access and thus, a larger portion of the urban area with improved accessibility.

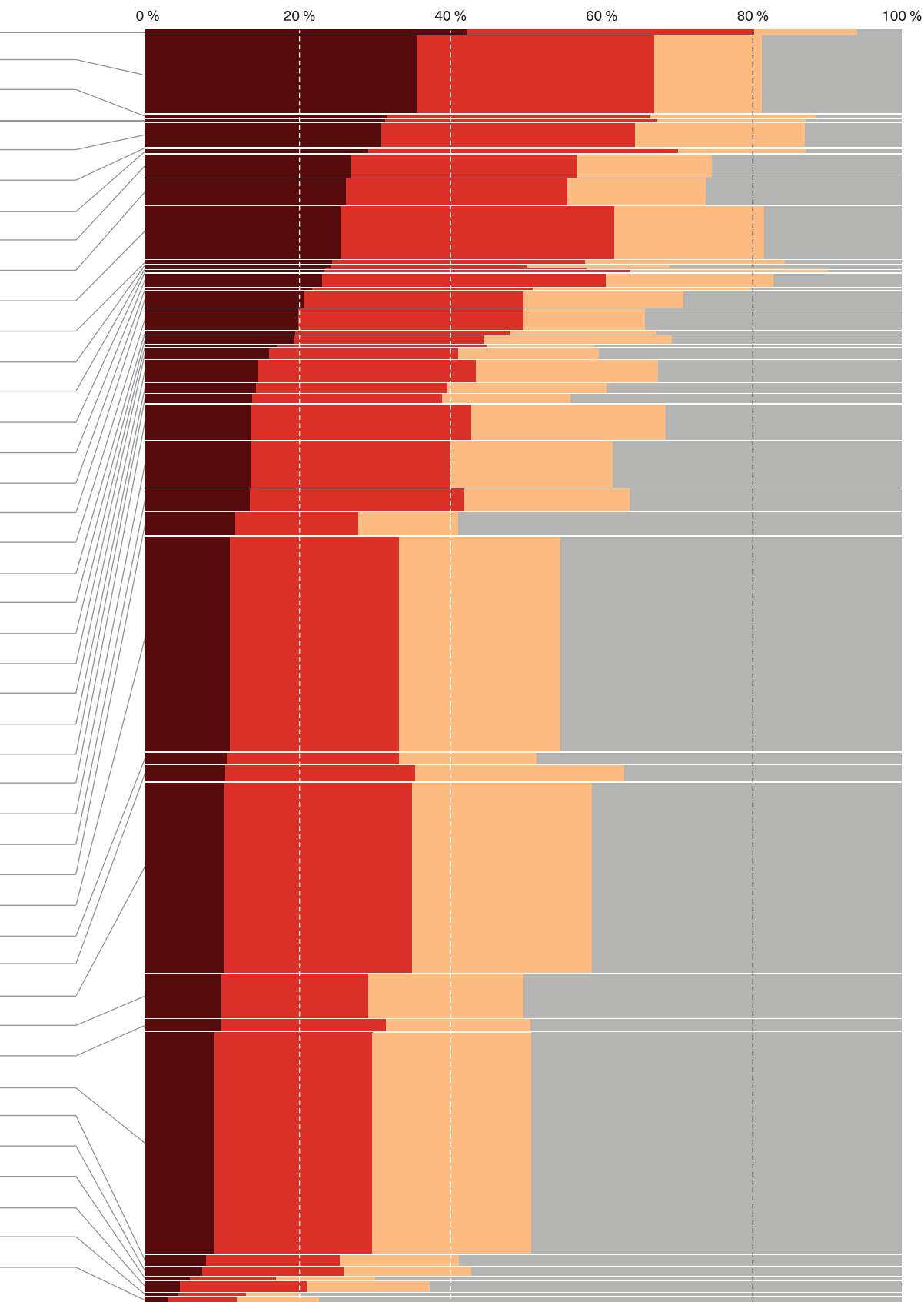
ACCESS TO HEALTH CENTERS INDICATOR IN LATIN AMERICA AND THE CARIBBEAN

Pedestrian Access to
Health Centers
Year 2018



Height of each city slab is proportional to its urban area (km²)



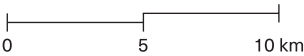


ACCESS TO HEALTH
CENTERS INDICATOR IN
LATIN AMERICA AND
THE CARIBBEAN

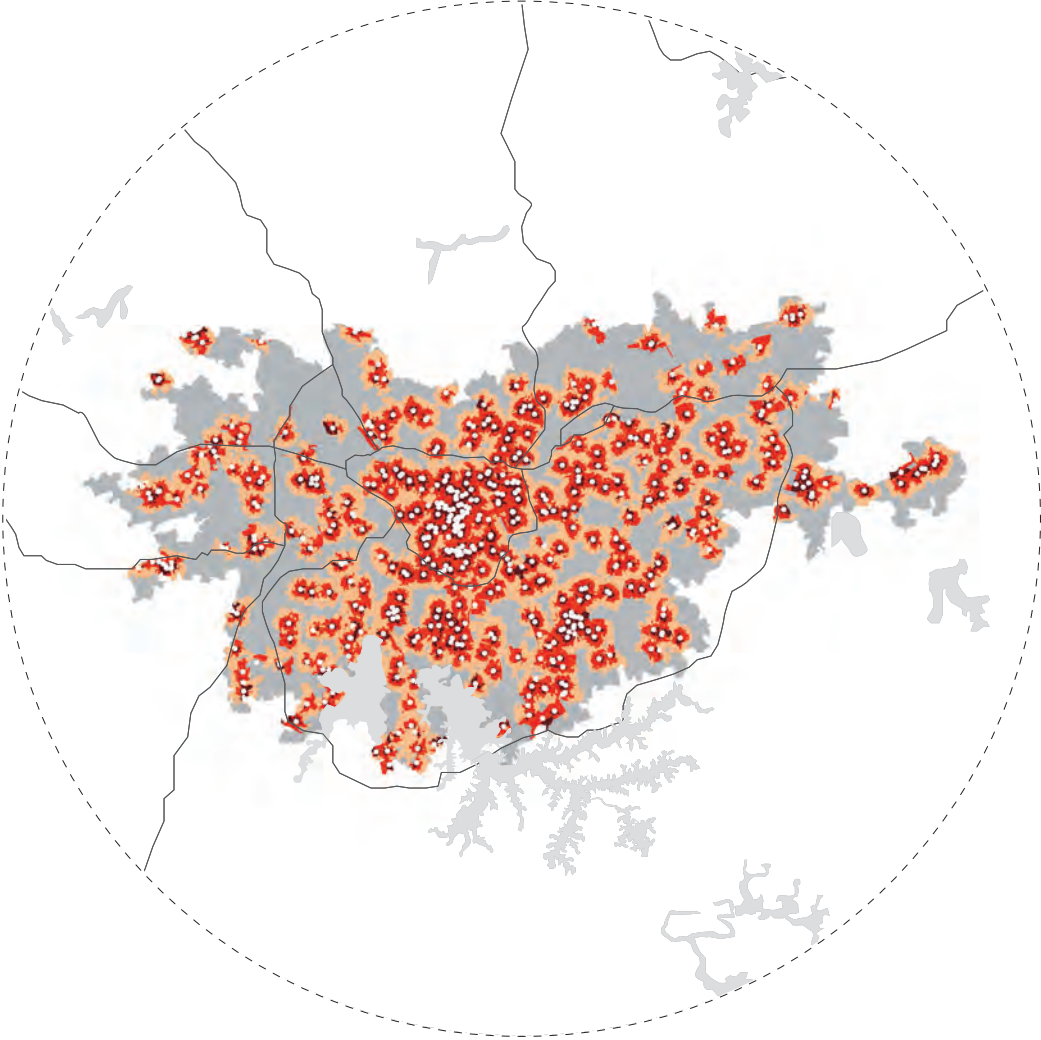
LARGE CITIES
> 1 000 km²

Pedestrian Access to
Health Centers
Year 2018

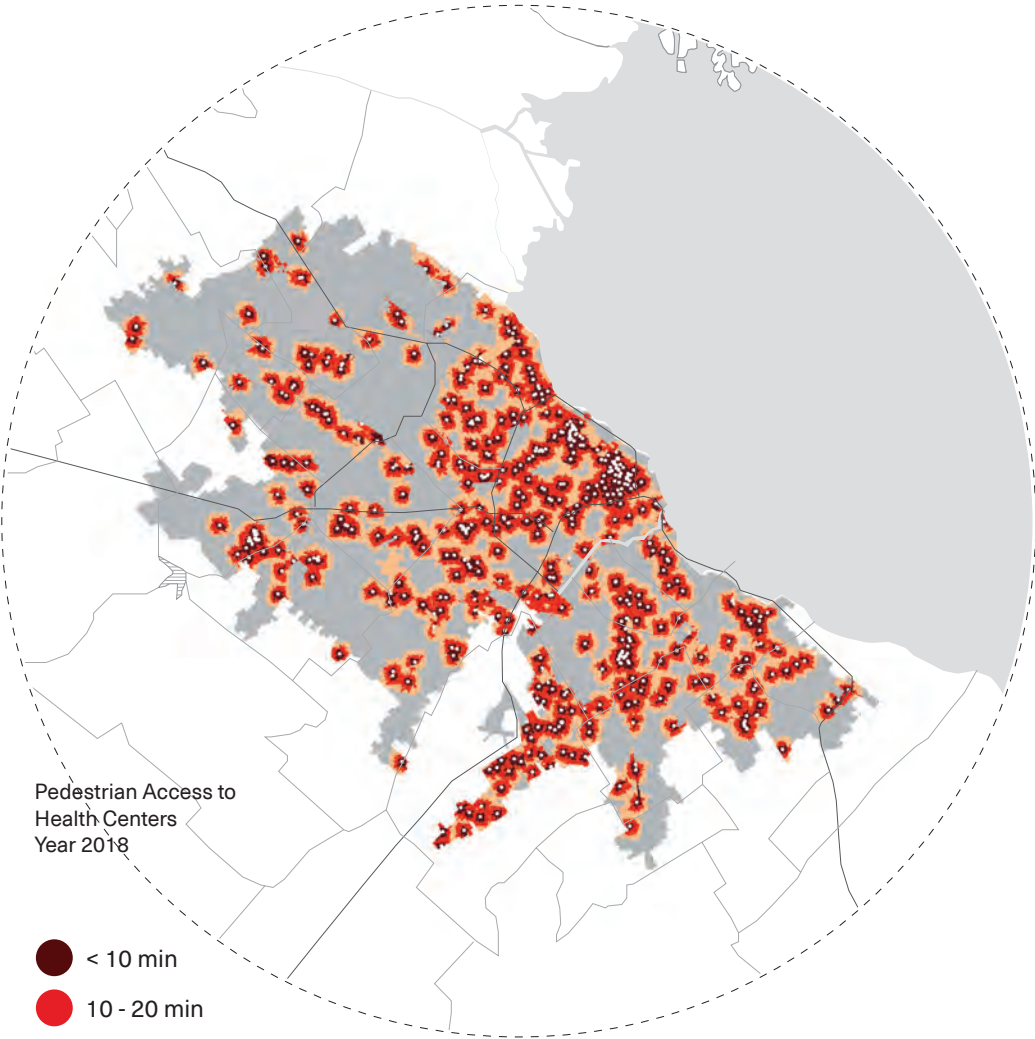
- < 10 min
- 10 - 20 min
- 21 - 30 min
- > 30 min



SÃO PAULO METROPOLITAN REGION
Brazil, 2056 km²

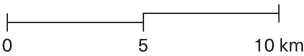


BUENOS AIRES METROPOLITAN AREA
Argentina, 1997 km²

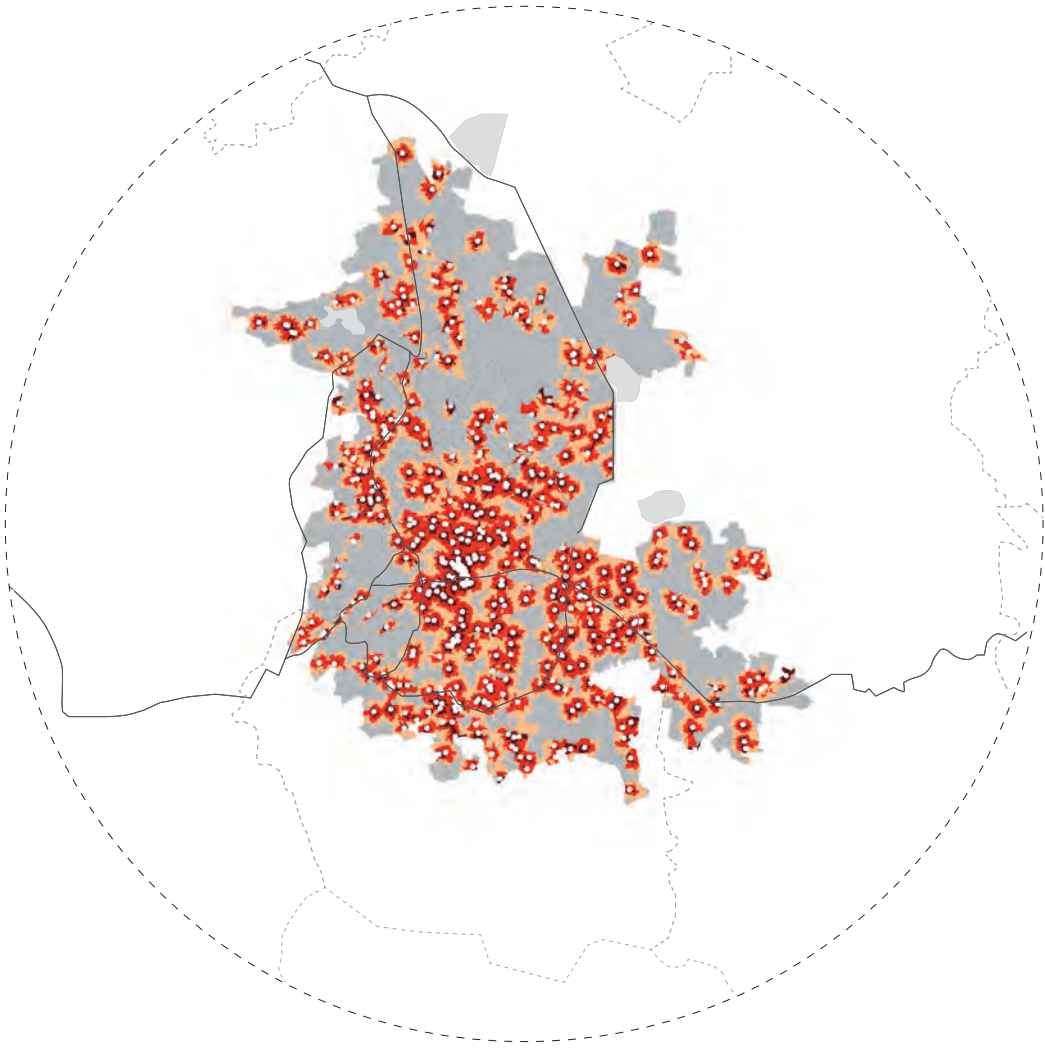


Pedestrian Access to
Health Centers
Year 2018

- < 10 min
- 10 - 20 min
- 21 - 30 min
- > 30 min



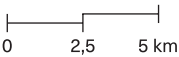
MEXICO VALLEY METROPOLITAN AREA
Mexico, 1768 km²



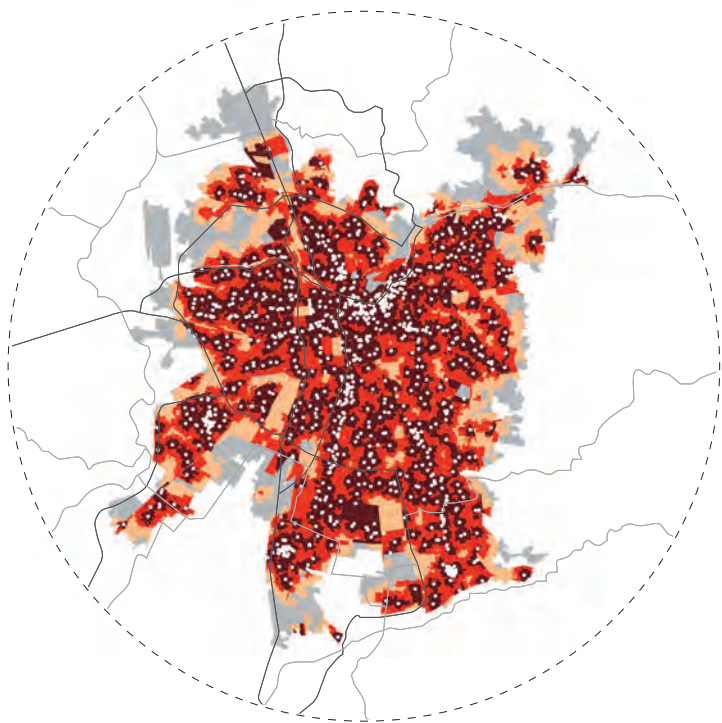
ACCESS TO HEALTH
CENTERS INDICATOR IN
LATIN AMERICA AND
THE CARIBBEAN

MEDIUM-SIZED CITIES
300 to 1 000 km²

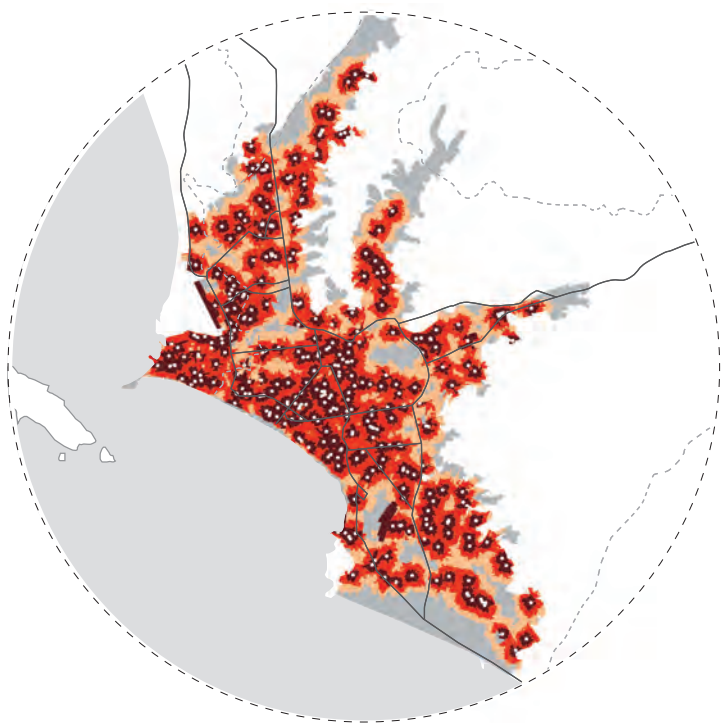
Pedestrian Access to
Health Centers
Year 2018



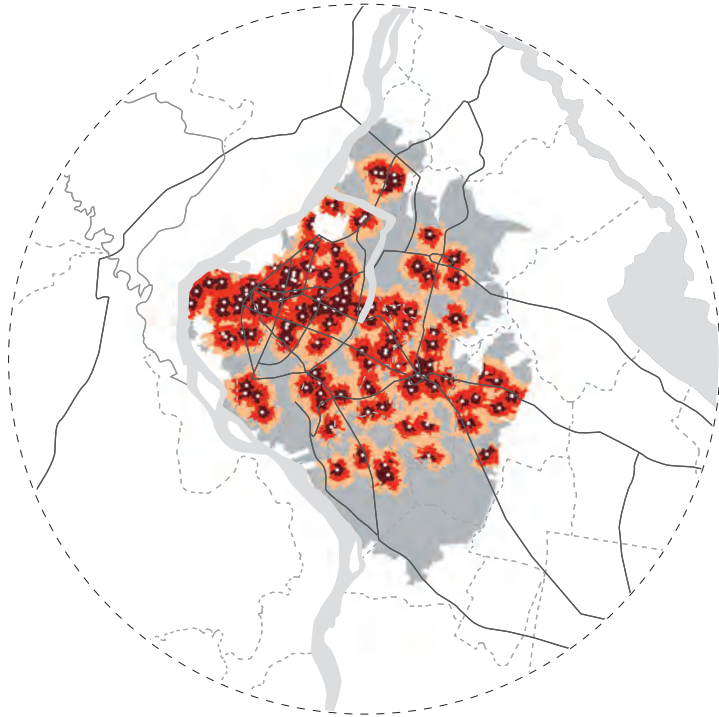
GREATER SANTIAGO
Chile, 719 km²



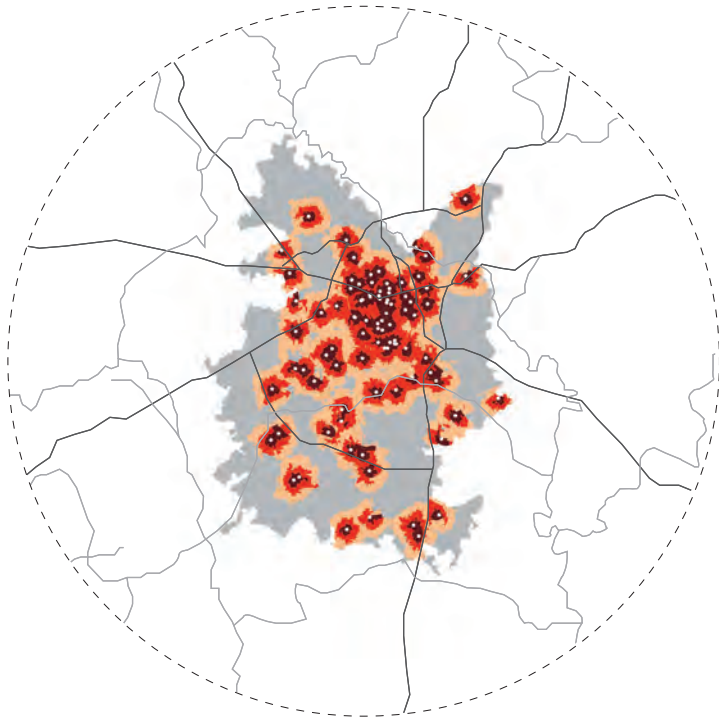
LIMA
Peru, 491 km²



GREATER ASUNCION
Paraguay, 427 km²



GOIANIA
Brazil, 409 km²

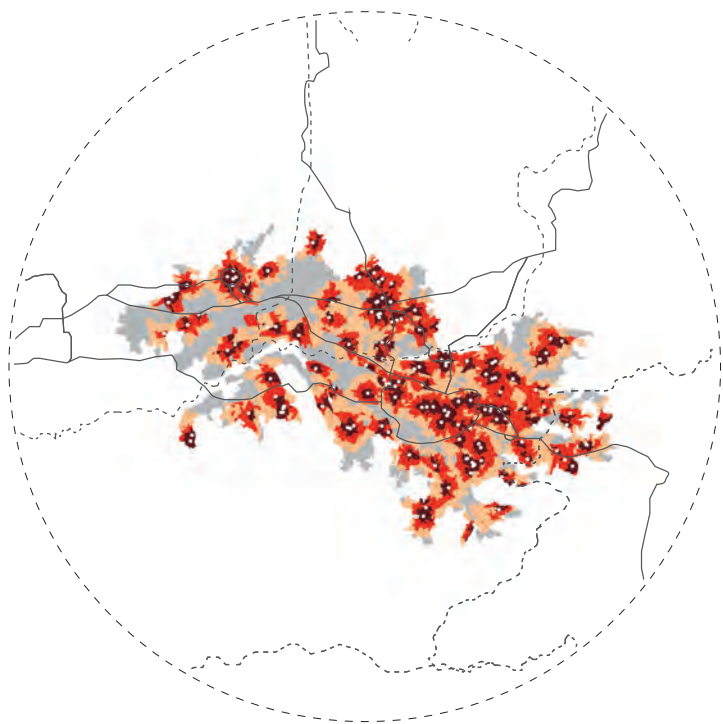


Pedestrian Access to
Health Centers
Year 2018

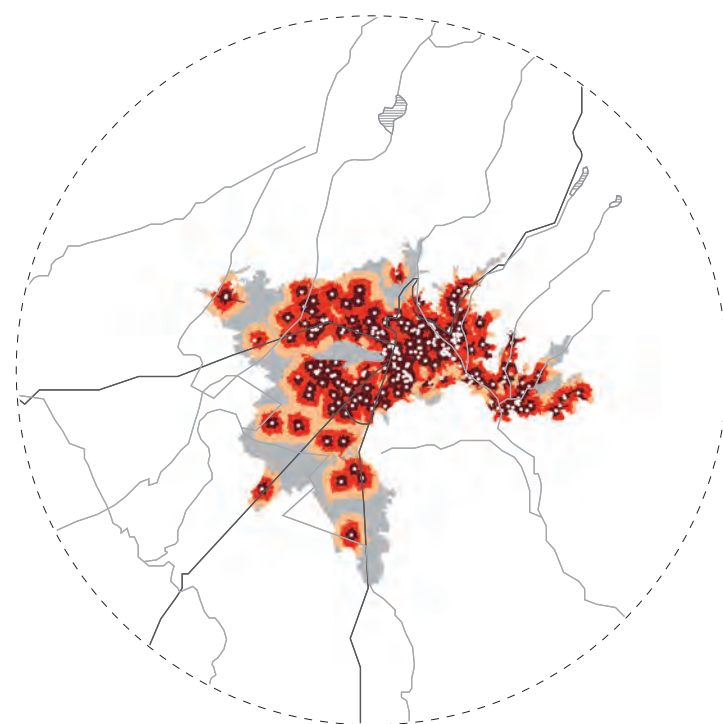
- < 10 min
- 10 - 20 min
- 21 - 30 min
- > 30 min

0 2,5 5 km

SAN JOSÉ
Costa Rica, 324 km²



LA PAZ - EL ALTO
Bolivia, 248 km²

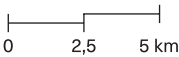


ACCESS TO HEALTH
CENTERS INDICATOR IN
LATIN AMERICA AND
THE CARIBBEAN

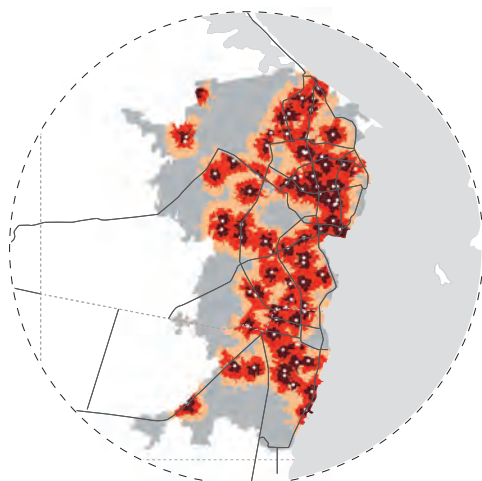
SMALL CITIES
< 300 km²

Pedestrian Access to
Health Centers
Year 2018

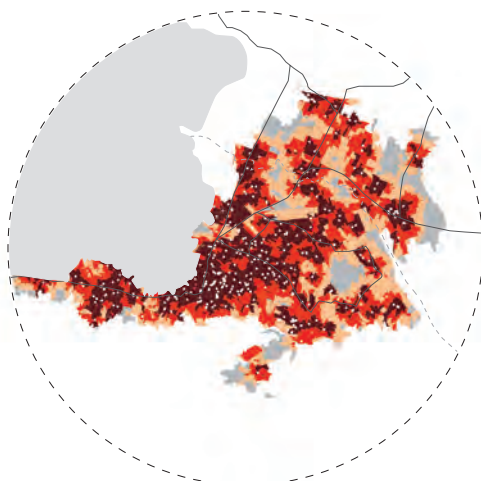
- < 10 min
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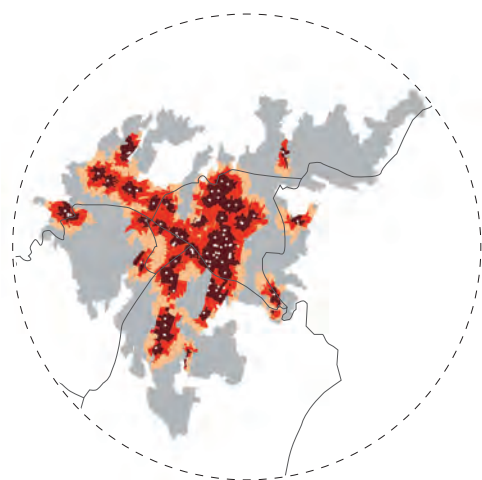
MARACAIBO
Venezuela, 225 km²



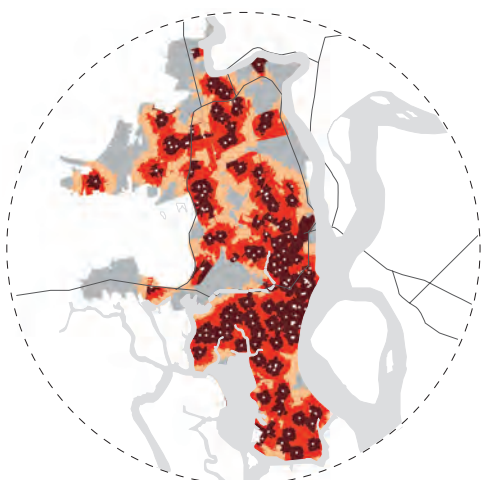
PORT-AU-PRINCE
Haiti, 218 km²



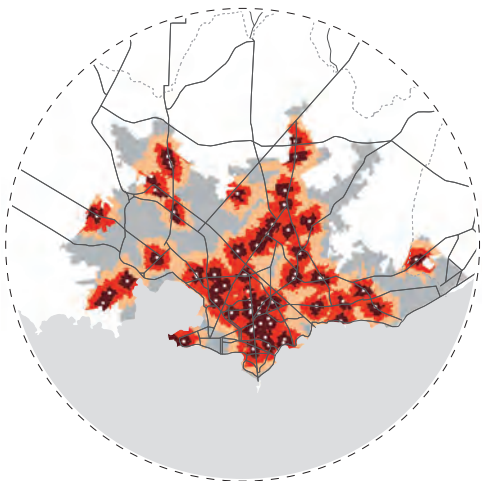
GUATEMALA CITY
Guatemala, 213 km²



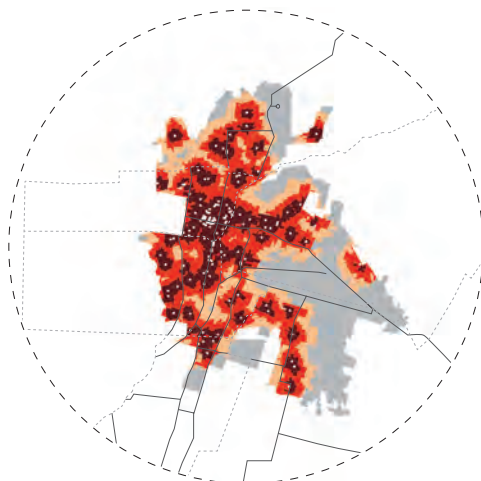
GUAYAQUIL
Ecuador, 210 km²



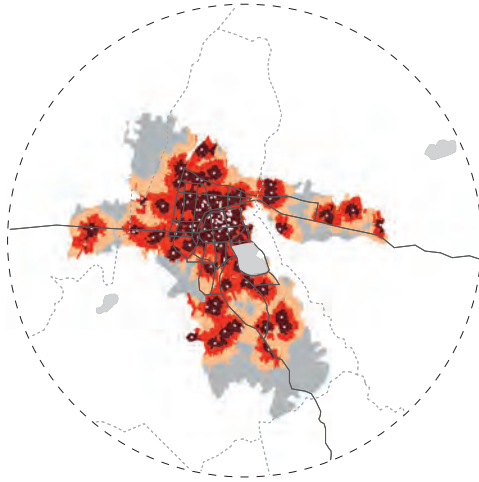
MONTEVIDEO
Uruguay, 201 km²



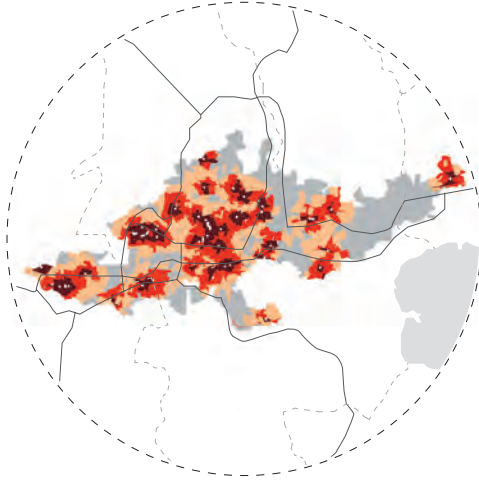
GREATER MENDOZA
Argentina, 195 km²



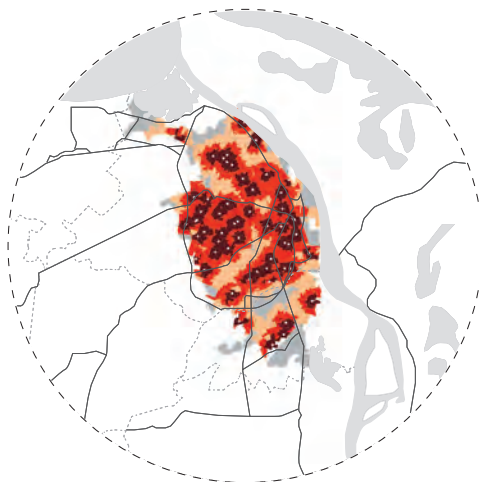
COCHABAMBA
Bolivia, 151 km²



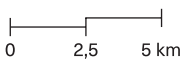
SAN SALVADOR
El Salvador, 149 km²



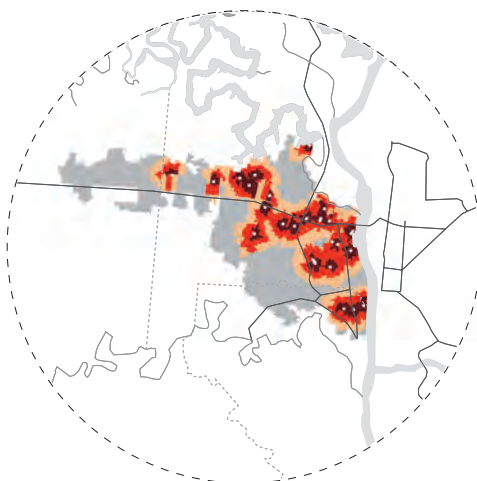
BARRANQUILLA
Colombia, 119 km²



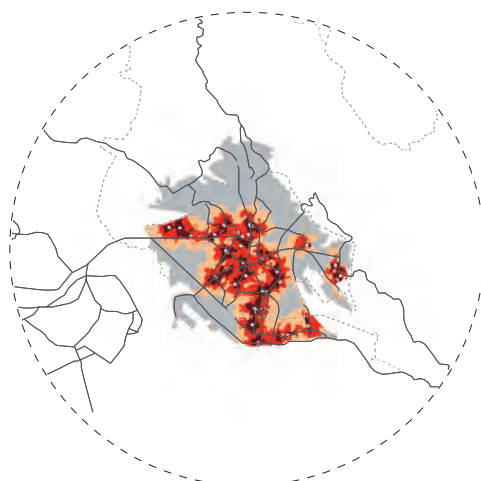
Pedestrian Access to
Health Centers
Year 2018



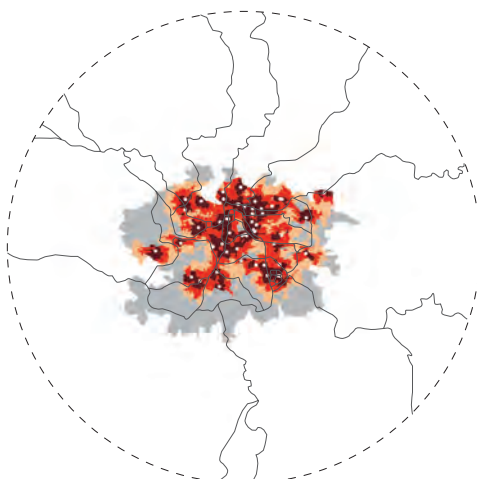
GREATER CIUDAD DEL ESTE
Paraguay, 111 km²



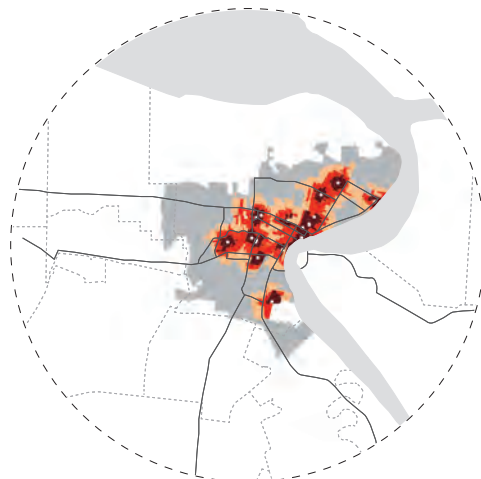
KINGSTON
Jamaica, 107 km²



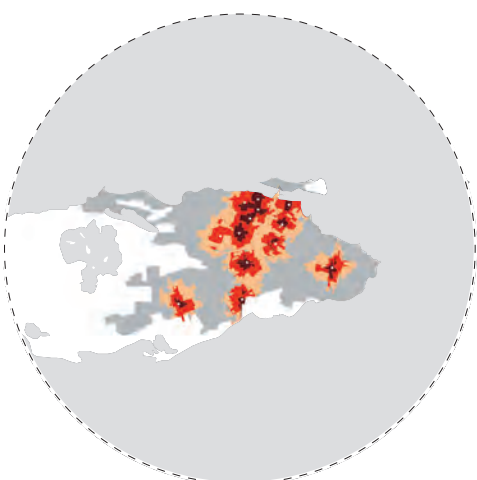
TEGUCIGALPA AND COMAYAGÜELA
Honduras, 99 km²



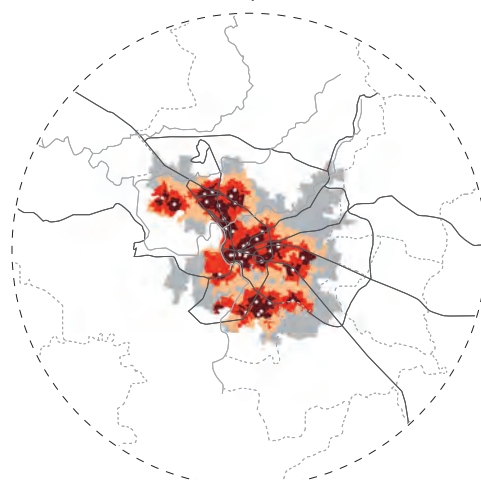
PARAMARIBO
Suriname, 96 km²



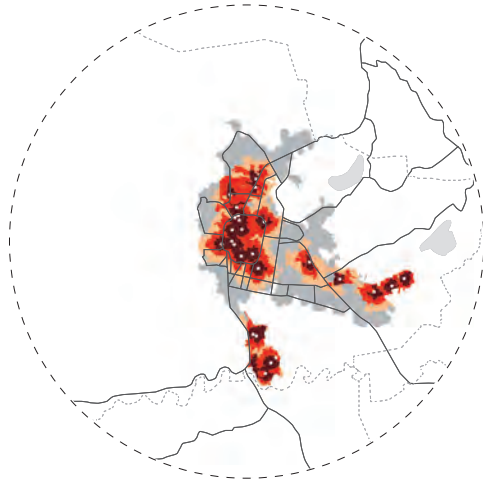
NASSAU
Bahamas, 95 km²



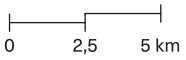
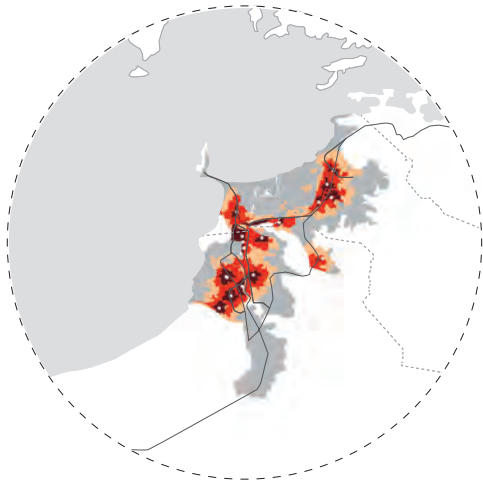
SANTIAGO DE LOS CABALLEROS
Dominican Republic, 89 km²



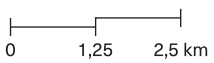
SAN PEDRO SULA
Honduras, 85 km²



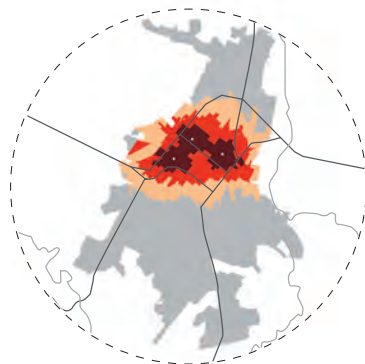
BARCELONA
Venezuela, 84 km²



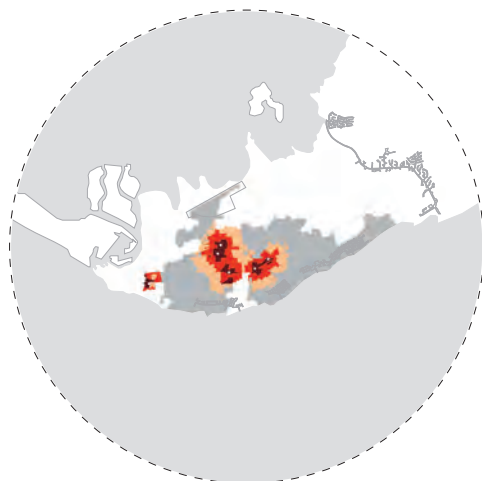
Pedestrian Access to
Health Centers
Year 2018



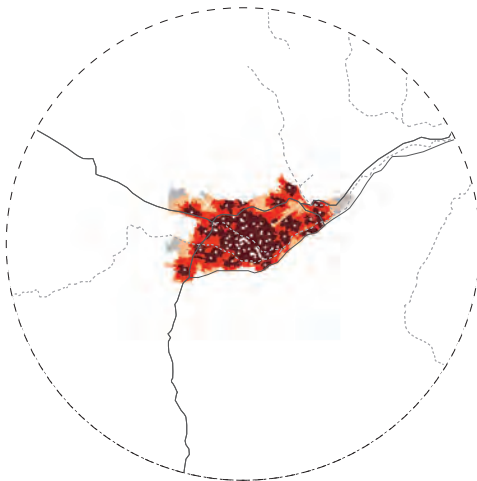
DAVID
Panama, 32 km²



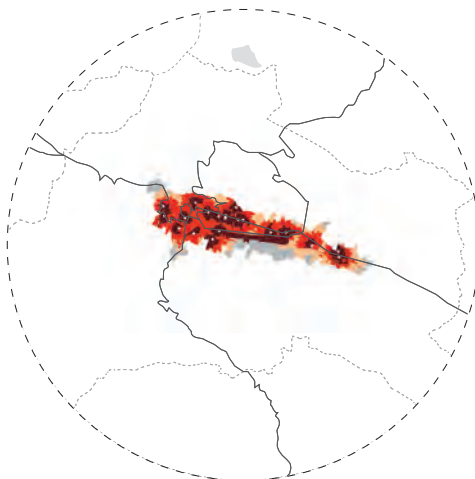
FREEPORT
Bahamas, 54 km²



CUENCA
Ecuador, 44 km²



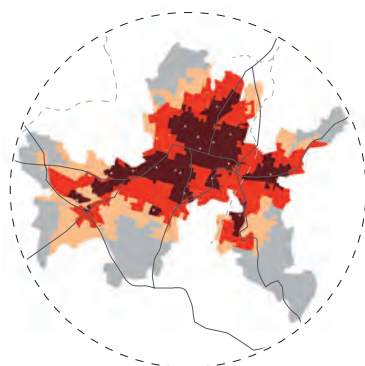
CUSCO
Peru, 33 km²



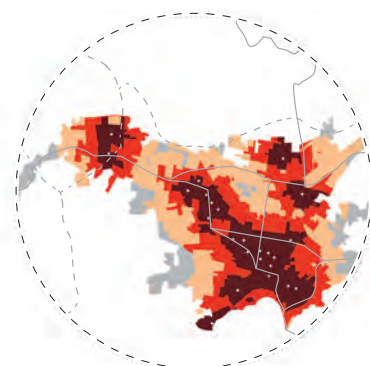
LA SERENA - COQUIMBO
Chile, 74 km²



SANTA ANA
El Salvador, 31 km²



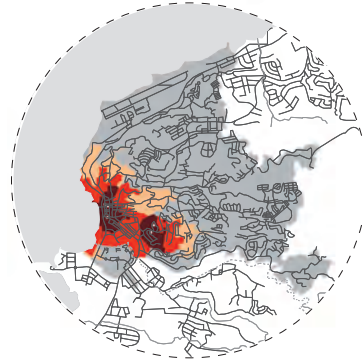
QUETZALTENANGO
Guatemala, 30 km²



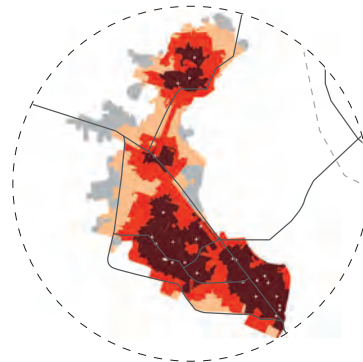
IBAGUE
Colombia, 30 km²



MONTEGO BAY
Jamaica, 28 km²



LAZARO CARDENAS
Mexico, 24 km²

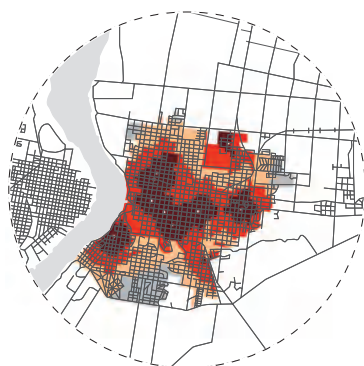


Pedestrian Access to
Health Centers
Year 2018

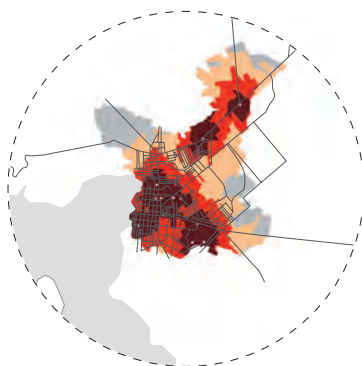
- < 10 min
- 10 - 20 min
- 21 - 30 min
- > 30 min

0 1,25 2,5 km

SALTO
Uruguay, 19 km²



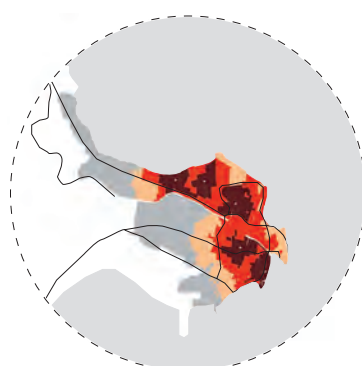
GONAIVES
Haiti, 18 km²



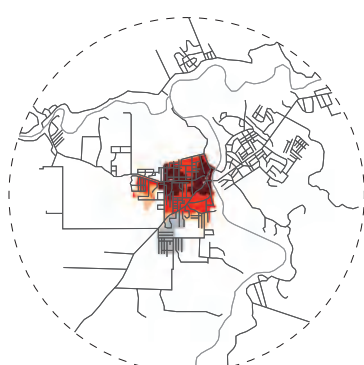
LEON
Nicaragua, 18 km²



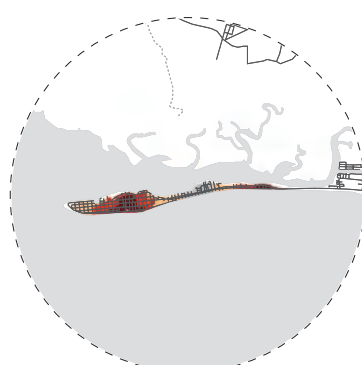
BELIZE CITY
Belize, 14 km²



SAN IGNACIO
Belize, 3 km²



PUNTARENAS
Costa Rica, 2 km²

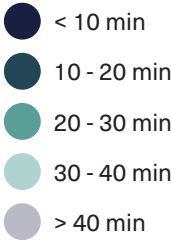


EMPLOYMENT INDICATOR

Access to the main employment areas/historic district was defined as the travel time within the urban area up to a certain time limit. In the case of employment, a maximum travel time was set at 60 minutes by motor vehicle. The concentration of amenities and services in specific areas of the metropolitan zone generates greater coverage of access and thus, a larger portion of the urban area with improved accessibility.

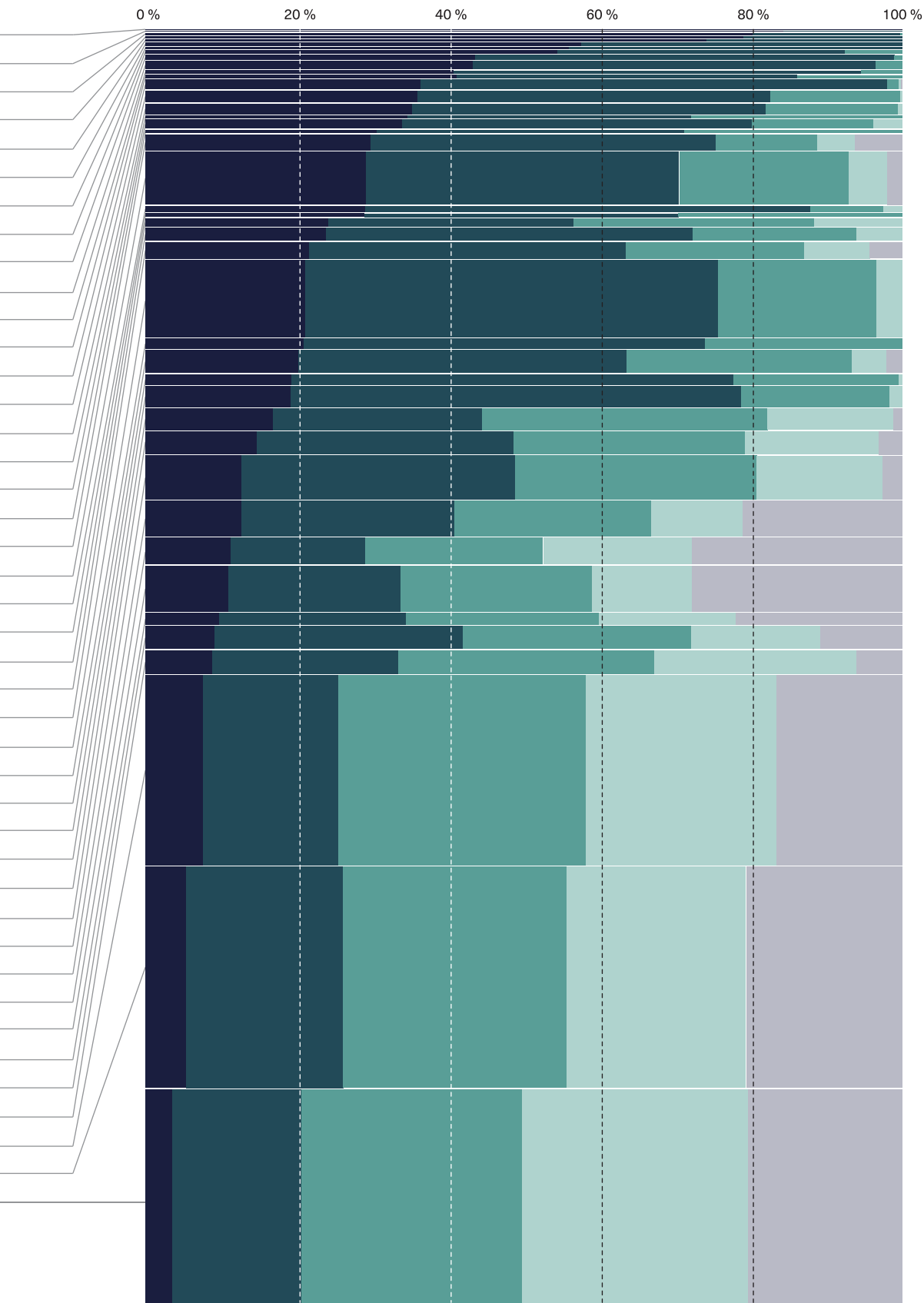
ACCESS TO THE MAIN EMPLOYMENT AREAS/HISTORIC DISTRICT IN LATIN AMERICA AND THE CARIBBEAN

Average Commute to
Employment Centers (by car)
Year 2018



The height of the city correspondos to its urban area (km²)



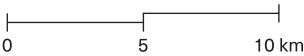


ACCESS TO THE MAIN
EMPLOYMENT AREAS/HISTORIC
DISTRICT IN LATIN AMERICA
AND THE CARIBBEAN

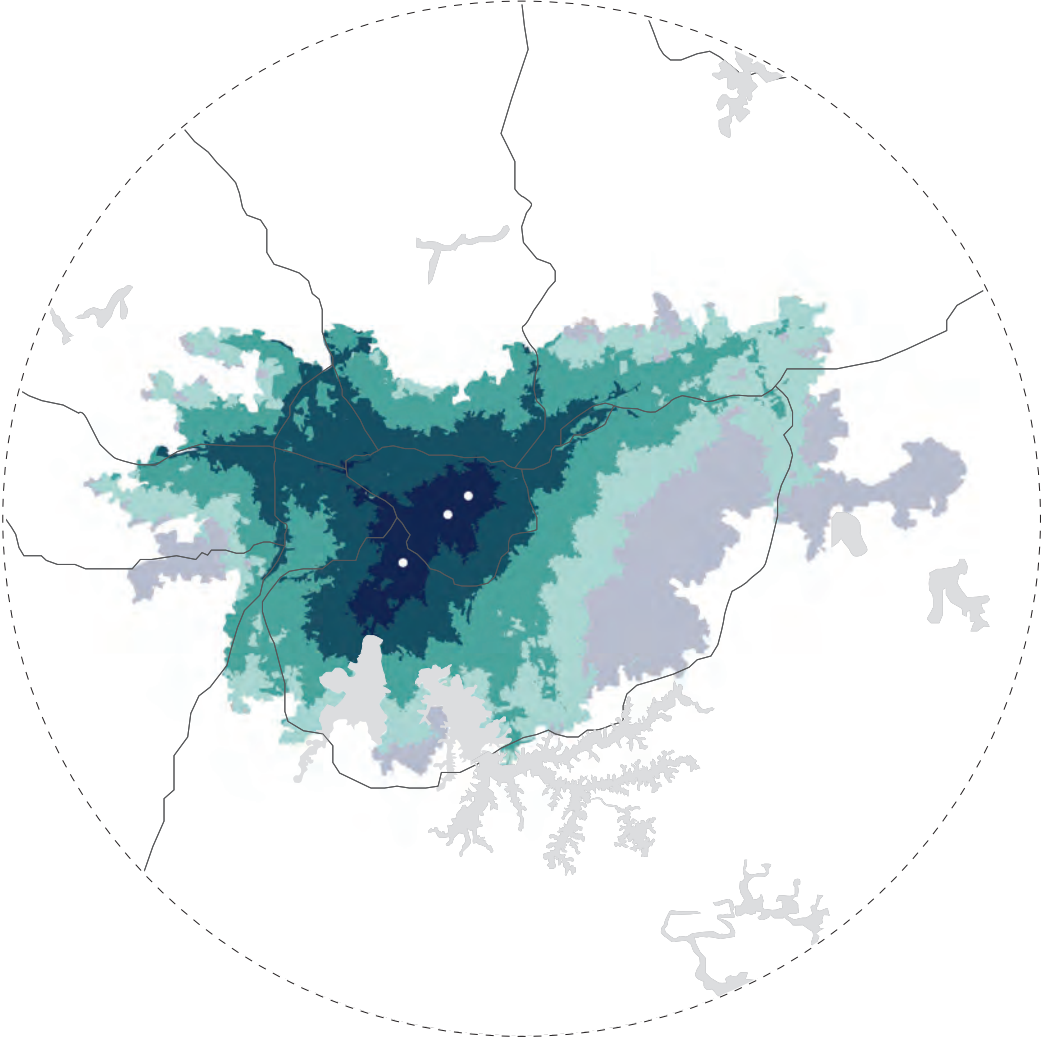
LARGE CITIES
> 1000 km²

Average Commute to
Employment Centers (by car)
Year 2018

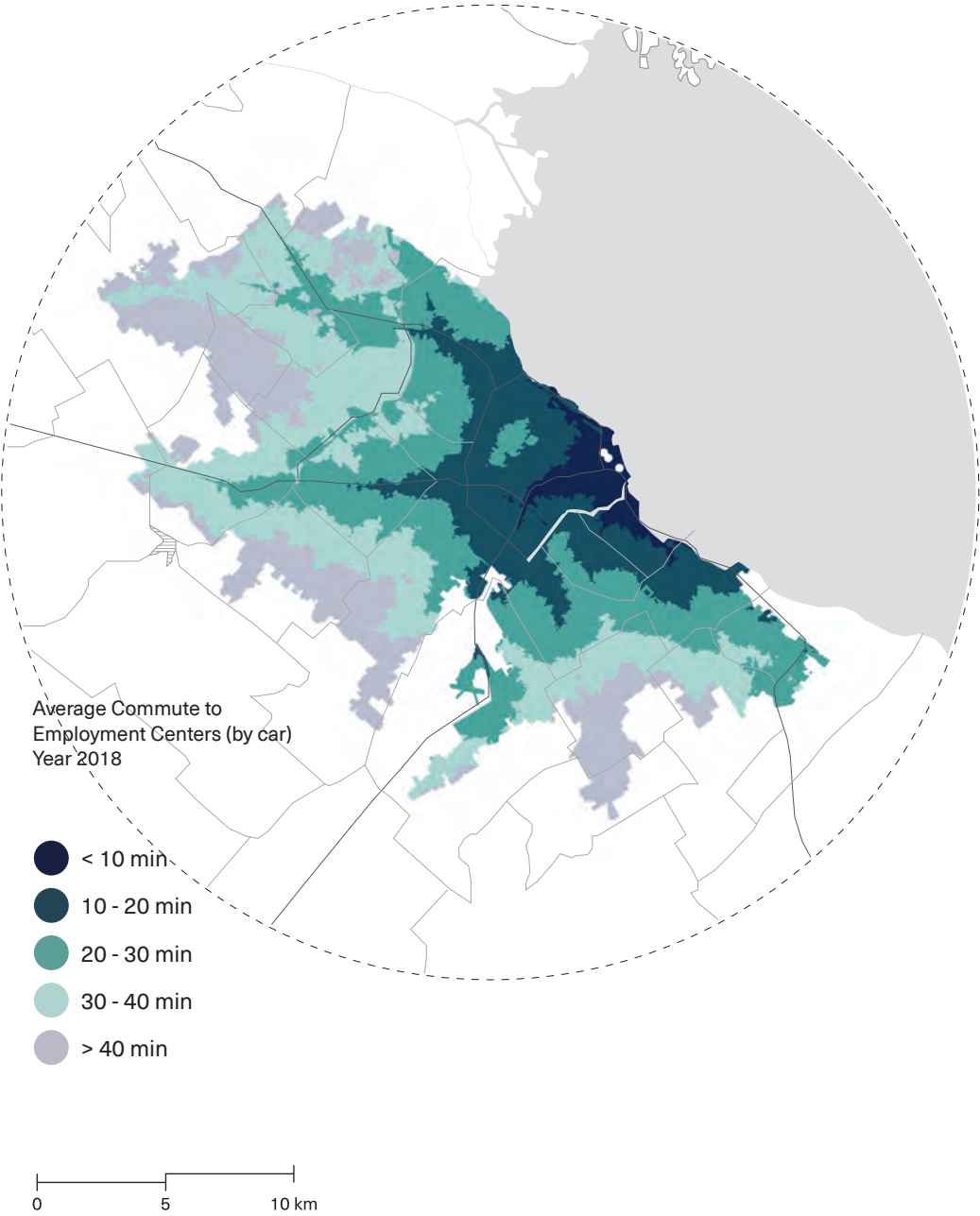
- < 10 min
- 10 - 20 min
- 20 - 30 min
- 30 - 40 min
- > 40 min



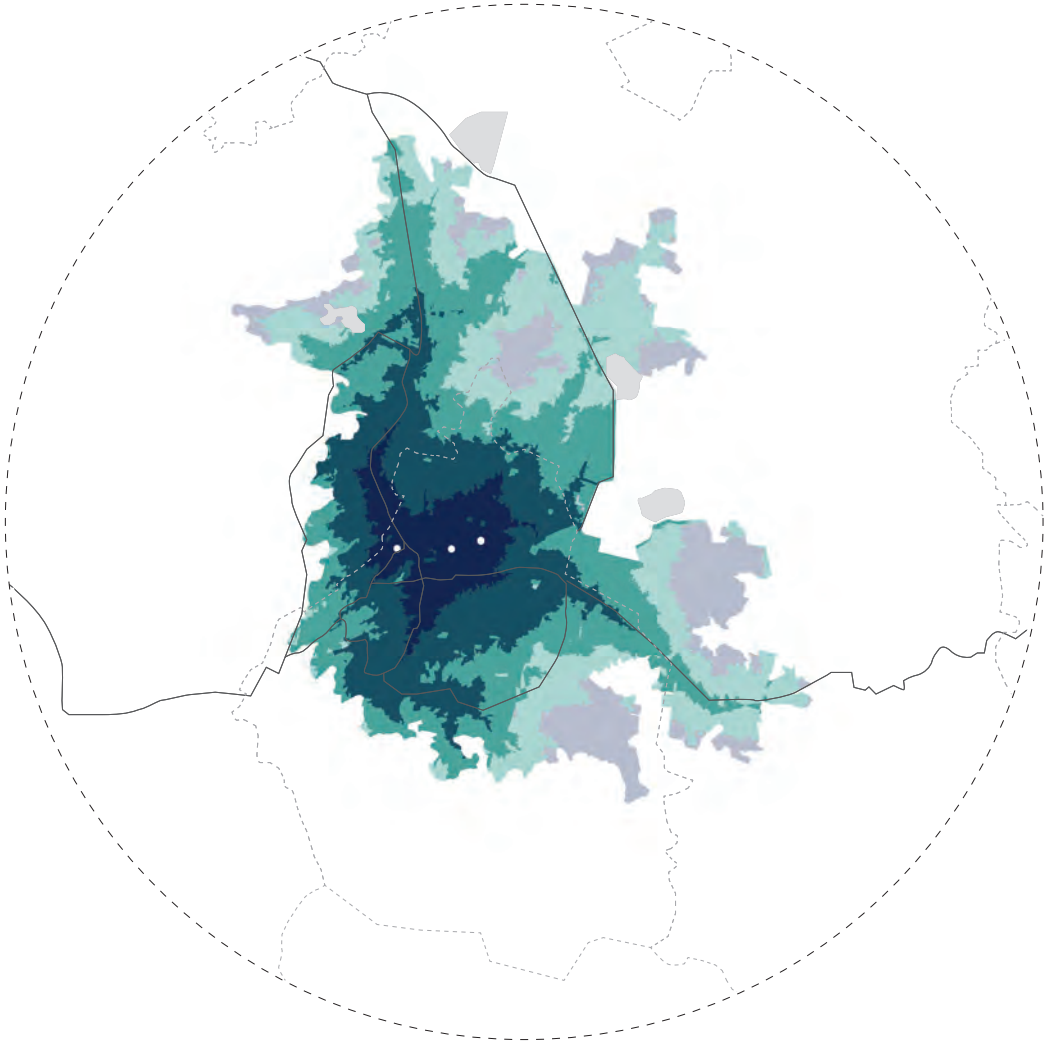
SÃO PAULO METROPOLITAN REGION
Brazil, 2056 km²



BUENOS AIRES METROPOLITAN AREA
Argentina, 1997 km²



MEXICO VALLEY METROPOLITAN AREA
Mexico, 1768 km²



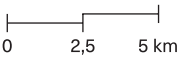
ACCESS TO THE MAIN
EMPLOYMENT AREAS/HISTORIC
DISTRICT IN LATIN AMERICA
AND THE CARIBBEAN

MEDIUM-SIZED CITIES

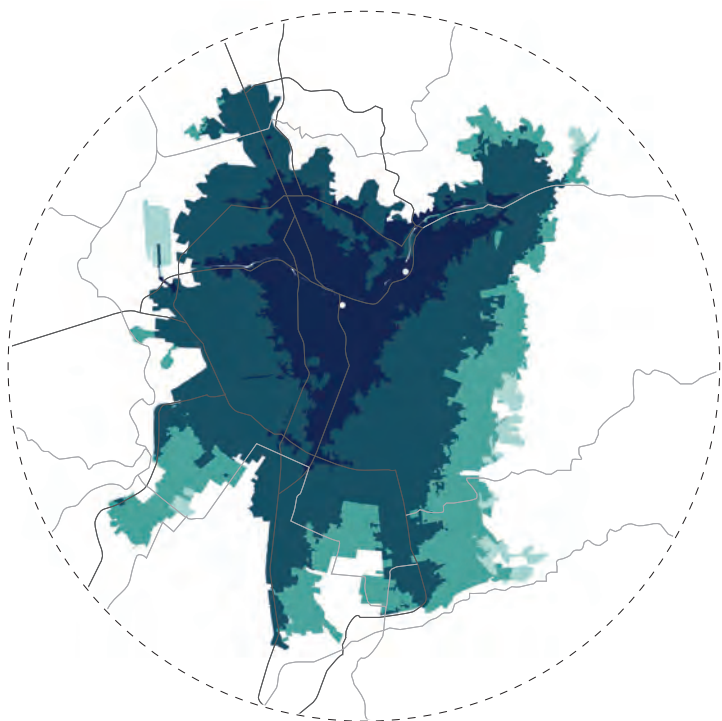
300 to 1000 km²

Average Commute to
Employment Centers (by car)
Year 2018

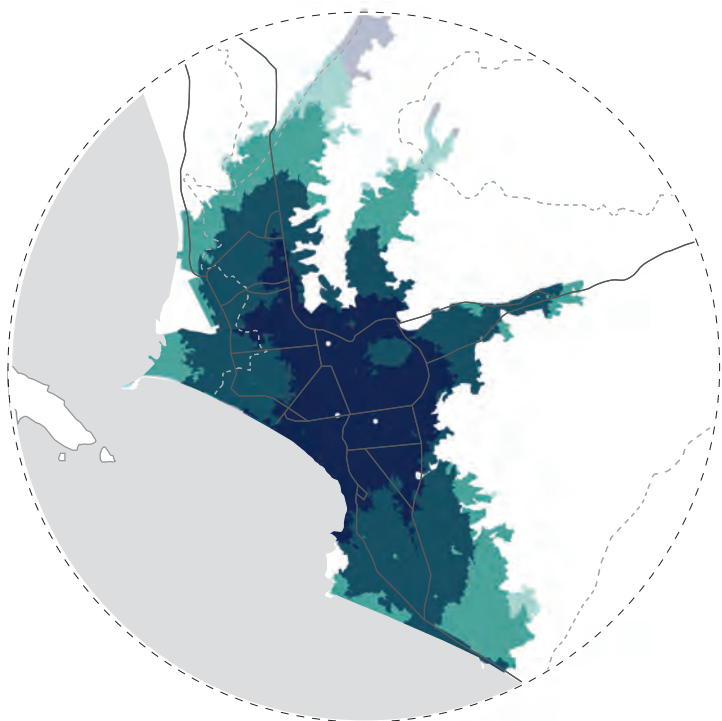
- < 10 min
- 10 - 20 min
- 20 - 30 min
- 30 - 40 min
- > 40 min



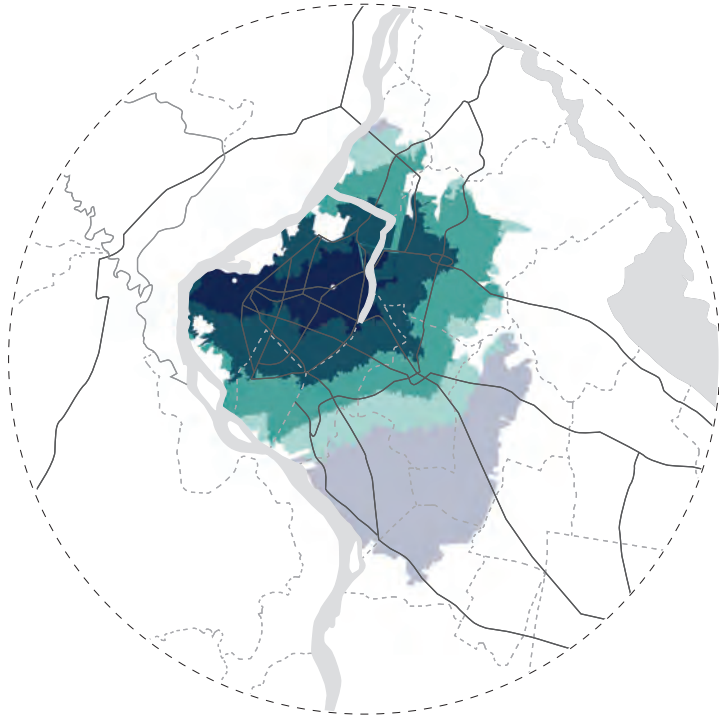
GREATER SANTIAGO
Chile, 719 km²



LIMA
Peru, 491 km²



GREATER ASUNCION
Paraguay, 427 km²

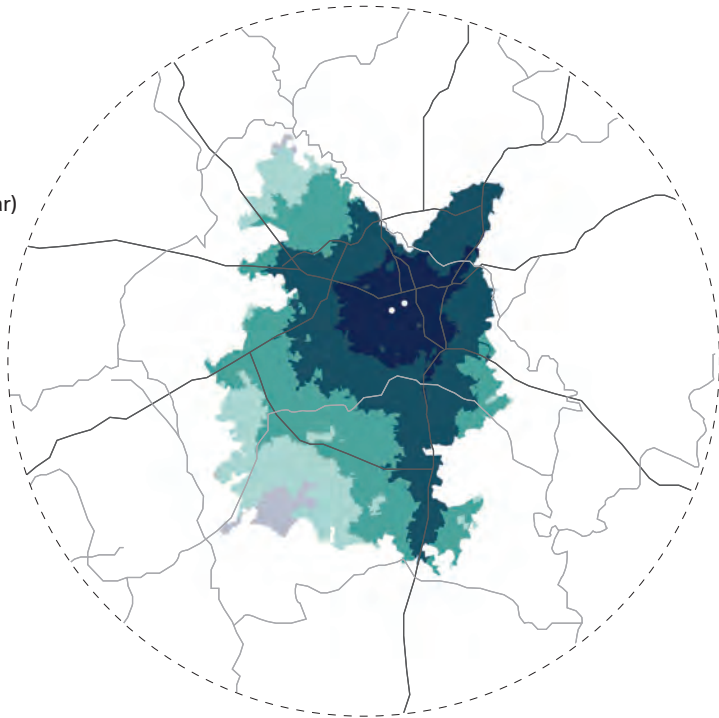


GOIANIA
Brazil, 409 km²

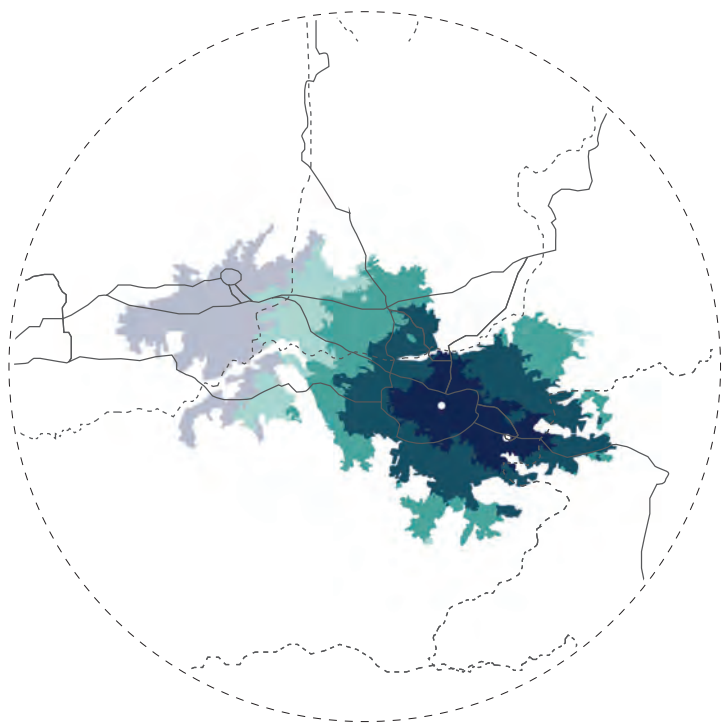
Average Commute to
Employment Centers (by car)
Year 2018

- < 10 min
- 10 - 20 min
- 20 - 30 min
- 30 - 40 min
- > 40 min

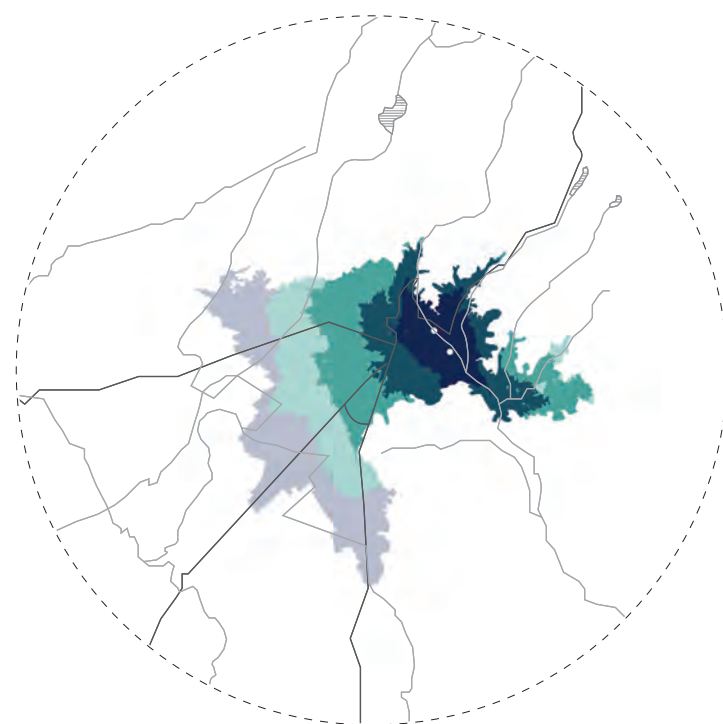
0 2,5 5 km



SAN JOSÉ
Costa Rica, 324 km²



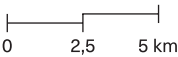
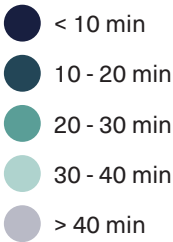
LA PAZ - EL ALTO
Bolivia, 248 km²



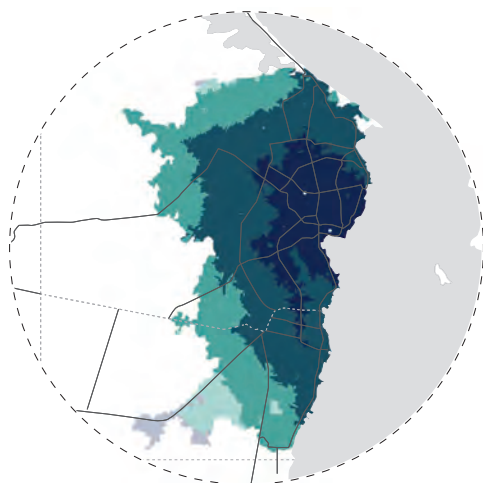
ACCESS TO THE MAIN
EMPLOYMENT AREAS/HISTORIC
DISTRICT IN LATIN AMERICA
AND THE CARIBBEAN

SMALL CITIES
< 300 km²

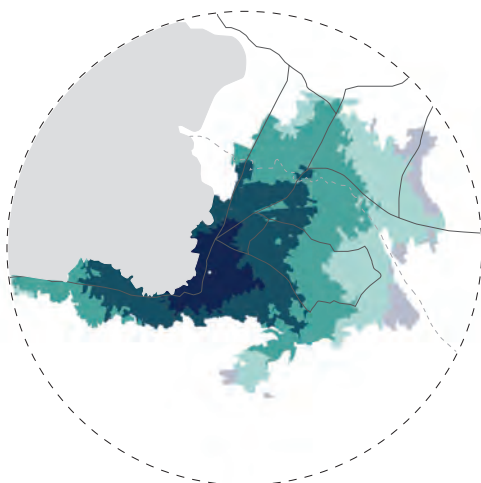
Average Commute to
Employment Centers (by car)
Year 2018



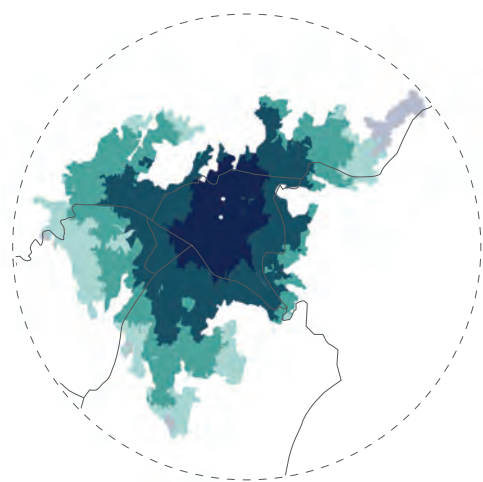
MARACAIBO
Venezuela, 225 km²



PORT-AU-PRINCE
Haiti, 218 km²



GUATEMALA CITY
Guatemala, 213 km²



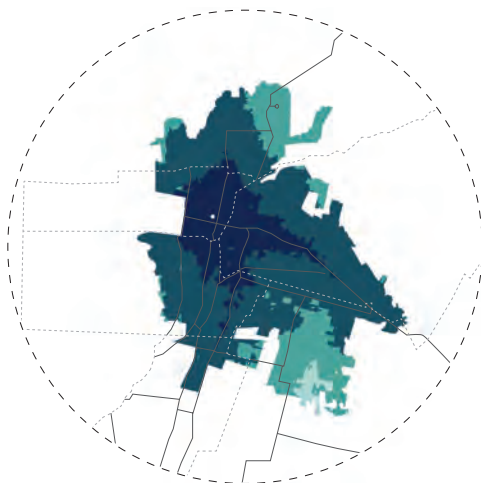
GUAYAQUIL
Ecuador, 210 km²



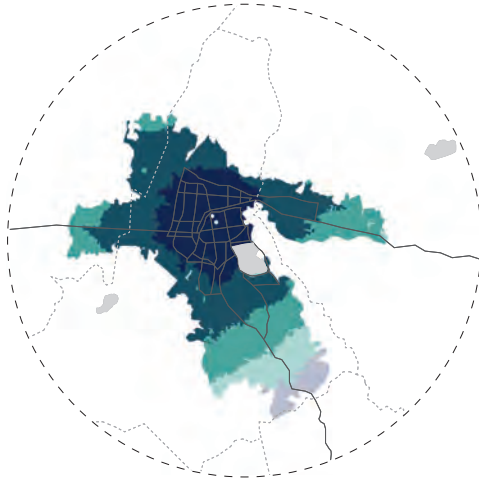
MONTEVIDEO
Uruguay, 201 km²



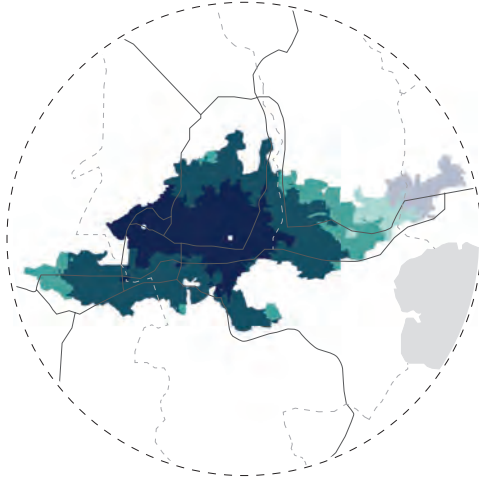
GREATER MENDOZA
Argentina, 195 km²



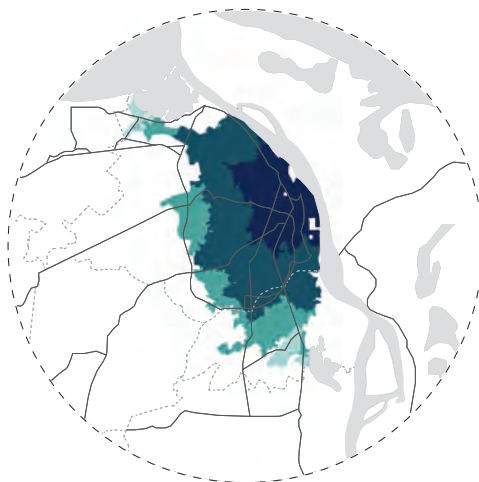
COCHABAMBA
Bolivia, 151 km²



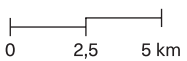
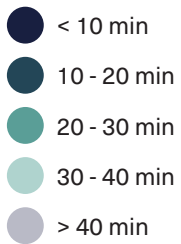
SAN SALVADOR
El Salvador, 149 km²



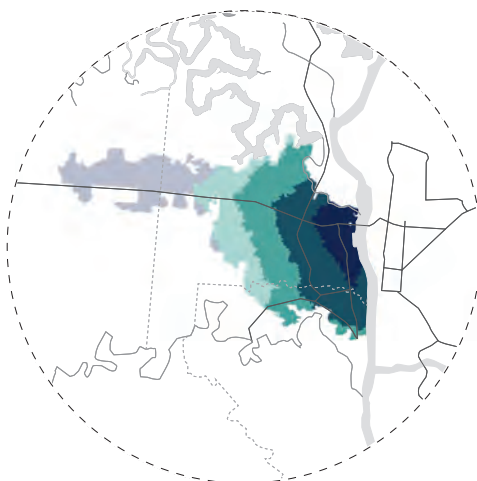
BARRANQUILLA
Colombia, 119 km²



Average Commute to
Employment Centers (by car)
Year 2018



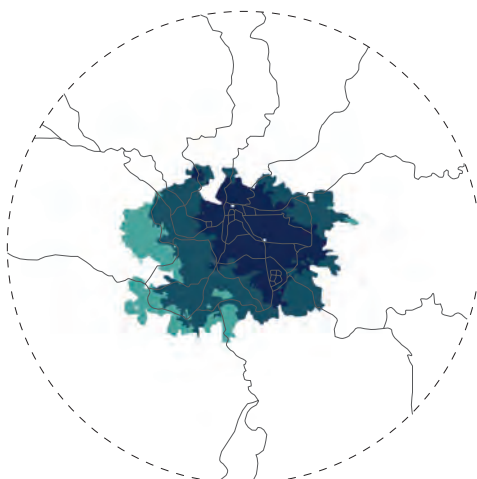
GREATER CIUDAD DEL ESTE
Paraguay, 111 km²



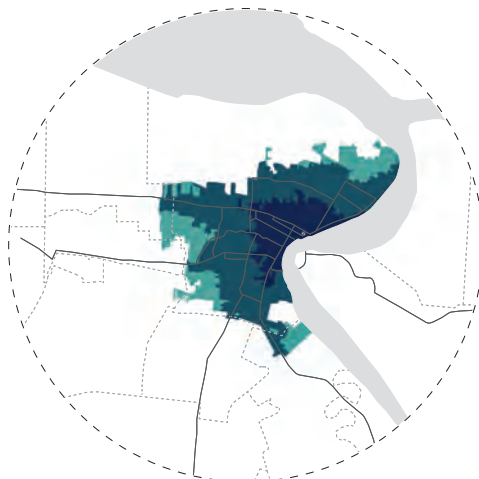
KINGSTON
Jamaica, 107 km²



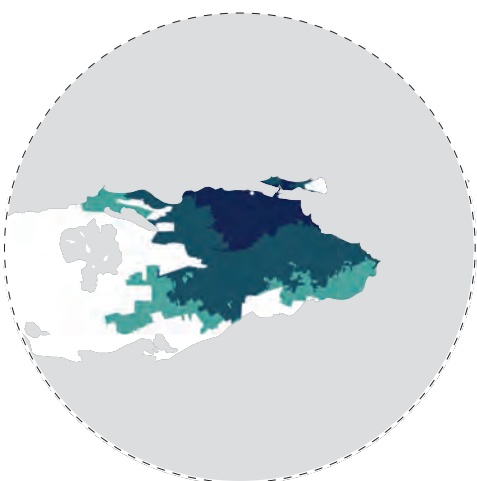
TEGUCIGALPA AND COMAYAGÜELA
Honduras, 99 km²



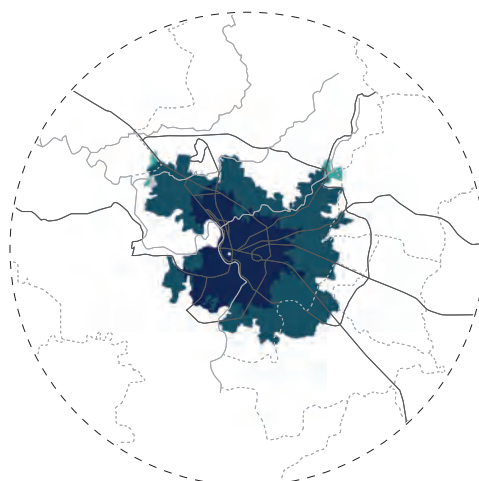
PARAMARIBO
Suriname, 96 km²



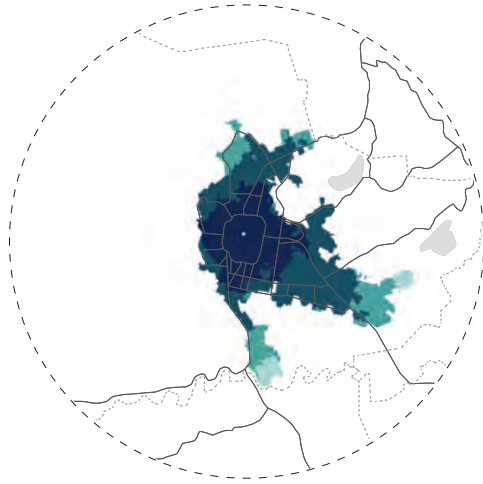
NASSAU
Bahamas, 95 km²



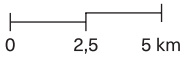
SANTIAGO DE LOS CABALLEROS
Dominican Republic, 89 km²



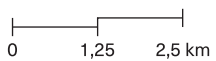
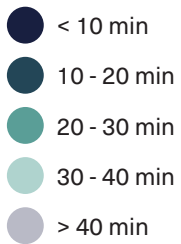
SAN PEDRO SULA
Honduras, 85 km²



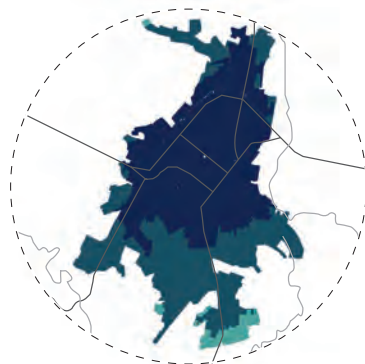
BARCELONA
Venezuela, 84 km²



Average Commute to
Employment Centers (by car)
Year 2018



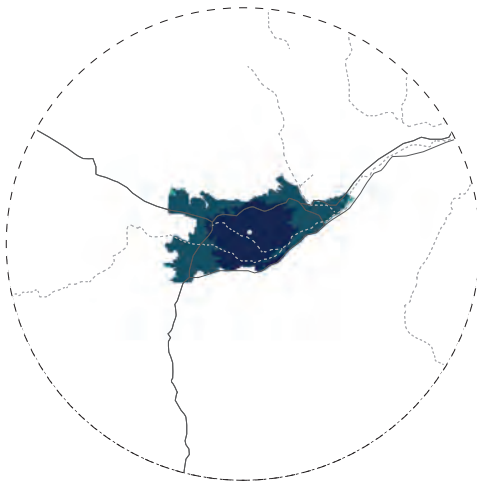
DAVID
Panama, 32 km²



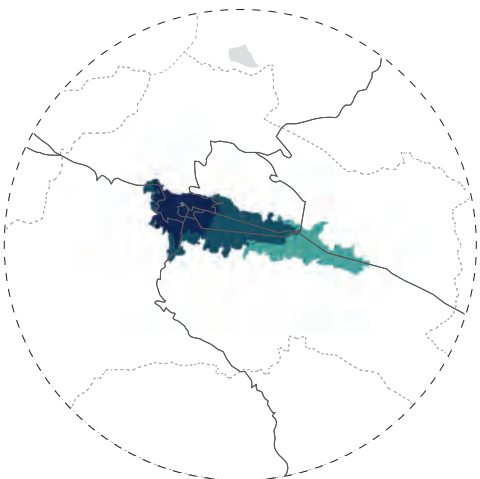
FREEPORT
Bahamas, 54 km²



CUENCA
Ecuador, 44 km²



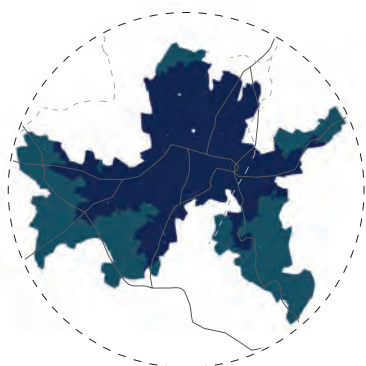
CUSCO
Peru, 33 km²



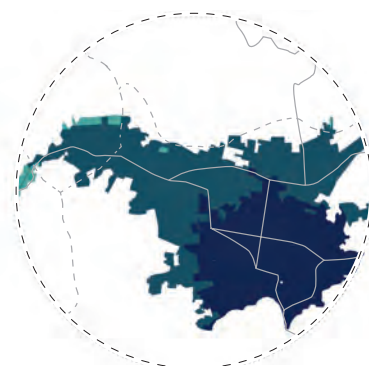
LA SERENA - COQUIMBO
Chile, 74 km²



SANTA ANA
El Salvador, 31 km²



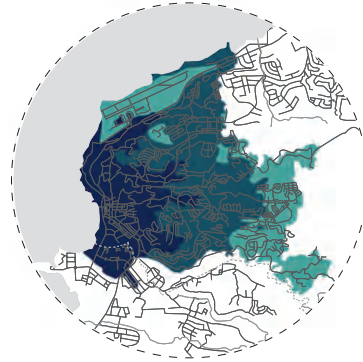
QUETZALTENANGO
Guatemala, 30 km²



IBAGUE
Colombia, 30 km²

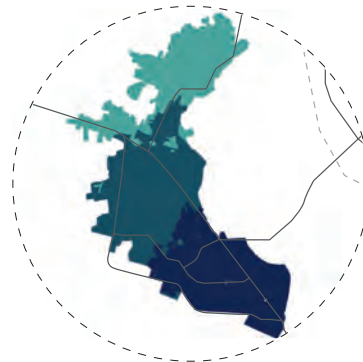


MONTEGO BAY
Jamaica, 28 km²



Average Commute to
Employment Centers (by car)
Year 2018

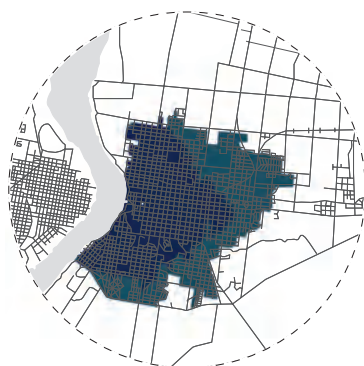
LAZARO CARDENAS
Mexico, 24 km²



- < 10 min
- 10 - 20 min
- 20 - 30 min
- 30 - 40 min
- > 40 min



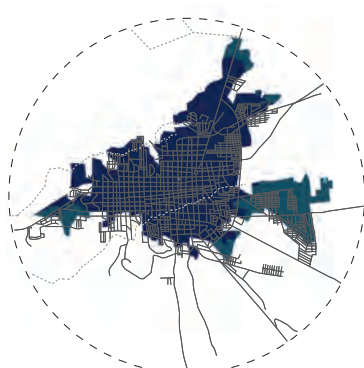
SALTO
Uruguay, 19 km²



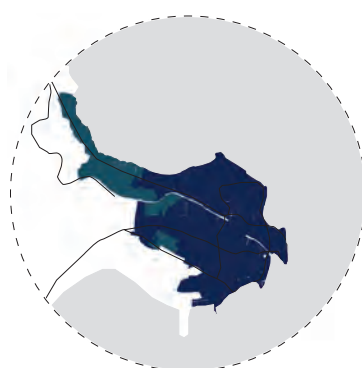
GONAIVES
Haiti, 18 km²



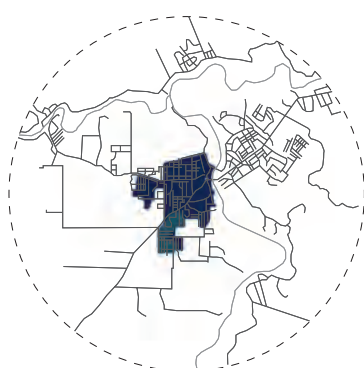
LEON
Nicaragua, 18 km²



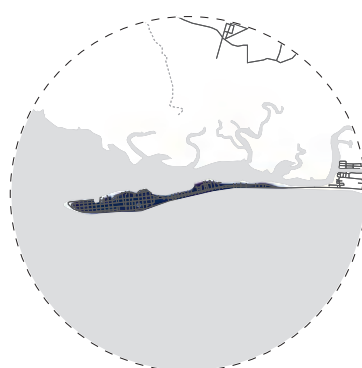
BELIZE CITY
Belize, 14 km²



SAN IGNACIO
Belize, 3 km²



PUNTARENAS
Costa Rica, 2 km²



SYNTHETIC URBAN QUALITY INDICATOR

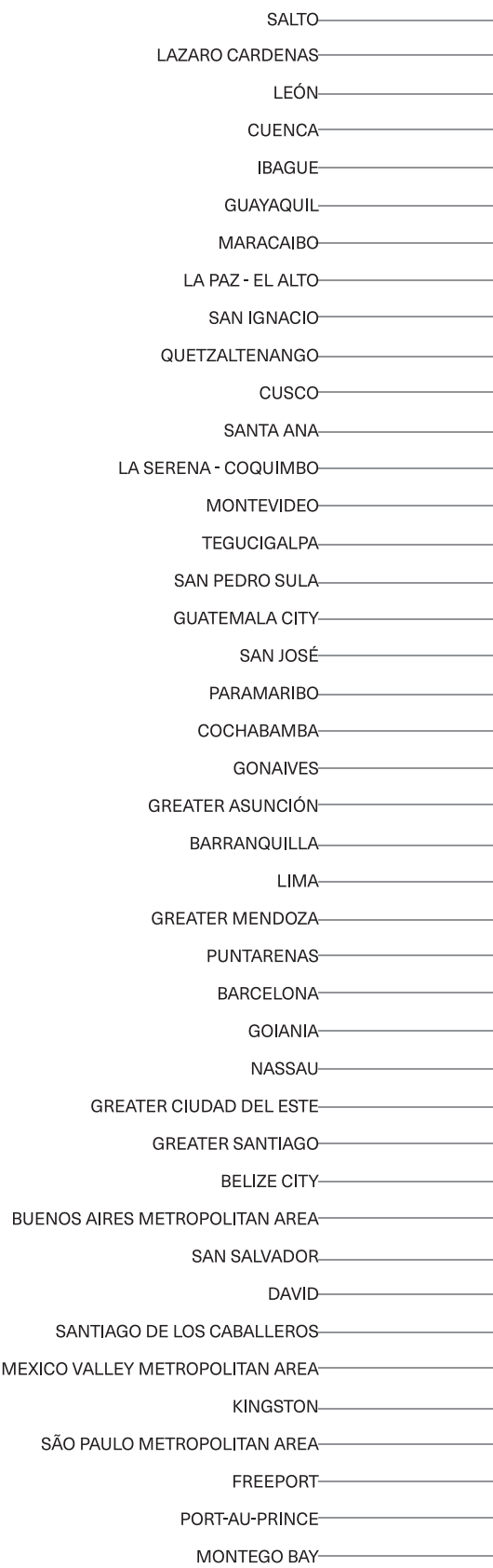
The Synthetic Urban Quality Indicator was obtained by reclassifying, assessing, scoring and zoning the analyzed variables (accessibility and environmental comfort). The calculated accessibilities were reclassified using the Moran scatterplot. In the case of accessibility, city blocks with longer travel times received a lower score, and those with shorter travel times, a higher score. In terms of environmental comfort, city blocks with greater comfort received higher scores. Finally, all the points were totaled.

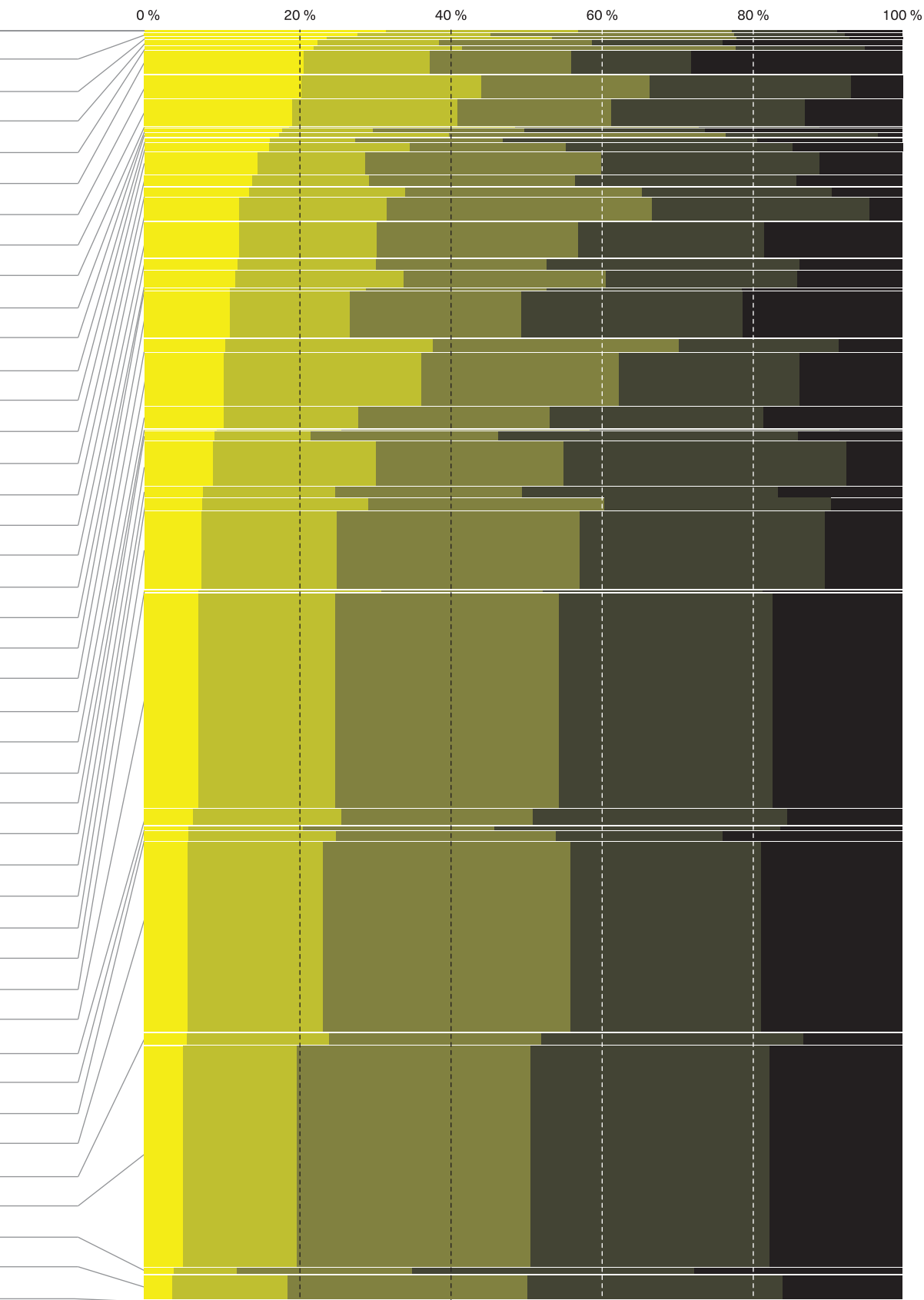
SYNTHETIC URBAN QUALITY INDICATOR IN LATIN AMERICA AND THE CARIBBEAN

Synthetic Urban
Quality Indicator
Year 2018



The height of the city corresponds to its urban area (km²)



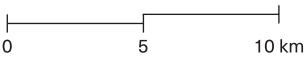


SYNTHETIC URBAN QUALITY
INDICATOR IN LATIN AMERICA
AND THE CARIBBEAN

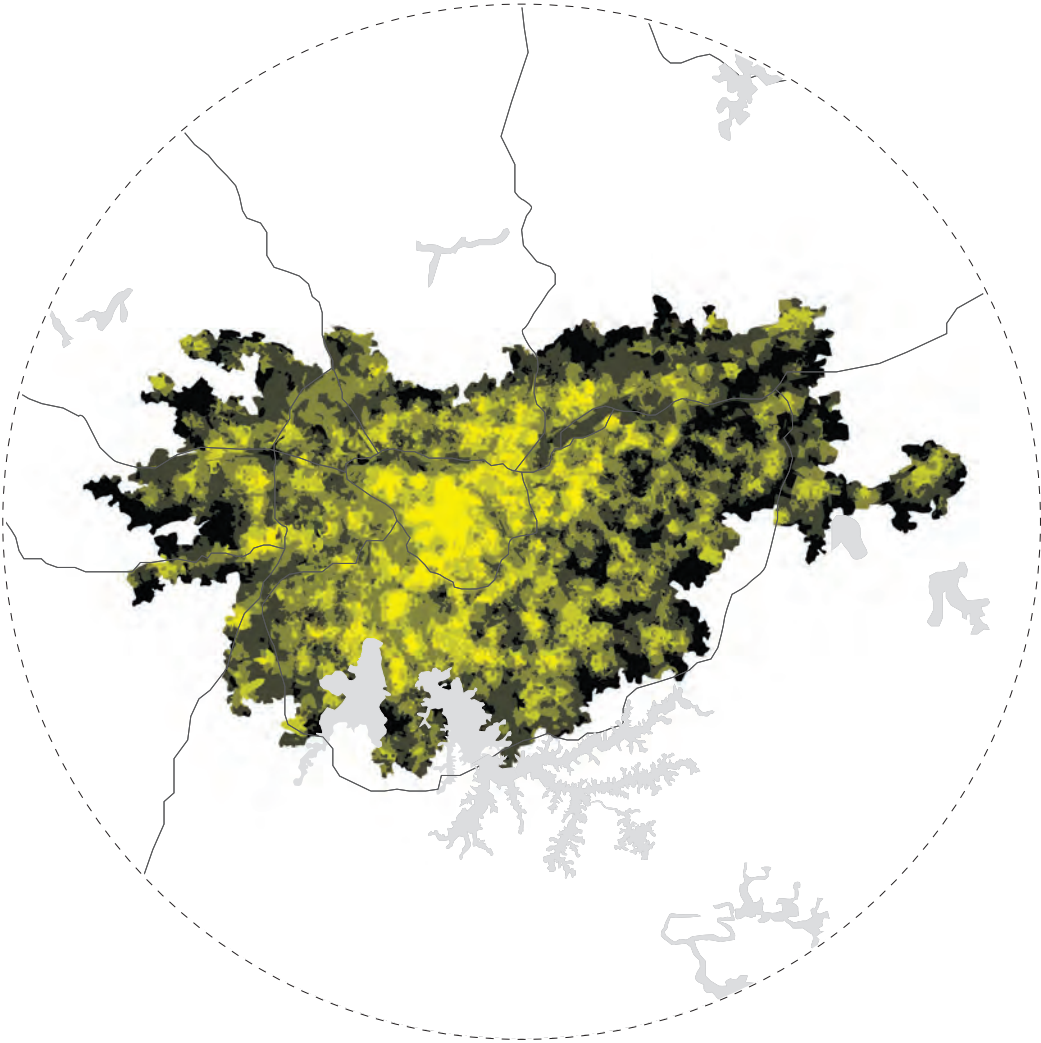
LARGE CITIES
> 1 000 km²

Synthetic Urban
Quality Indicator
Year 2018

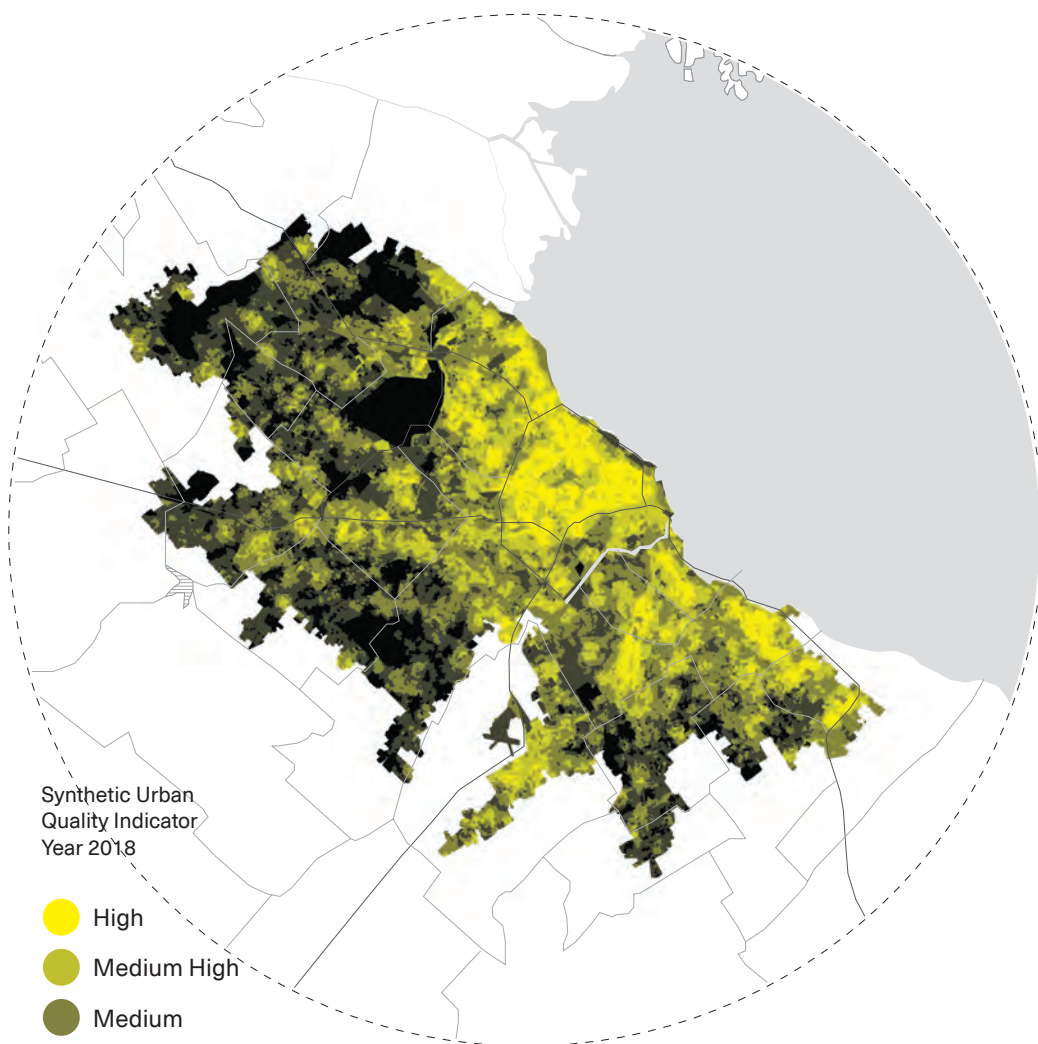
- High
- Medium High
- Medium
- Medium Low
- Low



SÃO PAULO METROPOLITAN REGION
Brazil, 2056 km²



BUENOS AIRES METROPOLITAN AREA
Argentina, 1997 km²

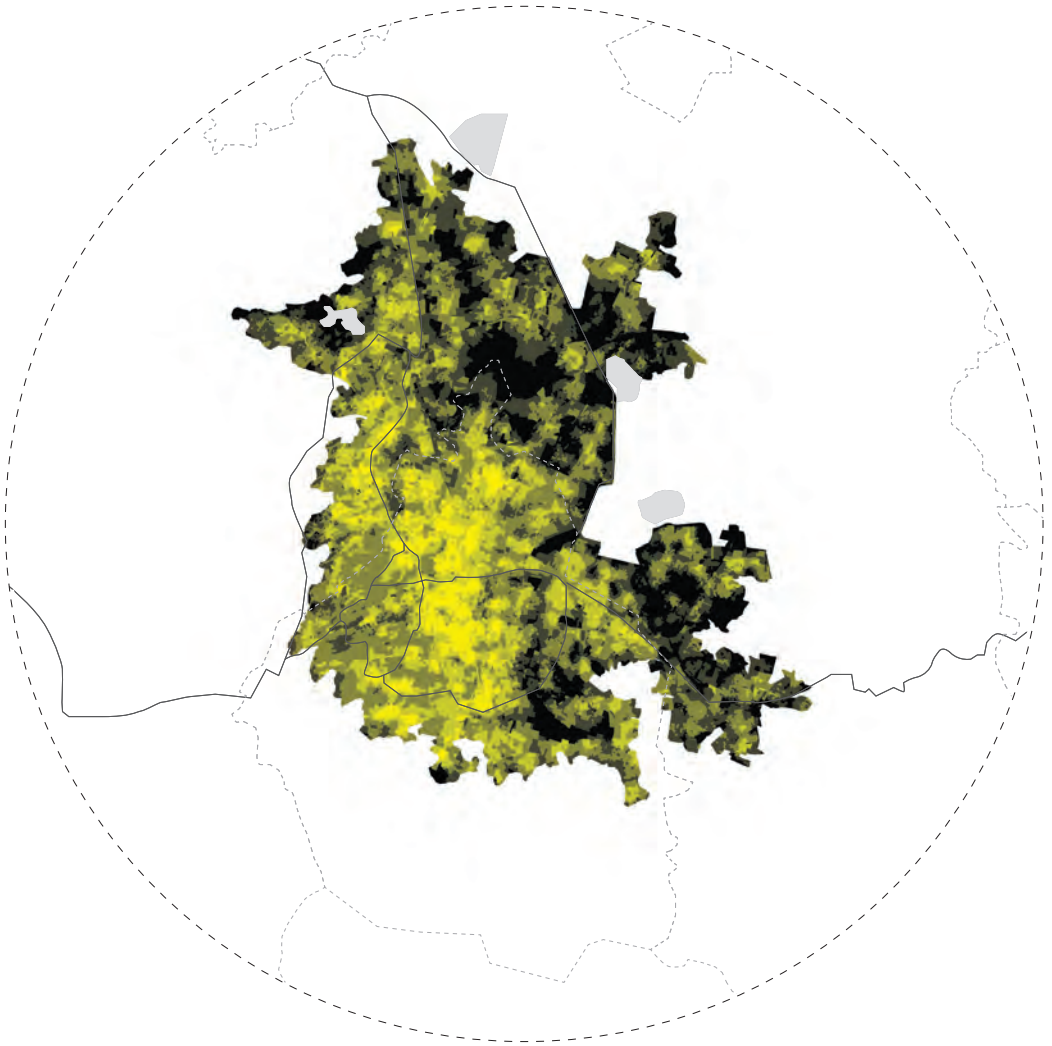


Synthetic Urban
Quality Indicator
Year 2018

- High
- Medium High
- Medium
- Medium Low
- Low

0 5 10 km

MEXICO VALLEY METROPOLITAN AREA
Mexico, 1768 km²

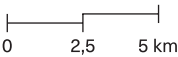


SYNTHETIC URBAN QUALITY
INDICATOR IN LATIN AMERICA
AND THE CARIBBEAN

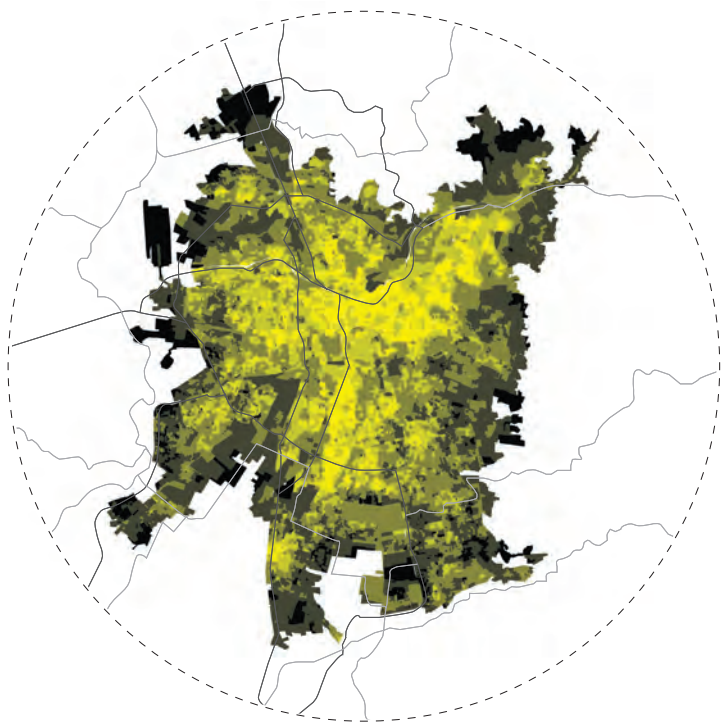
MEDIUM-SIZED CITIES
300 to 1 000 km²

Synthetic Urban
Quality Indicator
Year 2018

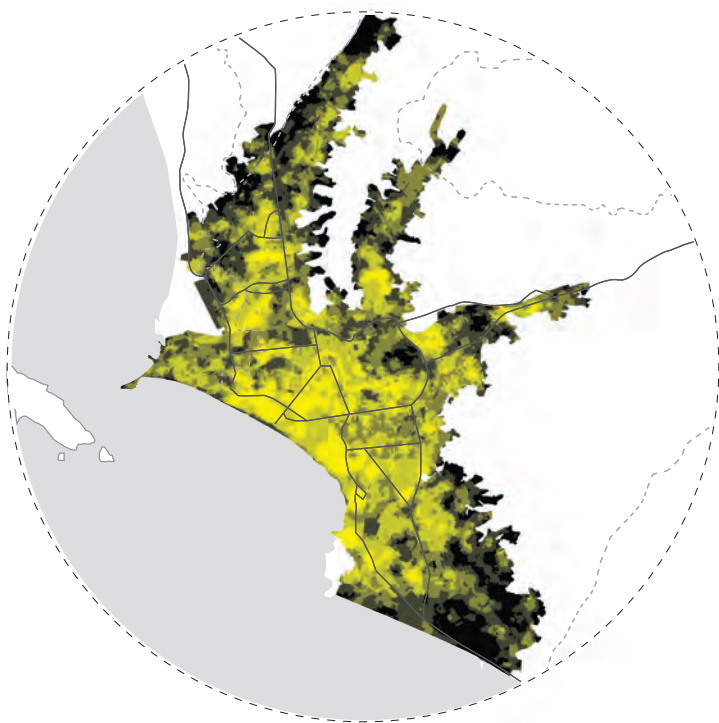
- High
- Medium High
- Medium
- Medium Low
- Low



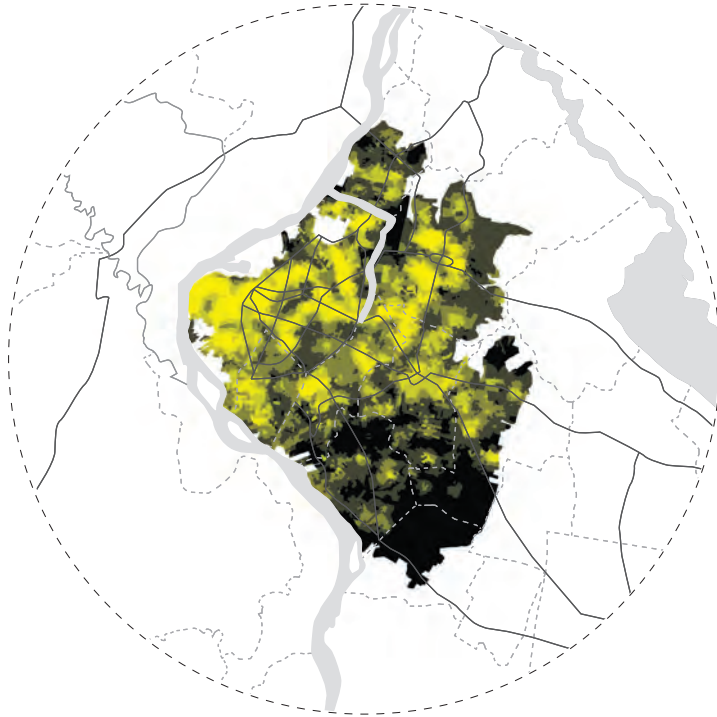
GREATER SANTIAGO
Chile, 719 km²



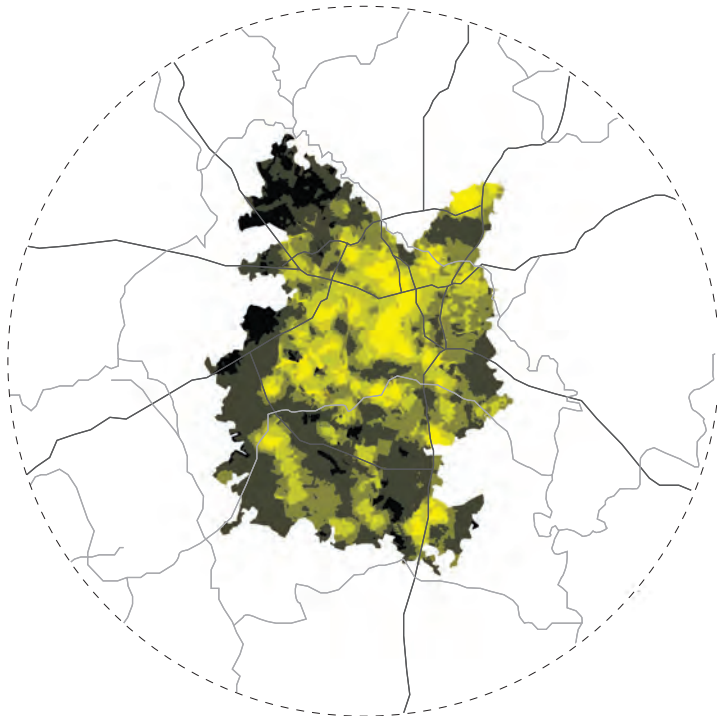
LIMA
Peru, 491 km²



GREATER ASUNCION
Paraguay, 427 km²



GOIANIA
Brazil, 409 km²

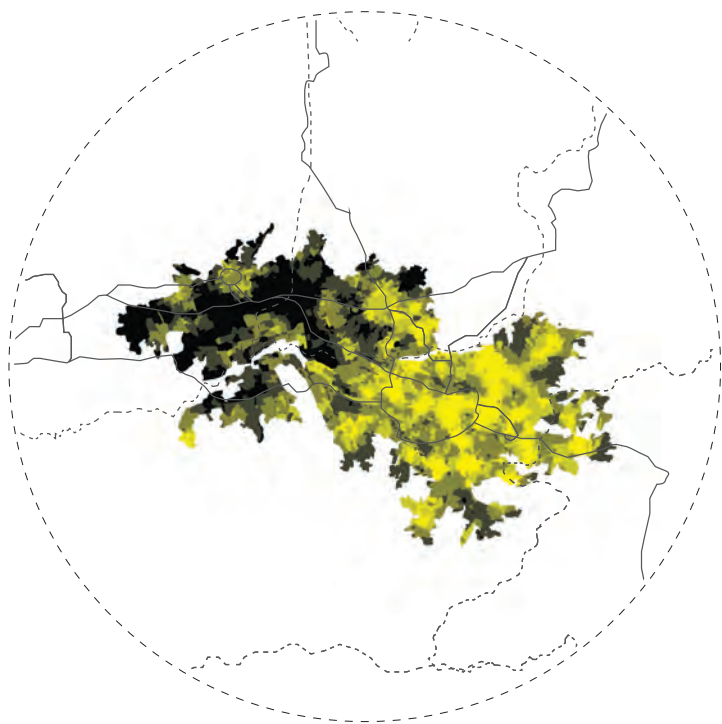


Synthetic Urban
Quality Indicator
Year 2018

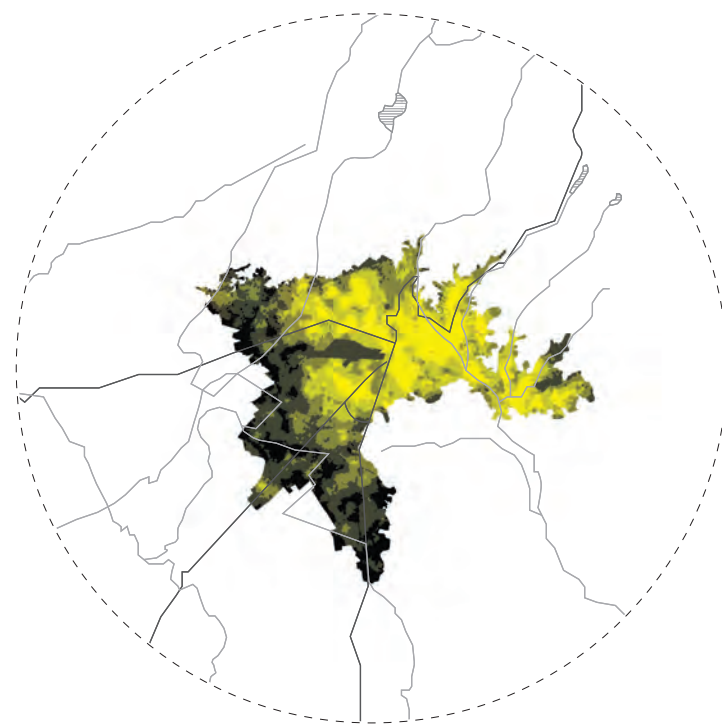
- High
- Medium High
- Medium
- Medium Low
- Low

0 2,5 5 km

SAN JOSÉ
Costa Rica, 324 km²



LA PAZ - EL ALTO
Bolivia, 248 km²

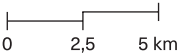


SYNTHETIC URBAN QUALITY
INDICATOR IN LATIN AMERICA
AND THE CARIBBEAN

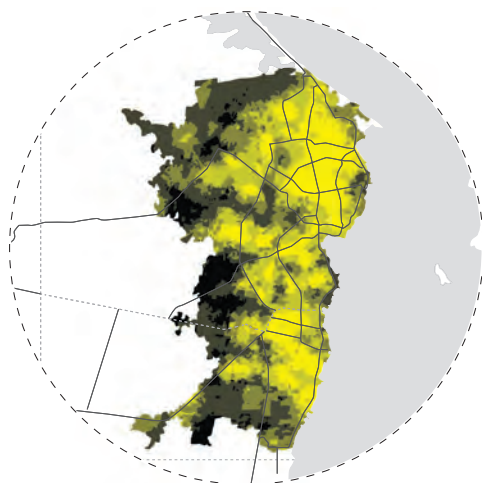
SMALL CITIES
< 300 km²

Synthetic Urban
Quality Indicator
Year 2018

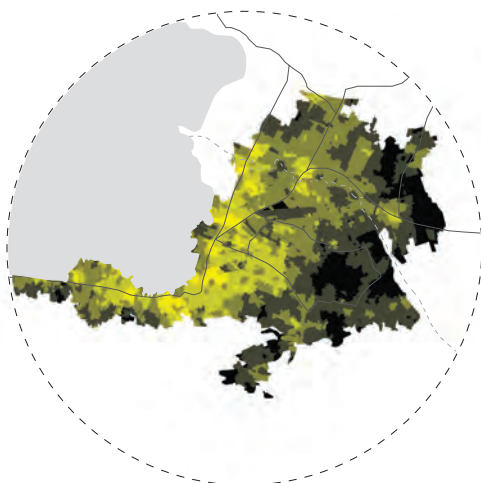
- High
- Medium High
- Medium
- Medium Low
- Low



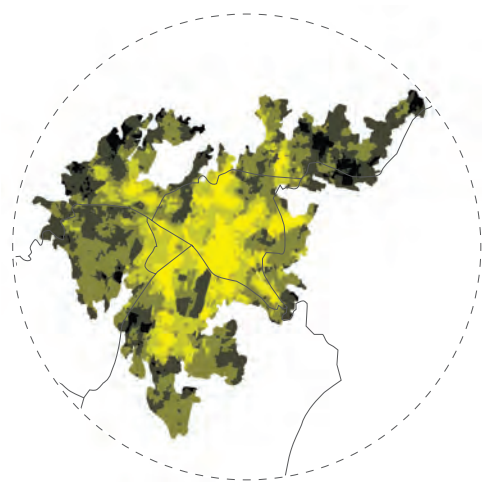
MARACAIBO
Venezuela, 225 km²



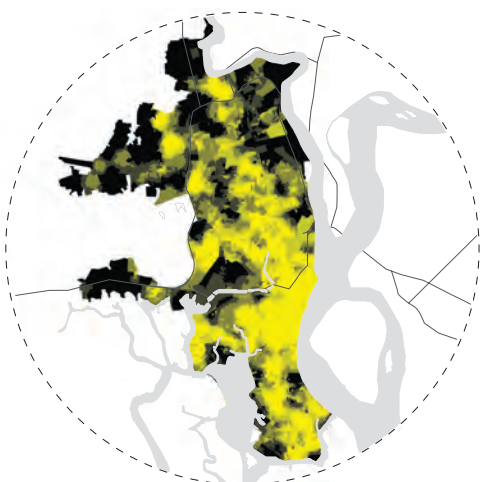
PORT-AU-PRINCE
Haiti, 218 km²



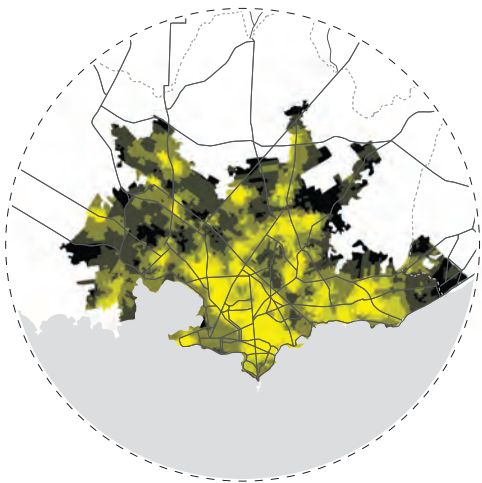
GUATEMALA CITY
Guatemala, 213 km²



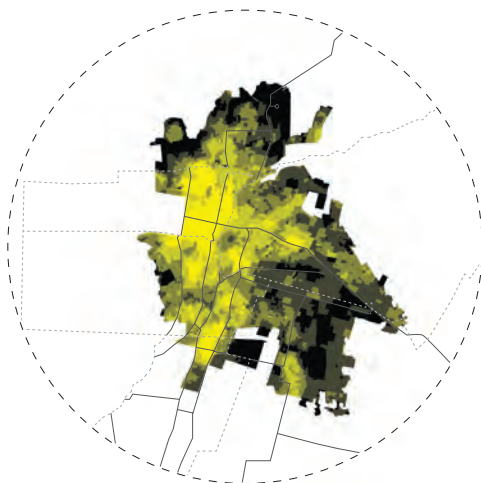
GUAYAQUIL
Ecuador, 210 km²



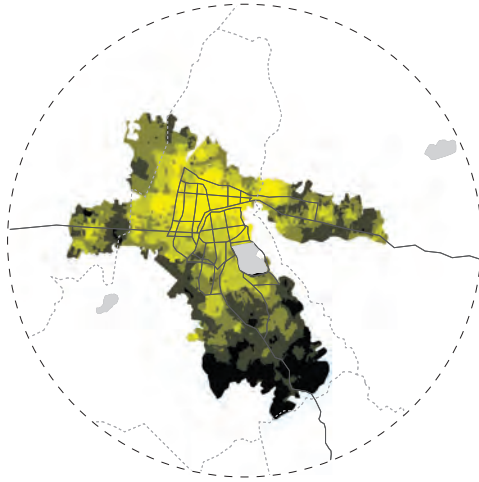
MONTEVIDEO
Uruguay, 201 km²



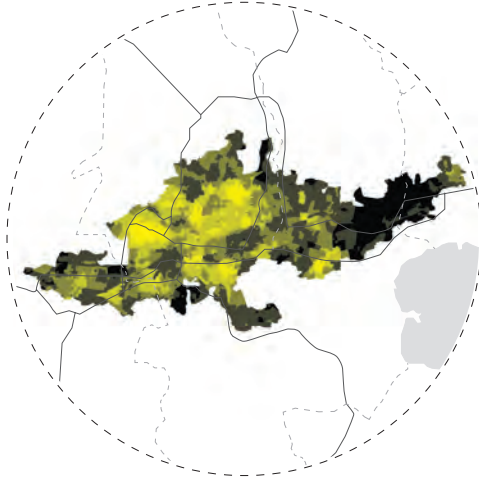
GREATER MENDOZA
Argentina, 195 km²



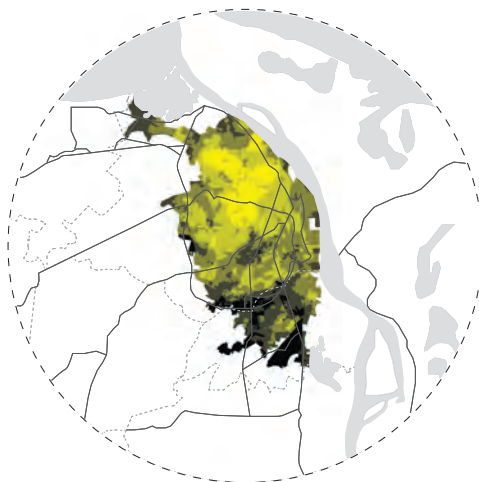
COCHABAMBA
Bolivia, 151 km²



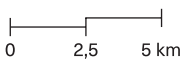
SAN SALVADOR
El Salvador, 149 km²



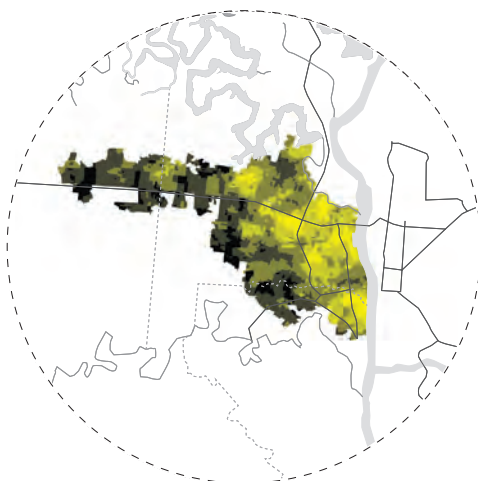
BARRANQUILLA
Colombia, 119 km²



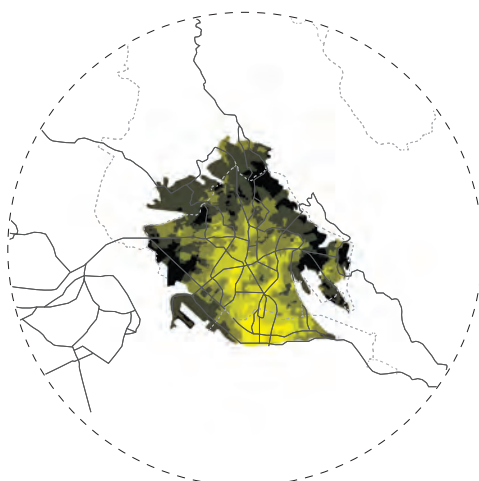
Synthetic Urban
Quality Indicator
Year 2018



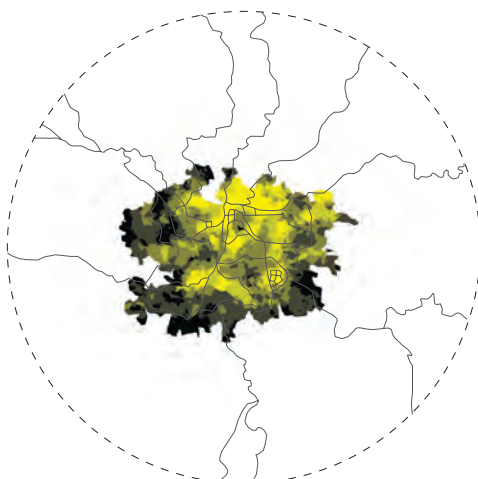
GREATER CIUDAD DEL ESTE
Paraguay, 111 km²



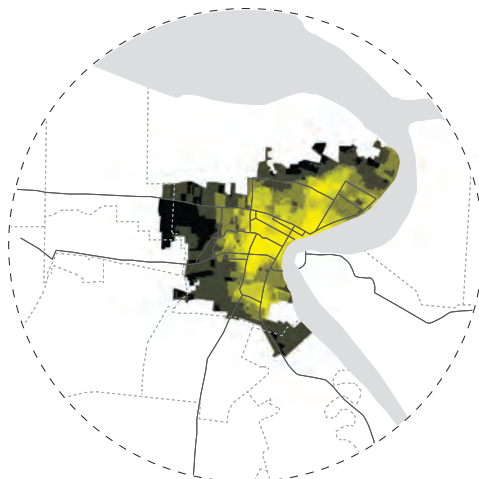
KINGSTON
Jamaica, 107 km²



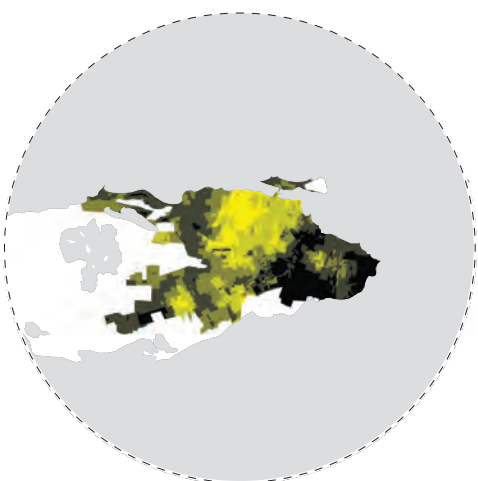
TEGUCIGALPA AND COMAYAGÜELA
Honduras, 99 km²



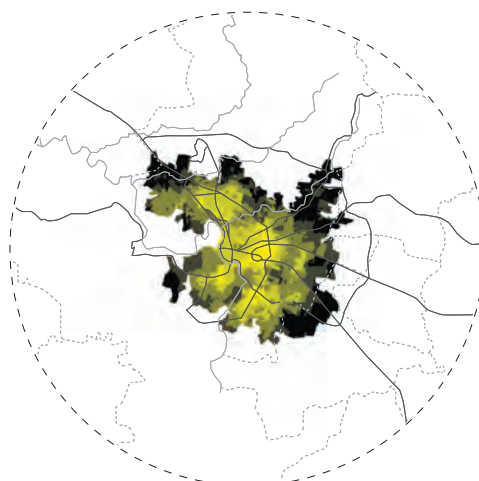
PARAMARIBO
Suriname, 96 km²



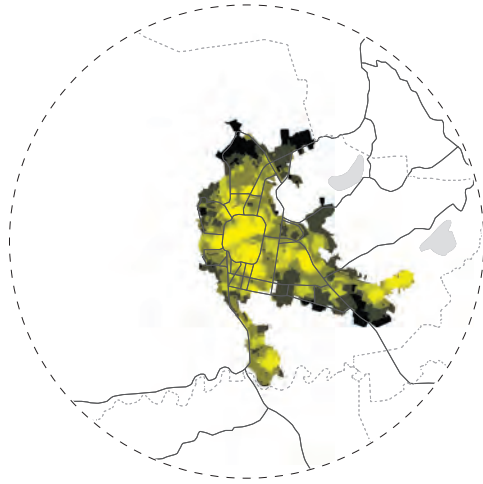
NASSAU
Bahamas, 95 km²



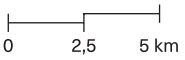
SANTIAGO DE LOS CABALLEROS
Dominican Republic, 89 km²



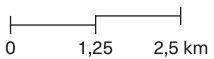
SAN PEDRO SULA
Honduras, 85 km²



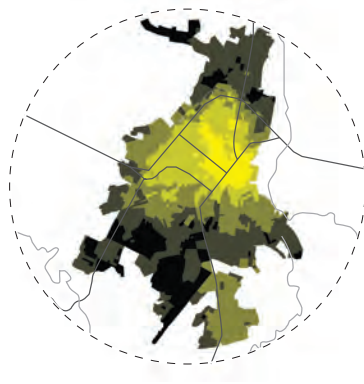
BARCELONA
Venezuela, 84 km²



Synthetic Urban
Quality Indicator
Year 2018



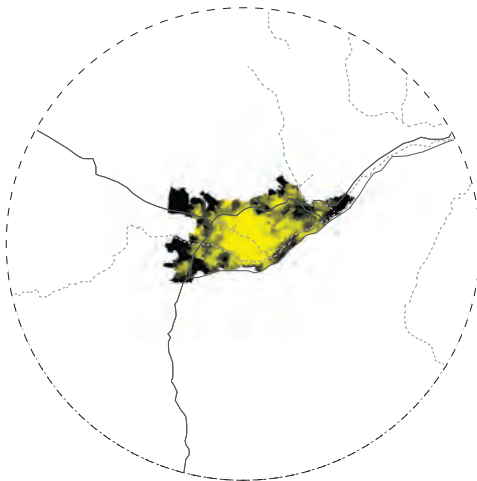
DAVID
Panama, 32 km²



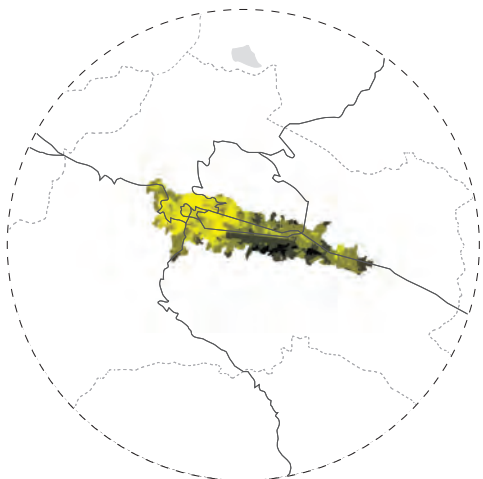
FREEPORT
Bahamas, 54 km²



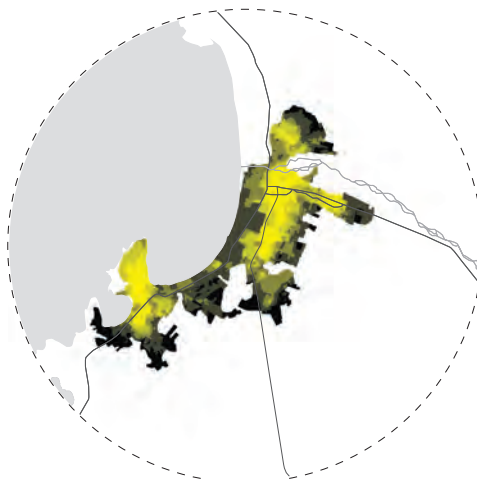
CUENCA
Ecuador, 44 km²



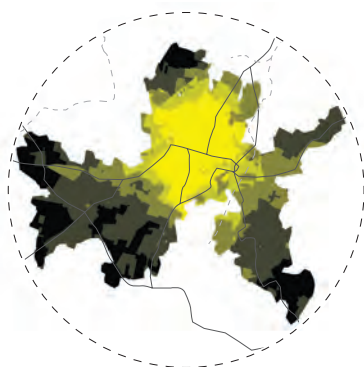
CUSCO
Peru, 33 km²



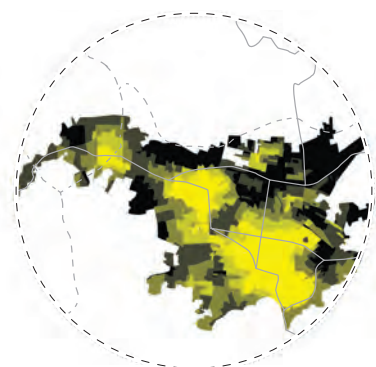
LA SERENA - COQUIMBO
Chile, 74 km²



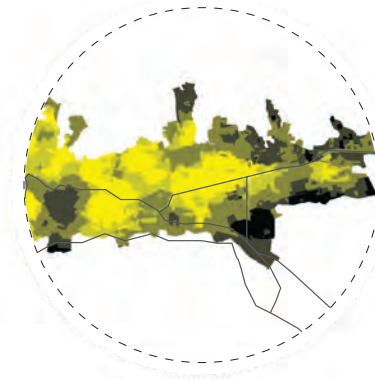
SANTA ANA
El Salvador, 31 km²



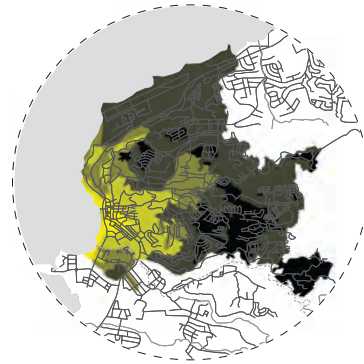
QUETZALTENANGO
Guatemala, 30 km²



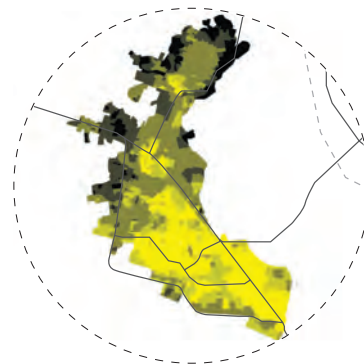
IBAGUE
Colombia, 30 km²



MONTEGO BAY
Jamaica, 28 km²



LAZARO CARDENAS
Mexico, 24 km²

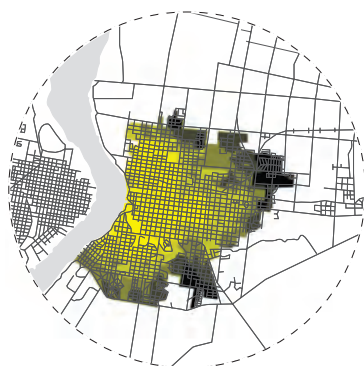


Synthetic Urban
Quality Indicator
Year 2018

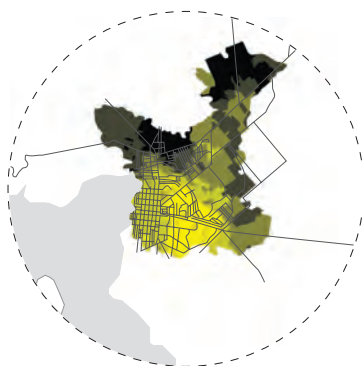
- High
- Medium High
- Medium
- Medium Low
- Low

0 1,25 2,5 km

SALTO
Uruguay, 19 km²



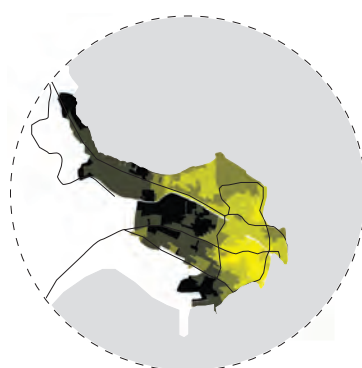
GONAIVES
Haiti, 18 km²



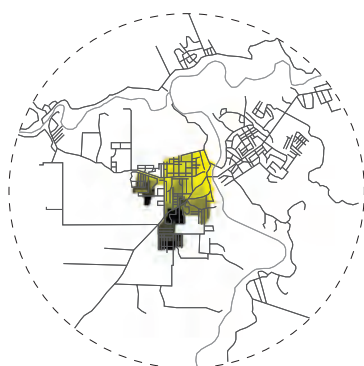
LEON
Nicaragua, 18 km²



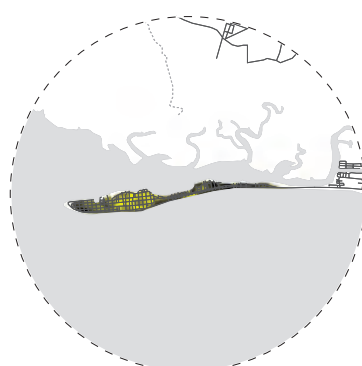
BELIZE CITY
Belize, 14 km²



SAN IGNACIO
Belize, 3 km²



PUNTARENAS
Costa Rica, 2 km²



REFLECTIONS

THE SOCIAL HOUSING BURDEN: The impact of living in the urban periphery¹

NORA LIBERTUN DE DUREN

Senior Specialist, Housing and Urban
Development Sector

Inter-American Development Bank

In most Latin American countries, access to housing is considered a basic individual right enshrined in the national constitution. Such is the case of Mexico's constitution, ratified in 1985, Brazil's constitution of 1988, and Colombia's constitution of 1991, among others. These constitutions present the issue of access to housing in terms similar to the 1948 United Nations Universal Declaration of Human Rights, which states that "Everyone has the right to a standard of living adequate for health and wellbeing of himself [or herself] and his [or her] family, including food, clothing, housing and medical care and necessary social services" (UN 1948).

Recently, this normative principle for housing policy has been recast into a pragmatic argument based on the premise that home ownership promotes economic prosperity (Rolnik 2013). This argument rests on three often interrelated assertions. The first is that home ownership increases wealth because it owning property is supposed to be less onerous than renting it (Retsinas and Belsky 2004) and homeowners can potentially use their property as collateral for other investments (Rappaport 2010). The second assertion is the corollary of the first: home ownership stimulates the whole economy because households can spend the money they save from rent on other goods, while demand for housing units supports the construction industry (Giang and Pheng 2011). The third assertion is that home ownership strengthens households' social capital, which ends up increasing households' economic benefits. That is, if residents are committed to staying in their houses for an extended period, they would acquire meaningful social ties (Vale 2009), which lead to many benefits, including access to economic opportunities (Kawachi et al. 1997).

In line with this pragmatic approach, Brazil, Mexico, and Colombia have recently launched ambitious social housing programs to promote the private production of affordable housing (Monkkonen 2012). These housing programs have been very successful in terms of increasing the quantity of affordable housing units for low income urban households. However, the location of these new housing units has been a source of concern. Most of them are on the periphery of urban areas, where developers get higher profits thanks to economies of scale and more permissive municipal regulations (Libertun de Duren 2009). In this captive market, those who offer affordable housing have the upper hand when choosing where to build the units. That is, housing units are located according to developers' preferences, without necessarily responding to the needs of the beneficiaries.

A mismatch between the needs of the households and



Location of the selected projects in Goiania, Brazil.



Housing complex in the outskirts of Goiania, Brazil.

the location of their house is a serious concern. Housing location correlates with significant externalities for residents, as reflected by its influence on the price of a housing unit and its potential appreciation, and on the resources a household allocates to commuting (Small and Song 1992). Location is not a simple variable: it relates both to the distance to places that society values (Wheaton 1997) as well as to the amenities available in a given neighborhood (Alonso 1964). Social capital is another important channel through which home ownership affects household wealth. In the case of vulnerable households, family ties are essential for providing protection and helping reduce the impact of negative shocks (Granovetter 1982). In low-income families, these ties are often a source of welfare, providing essential services ranging from child-care to credit (Desmond 2012). Acquaintances, on the other hand, are most useful when people need to find a job or improve their current one (Mouw 2003). There is evidence that the more diverse the social network of the poor, the better their chances of having access to better jobs (Woolcock and Narayan 2000).

What is the housing burden associated with peripheral social housing? How does it compare to similar housing that is more centrally-located? The magnitude of this burden is a serious concern inasmuch as these housing units are built solely to improve the material conditions of low-income households *that are already living in the city*. This paper addresses these questions through an exploratory survey of actual households located in social housing complexes in Brazil, Colombia, and Mexico. It compares the responses of households that are centrally-located with those in peripheral areas. The surveys focus on assessing the resources that households allocate to daily commuting, the frequency with which they interact with their preexisting social network, and perceived property values.

METHODOLOGY

We explore the burden of housing location by setting it as our independent variable, which can be either central or peripheral (Table 1). The dependent variables are the resources spent on commuting (time and money); the perceived marginal difference in the market price of the property; and the changes in the frequency of meetings with non-household relatives. Following this framework, we interviewed residents in housing complexes in central and peripheral locations, and then compared the differences between the two groups. Our survey collects information on four main topics: (1) household characteristics, (2) the market

value of residents' property as they perceive it, (3) resources that households allocate to daily commuting, and (4) how housing location changes households' social capital.

We surveyed residents in social housing complexes in three mid-size cities in the three countries most proactive in supporting affordable housing in peri-urban areas: Goiânia in Brazil, Barranquilla in Colombia, and Puebla in Mexico. Each of these cities is a regional hub and home to about 1.5 million residents. While clearly in the process of being expanded and becoming more polycentric, these cities still concentrate most employment in their downtowns, thus making apparent the peripheral condition of the remote housing complexes as well as the impact that location has on accessibility to services and jobs.

The housing complexes selected were located either within five kilometers of the area where most employment is concentrated, or between 10 and 15 kilometers from it. In both locations, the housing complexes were built through a social housing program that targeted low-income households. The complexes also share the same architectural typology and scale: long, rectangular structures, three to four stories, containing between 350 and 500 housing units, without elevators, and with common public spaces. The complexes were built about the same time, which prevented changes in the valuation of the area from affecting the cost of the units. The housing units were also similar, responding all to the minimum quality and size requirements established by the housing programs. In Brazil, that requirement is 39 square meters, in Mexico 40 meters, and in Colombia 45 meters. All units have one bathroom and basic kitchen, but lack internal finishes such as painting and tiles.

Residents surveyed were selected randomly and thus were not clustered in a particular area of the housing complex. All of them pertained to the lowest two income quintiles (as defined by national censuses) and had been living in the housing complex for no less than 18 months. The findings are based on the total number of 150 questionnaires that we collected, half of them from central housing complexes and half from peripheral ones. The survey findings reported here should be interpreted as being within ± 7.5 percent of the actual mean of the overall social housing population, an acceptable range within which to draw conclusions on the impact of the independent variable location.

FINDINGS

Households characteristics. Households in the urban periphery are often poorer than those in the center, with an

average difference in their spending of 45% in Brazil, 42% in Mexico, and 27% in Colombia. Also, peripheral households are more likely to be headed by single women; women head 60% of households in the periphery and 45% in the center; periphery households tend to have more children, except in Goiânia, where program regulations limit the number of children per household to two. In all cases, the portion of seniors is almost

HOUSEHOLD CHARACTERISTICS	CENTER			PERIPHERY		
	Barranquilla (Colombia)	Goiânia (Brazil)	Puebla (Mexico)	Barranquilla (Colombia)	Goiânia (Brazil)	Puebla (Mexico)
MONTHLY SPENDING	USD 711	USD 938	USD 1.033	USD 521	USD 513	USD 602
FEMALE HEAD OF HOUSEHOLD	42%	47%	47%	58%	55%	62%
AVERAGE MEMBERS PER HOUSEHOLD	3.6	4	2.4	2.4	4.2	4.1
AVERAGE MINORS PER HOUSEHOLD	1.3	1.9	0.2	0.5	1.5	0.7
AVERAGE SENIORS PER HOUSEHOLD	0.2	0.1	0.2	0.1	0	0
SHARE OF RESIDENTS WHO MOVED FROM URBAN LOCATION	90%	100%	90%	85%	90%	90%
SHARE OF FIRST-TIME OWNERS	15%	60%	30%	70%	95%	90%

nonexistent. One positive finding was that social housing projects in peripheral areas did provide opportunities toward first-time homeownership. In Goiânia, for example, almost all residents were first-time owners. However, this success was at the expense of distanced relocation as households placed in homes in the periphery used to live in more central locations. These housing units do not provide housing to rural newcomers to the city, but rather removed current urban low-income renters from central neighborhoods.

Market value. Residents estimate that the sale value of peripheral housing was on average, half the value of central housing. This difference reflects the premium on central locations, which also drives up the prices of affordable housing developments. The average differential between the sale price of a unit in a central and a peripheral location amounts to almost 40% of the house value and ranges from USD12,000 to USD17,000. The sizes of peripheral and central homes are similar in all cases except in Goiânia; nevertheless, the price per square meter still favors central units in the three cases at a rate that ranges from 20-50%. The differences in valuation are even more relevant for the

HOUSEHOLD PERCEPTIONS OF THE MARKET VALUE OF THEIR PROPERTY	CENTER			PERIPHERY		
	Barranquilla (Colombia)	Goiânia (Brazil)	Puebla (Mexico)	Barranquilla (Colombia)	Goiânia (Brazil)	Puebla (Mexico)
AVERAGE SALE PRICE PER UNIT	USD 29.750	USD 45.600	USD 38.100	USD 17.700	USD 29.900	USD 21.100
AVERAGE UNIT AREA (SQUARE METERS)	42	44	40	45	38	40
AVERAGE SALE PRICE PER SQUARE METER	USD 710	USD 990	USD 950	USD 330	USD 790	USD 530
AVERAGE MONTHLY RENT PER UNIT	USD 200	USD 330	USD 265	USD 100	USD 170	USD 95
ANNUAL RENT-TO-SALE RATIO	12	12	12	15	15	19
AVERAGE SALE PRICE ANNUAL CHANGE	+3%	+5%	+3%	0	0	-3%

average monthly rent, units in the periphery rent for less than half the price of those in the center and rental markets are not well developed. Last, during a 12-month period, while central units experienced some price appreciation, prices of the peripheral units either stayed the same or declined.

Daily Commuting. On average, peripheral households spent triple the time commuting as compared to central households. Their typical daily journey takes between 50 to 70 minutes each way; by comparison, members of a household living in a central social housing project commute for as little as 15 minutes to get to their jobs. Only a few respondents in peripheral housing worked nearby, mostly in informal jobs such as providing childcare or other local services. Nearly all resident house-

HOUSEHOLDS' AVERAGE DAILY COMMUTING TIMES AND DISTANCES	CENTER			PERIPHERY		
	Barranquilla (Colombia)	Goiânia (Brazil)	Puebla (Mexico)	Barranquilla (Colombia)	Goiânia (Brazil)	Puebla (Mexico)
TRIPS TO WORK (min)	28	48	72	90	140	126
TRIPS TO SHOPS (min)	30	12	38	110	136	64
TRIPS TO SCHOOL (min)	16	36	72	76	24	172
AVERAGE TIME SPENT (min)	25	32	61	92	100	111
AVERAGE DISTANCE (km)	2	3	5	11	18	13
SHARE OF MONTHLY HOUSEHOLD SPENDING	21%	12%	16%	23%	10%	34%
MAIN TRANSPORTATION METHOD	Bus	Bus	Bus	Bus	Bus	Bus



Location of selected projects in Puebla, Mexico.

holds in both peripheral and central social housing use buses frequently. The cost of these trips for different residents presents a complex picture. Households on the peripheries of Barranquilla and Goiânia, where buses rely on a flat fee system, spend the same on transportation as centrally-located households. Conversely, in Puebla, where the distance traveled determines the bus fare, peripheral households spend twice as much on transportation as central ones.

Social Capital. Few households in the periphery maintained frequent contact with family and relatives. About three-quarters of centrally-located households visit relatives more than once a month, while only about a third of peripherally-located households do so. Residents pointed to increased distances and inadequate public transport as the reasons why they see relatives less after moving to the periphery. We did not monetize the impact of these diminished interactions with family, or the other benefits that these social ties might have provided in terms of, for example, emotional support or the sharing of pooled resources. Residents also expressed their concern about being concentrated in areas that are, by design, homogeneously low-income; the loss of social interaction is even harder to monetize; poor and segregated neighborhoods do not typically create opportunities for their residents.

FREQUENCY OF HOUSEHOLDS' SOCIAL INTERACTIONS	CENTER			PERIPHERY		
	Barranquilla (Colombia)	Goiânia (Brazil)	Puebla (Mexico)	Barranquilla (Colombia)	Goiânia (Brazil)	Puebla (Mexico)
SHARE OF RESIDENTS WHO MEET WITH FAMILY ONCE A MONTH OR LESS	25%	30%	40%	65%	60%	80%
SHARE OF RESIDENTS WHO REDUCED THE NUMBER OF FAMILY VISITS SINCE MOVING	10%	25%	25%	35%	45%	35%
AVERAGE TRAVEL TIME TO CLOSEST RELATIVE (min)	12	15	30	45	60	75

CONCLUSIONS AND PROPOSALS

Where housing is built has a significant impact on the burdens and benefits associated with it. Housing location has direct effects on the market value of the housing unit, the commuting expenses of the household, and the social network in which the household participates. Given these findings, policy approaches

to social housing should focus on two goals: first, alleviating the negative impact that location has on low-income households, and second, promoting social housing in locations that have good access to jobs and are not socially segregated.

Any measure that contributes to ease the burden of commuting would benefit these households, including providing affordable and accessible public transportation between housing complexes and city centers. Public transportation with a single fare system independent of distance would also help: it is important to reduce the isolation of residents and provide households with more resourceful social networks. Some other specific actions to consider include increasing the value of housing units by making their location more valuable and facilitating the location of jobs close to housing complexes, both via zoning codes that allow for mixed-use developments and incentives for employers. Likewise, investing in the quality of the urban design and services of these neighborhoods could increase the value of the homes there.

Promoting housing complexes with access to jobs and social networks requires understanding housing as a bundle of services, rather than as a product for consumption. As with all services, quality determines value. Establishing clear and enforceable requirements in terms of accessibility and location is more relevant for the welfare of households than ownership, *per se*. In addition, the assessment of the burden of ownership needs to include transportation costs as well as some measure of social capital.

Another important takeaway from this study is the need to promote effective metropolitan planning. When municipalities fail to coordinate in planning the uses of their land, the wealth imbalances in society tend to be replicated, exacerbated, and more entrenched in the city's spatial outlays. Land use that is undervalued ends up concentrated in areas that lack amenities and are disconnected from the whole, undermining their prospects for development and the quality of the lives of those who reside there. The impact of imbalanced urban development is also felt beyond those boundaries in the form of more congested roads, more pollution, less productivity, and unsustainable fiscal imbalances. There is no question that spatially segregated societies do not fare well in terms of individual or social development.

1 — This article is based on the previous publication by the IDB: Libertun de Duren, Nora. "La carga de la vivienda de interés social: Comparación entre hogares de la periferia y del centro en ciudades de Brasil, Colombia y México," 2017.

THE URBANIZATION- DEVELOPMENT NEXUS: Rethinking the Role of Housing in Sustainable Urbanism

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Urban fragmentation in the outskirts of Tijuana, Mexico. Ph. Francisco Lara Garcia.
Source: Diane E. Davis research team.

INTRODUCTION

Economists, sociologists, and political scientists have long theorized a positive relationship between national economic development and the growth of cities, both historically and in the contemporary era. But a view to Mexico and many other emerging economies suggests that we need to rethink these assumptions. The country now faces a wide array of problems and challenges that are associated with the rapid growth of cities, particularly in those urban areas where city boundaries are being extended through the mass production of housing. Housing-led sprawl has not only produced growing demands for public investment in urban services that are straining local and national budgets, it also contributed to accelerating carbon emissions and undermined environmental sustainability. In some parts of Mexico, sprawl is also associated with an increase in abandoned housing, which itself owes partly to the tendency to locate housing in areas overly distant from family, jobs, and the basic goods of life.

One reason Mexico faces these problems is because many housing promoters, in both the public and private sector, have been working under the assumption that the mass production of housing generates jobs, re-invigorates the construction

industry, strengthens banks, provides families with their basic shelter needs, and thus strengthens the country's overall economic development potential. But we must wonder if the social, spatial, and economic costs associated with these building strategies may undermine overall economic gains. This essay critically examines the validity of longstanding assumptions about the positive relationship between urbanization and economic development, and considers housing's role in mediating this relationship.

HISTORICAL ANTECEDENTS: CITIES AND NATIONAL ECONOMIC DEVELOPMENT IN THE UNITED STATES AND EUROPE

Much of the scholarship that assumes a positive relationship between urbanization and economic development traces its intellectual origins to writings by nineteenth and early twentieth-century scholars who sought to account for the development of capitalism, the nation-state, and social modernization in early modern Europe. They posited a direct and positive role for cities in these fundamental transformations. In Europe and the United States, cities were understood to have emerged from and fueled processes of commercialization and capital accumulation, by virtue of their role as exchange nodes in local, national, and international trade. Particularly when contrasted to rural areas, cities were also seen as the sites in which the social relations and values associated with modernity materialized, ranging from a commitment to savings and a taste for commercial goods to competitive and achievement-oriented world views. These views were seen as laying the foundation for markets, trade, and capital accumulation within the city itself, primarily by producing citizens who were open to consumption, whose cultural traditions valued education, and who relied on services for everyday life. Most significantly, such dynamics helped generate a middle class, which was seen as central to the development of a strong economy.

These well-understood propositions about the strong relationship between urbanization and economic growth began to be called into question when scholars turned their attention to emerging economies: the growth of cities in Latin America and elsewhere in the late industrializing world did not always foster these same results. Much of this is owed to the impacts of colonialism, and the stark social and demographic inequalities it produced not just between the countryside and the city, but within the city itself. Despite the fact that Latin American countries tried to industrialize and generate their own

independent economies, their cities started growing almost too rapidly. By the 1960s and 1970s it soon became clear that even with high urbanization rates, national economic development gains remained minimal, not just in comparison to the modal patterns established in Europe and the United States, but also as measured in per capita income, GNP, and practically all other standard macroeconomic indicators. These conditions made some scholars argue that urbanization—in this case defined as the unparalleled demographic growth of cities—was more likely to *hinder* than facilitate economic development in Latin America. Some of this was assumed to owe to the fact that, even with large cities, the middle classes as a demographic group in Latin America were not growing rapidly, further limiting the economic growth potential assumed to be fueled by urbanization.

CAN CITIES BE TOO BIG (AND WHO SUFFERS AS A RESULT)?

Among those who tried to understand this dilemma, most understood the main problem to be “*over-urbanization*,” which has been defined as when a city’s population grows faster than its capacity to service its residents. Of course, this situation was



Abandoned INFONAVIT housing in Mérida, Mexico.
Ph. Diane E. Davis research team.

a reflection of the fiscal weakness of cities and countries who were trying to both industrialize and attend to the service needs of its citizens. But as a dilemma, it was also considered to be as much a social problem as a fiscal one. As both the state and the private sector failed to invest sufficiently in services and infrastructure for the population, many Latin American cities became identified with overcrowding, poor infrastructure, and large numbers of residents without shelter and basic services. In Latin America, capital cities and other major commercial and industrial centers, of which Mexico City is exemplary, hosted many of these problems, primarily because they were magnets for both rural migrants and industrialists who were trying to build their national economies.

The problems of over-urbanization were particularly daunting in those countries where strong states directed national infrastructure investments in one or two principal cities for the purposes of jump-starting industrialization, investment decisions that disadvantaged agriculture and further pushed peasants into cities. Owing to these policies, cities like Mexico City, Buenos Aires, Rio de Janeiro, São Paulo, and Lima grew at unprecedented rates over the 1960s and 1970s, leading to national urbanization rates of close to 50 percent in some cases, with certain mega-cities doubling or tripling in population size within the course of several decades. And again, even with a large size, these cities usually hosted a very small middle class, at least as defined in terms of education, income, and stable salaries.

With such astounding population growth rates and limited resources for infrastructure, many problems emerged. Among the most significant were insufficient employment opportunities, housing scarcities, unequal social policy provision, and informal land occupation, including squatting as well as socioeconomic and spatial marginality. Many of these social and political problems intensified during the late 1980s, when macroeconomic changes brought new global pressures on national industries to compete. Many industrial firms shifted from import-substitution to export-led manufacturing, although the transition was costly and took years to bear fruit, leading to debt crisis, factory closings, and downward pressures on foreign exchange, all of which negatively brought unemployment, inflation, and higher costs of imported consumer goods, it also affected urban livelihoods and the overall ambience in cities.

In terms of class structures, there was a very large group of un- and under-employed citizens in petty trading and informality, a declining industrial working class with reduced buying power, a large proportion of government employees (who may have achieved some middle class status, but who tended to be



New urban development in the outskirts of Tijuana, Mexico.
Ph. Mayra Melgar López.



Potentially active housing in Mexico.
Ph. Adriana Chávez.

organized in unions and thus shared elective affinity with industrial workers more than other middle classes, who were still relatively small), and a small economic elite, many of whom were linked to prior national support for industrial development.

Even so, there was an upside, if you can call it that, particularly in terms of the political consequences of these urban and macro-economic troubles. For one, reduced employment for workers and terrible living conditions called into question the state's legitimacy and fed an explosion of urban social movements calling for democracy, accountability, and greater governmental responsiveness to citizen claims for political inclusion, equity, and better urban servicing. And as these activities hastened the fall of authoritarian regimes, the governments that took their place sought alternative development models and practices, both urban and national.

Specifically, most embraced a more neoliberal approach to economy and governance in the 1990s, a macro-economic policy shift which brought a commitment to strengthening urban markets and to decentralized democracy at the local level. These changes not only transferred the politics of urban policymaking to the locality, they also brought new opportunities for local authorities to marshal investment into develo-

pment of urban infrastructure for services and infrastructure, rather than just employment or industry, which had been a key concern of national states.

IMPACTS OF NEOLIBERALISM ON THE RELATIONS BETWEEN URBANIZATION AND DEVELOPMENT

With the turn to neoliberalism, governments began to think about building cities in new ways that could strengthen the national economy through investments in the built environment and services rather than industry. Such priorities were also predicated on the assumption that more open market policies would help create a larger middle class, thus further fueling economic growth. And in fact, statistics show that in the last decade, Latin America has registered an increase in the number of middle class households and a decrease in the number of poor.

These shifts had direct implications for the growth and nature of cities. With a larger cadre of middle classes, there was greater demand for new services and investments that accommodated new commodity and leisure demands—not only in housing but also in commerce and entertainment. This was reflected in the development of new suburbs, large commercial plazas, and revitalized shopping centers in many Latin American cities over the last two decades. These changes were not just the result of new consumer preferences, however. They were driven as much by supply as by demand driven. This was because economic globalization meant that finance and services had become one of the leading sectors of the economy—and this happened globally, not just in Latin America.

Private sector investors were more likely to direct their capital into urban services, finance, and real estate activities, many targeted toward city branding for the purposes of showing their developmental potential. With this in mind, major cities like Mexico City, Rio de Janeiro, São Paulo, and Buenos Aires began to embrace their role as command and control nodes in a globalizing economy, and started build a more upscale urban environment to signify their new “global city status.”

Today, Latin America’s largest metropolises are modern and economically dynamic cities with architecturally sophisticated high rises and gated communities that could rival those seen in any major city of North America or Europe. In addition to iconic architecture, most Latin American cities are hosting a plethora of new suburban housing developments geared toward the growing middle class, with government authorities reaping political benefits when citizens who dream of owning their own

home find their wishes coming true. On the surface, then, all these changes in the built environment of Latin American cities seem to suggest that modernity, or developmental progress, has finally arrived.

NEWSOCIAL, SPATIAL, AND ENERGY CHALLENGES IN THE CONTEXT OF URBANIZATION-LED ECONOMIC GROWTH

But these transformations have not been cost-free, either to citizens, the public sector, or even the business investors who are driving these changes, let alone for the city itself. They have put outward pressure on the built environment, and generated new urban land use patterns that eat into agricultural lands on urban peripheries in ways that turn the natural environment into concrete and that further separate the rich and the poor. Indeed, starting in the late 1990s, and intensifying in the first decades of 2000, Latin American cities began to host degrees of urban sprawl unimaginable in the past, with their extension in space owing not merely to population growth and the decline of agriculture but also to the growing neoliberal embrace of formal property rights and newfound public-private sector support for real estate development as a main driver of the economy. In short, we might say that in contemporary Latin America we continue to see problems of “over-urbanization,” but it is more likely to be defined in spatial terms that reflect the physical expansion of cities (rather than mere population growth) beyond its environmental sustainability capacities.

While population growth in Latin America has stabilized to an average annual rate of 2.1%, urban areas keep expanding at 2-3 times that rate, much of which is attributable to the growth of the urban middle classes, who are known to consume more land than the poor, much of it in single family homes on the periphery of the city, and whose aggregate household energy consumption is also much higher than that of the poor. Sprawl and the proliferation of new suburban developments also has increased traffic congestion and commuting time, which in turn puts pressure on authorities to build more transport infrastructure. However, given the fiscal constraints on state coffers, these investments have tended to be in highways rather than in public transportation, thus encouraging more car ownership and the vicious cycle of more congestion and more pollution.

Yet sprawl has not just produced a larger urban footprint. In combination with more expendable income of a growing middle class, it has affected the consumption patterns of urban popula-

tions by increasing aggregate demand for water, electricity, automobiles, and other service items that reinforce environmental degradation. All this is happening as recent geo-thermal shifts associated with climate change have intensified environmental concerns, not just for poor residents of informal settlements most likely to locate in environmentally vulnerable areas, but for all urban residents.

All these trends suggest something of a paradox: just as countries like Mexico are moving into a new economic era in which consumption patterns are becoming more similar to those of the United States and Europe, these transformations are occurring at a time when questions of environmental degradation and energy futures are on the agenda, and when some are beginning to argue that such patterns are unsustainable. To be sure, Latin American countries like Mexico and Brazil do not have the high rates of carbon emissions evident in the United States and other advanced economies, but Mexico's rates, particularly in its urban centers, rival those of cities like New York, without having the same per capita income. This means that something else is driving these aggregate statistics, and I want to suggest that the way we are building the Latin American city is one of those factors. Simply stated, there is not enough attention to densification and the types of housing typologies and infrastructural investments that will keep cities compact and more energy efficient.

So why is this happening, despite the fact that experts agree that densification is a high priority and a key to future sustainability? One reason for this is that there are strong partisan forces behind the embrace of outward expansion, and they are not merely citizens. Some of these patterns are being driven by political and economic elites who benefit from these urban built environmental patterns. Indeed, although neo-liberalization of the economy (which also entailed the elimination of the *ejido*, which was particularly significant in Mexico in terms of shifting land uses) may have created new opportunities for urban investments, particularly in housing and commercial building projects, it also has transferred responsibility for housing permits and the provision of urban services to a myriad of smaller municipalities, which are not well-equipped to provide regulatory oversight and are still fiscally depending on revenue transfers from higher levels of government.

As a consequence, many local authorities accommodate housing developers' desires to build housing in exchange for tax revenues or the provision of rudimentary infrastructure. These bargains help buttress municipal budgets, but they also increase sprawl and the ever-expanding urban footprint. In Mexico, this problem has been exacerbated by the commitment to providing

more housing to workers eligible for INFONAVIT credit. In terms of social policy, one cannot criticize a government program that promises to make real the dream of home ownership for its more humble citizens, but because federal authorities offer incentives to the private sector to take on responsibility for low-income housing, rather than building housing itself (as in the past), private developers understandably chose to locate their houses on cheaper lands far from the city.

To be sure, Mexico is now trying to find solutions to those problems, and looking for new ways to generate denser cities and encourage verticality while still letting the private sector take a lead in housing production. But it is very hard to balance the aims of sustainability with private land market logics. There are not that many available lots in well-serviced areas of the city, while high land costs in central areas make developers unwilling to try to build affordable housing in denser locations. This is precisely why mass housing producers usually select peripheral locations. However, these areas do not have good transport connectivity or sufficient municipal services. Neither developers nor municipal authorities are eager to pay for the infrastructure that would make these areas livable, let alone sustainable, and this is particularly true in the case of public transportation infrastructure.

All this means that citizens who end up in these developments may at first think they are going to benefit because they finally have the possibility of purchasing their own home. However, instead, many continue to suffer—as does the rest of the urban citizenry—because these areas tend up being both isolated and under-serviced. Such conditions have led to high rates of abandonment, which often invites squatting and violent activities, further pushing people away from the developments and leading to a large mortgage crisis that becomes a fetter on the economy. Here presents a second paradox: an additional reason the government was so willing to embrace an expanded social housing program was that it held the potential to provide jobs in the construction industry and helped grease the wheels of the economy. But the social problems and mortgage failures that result from housing's location in the far periphery of the city have instead become a drain on the economy.

FROM HOUSING TO INFRASTRUCTURE TO URBAN PLANNING: CONNECTING THE DOTS

The problems produced by mass production of housing are not confined to the economics of the housing sector. They also relate directly to transportation and socio-spatial exclusion.



Potentially active housing in Mexico.
Ph. Juan Diego Izquierdo.

There has been little inter-institutional coordination among the different bureaucracies or government agencies to insure that new housing developments are placed in areas where services and infrastructure are already available, particularly when it comes to transportation services and schools, which, unlike water, electricity, and roads, remain beyond the purview of housing developers who elect to build in virgin areas of the city. Yet without transport access, citizens often find that the daily costs of commuting outweigh the gains of home ownership, at times leading to housing abandonment as a worst-case scenario. Even for those who keep their new homes despite the long distances, the quality of social life is poor because the developments remain largely abandoned during the daytime, some with the appearance of ghost-towns. In such conditions, social disorder and urban violence is common, thus explaining why these problems have been greatest in the most socially and economically marginal urban settlements, where exposure to environmental ills and chronic poverty have combined with informality and neglect to produce housing developments where lawlessness reigns. It may be worth noting that where a density of social life exists—as has been seen recently in downtown areas of Mexico City, after its revitalization and repurposing of formerly abandoned warehouses and other properties—there tends to be much less violence and crime.

These and other social problems that characterize the periphery of Mexico's rapidly growing cities stand in contrast to the wide array of obvious gains seen in other sectors of the economy in recent years. The transition to neoliberalism and free-market economies generate new opportunities for cities and private investors to keep their economies growing through the development of finance, services, and real estate, even in the face of declining industrial firm competitiveness. Sadly, in the process, most of these city-builders have failed to pay attention to the social and spatial problems associated with sprawl, they have ignored the growing risks associated with environmental vulnerability and violence, and they have failed to make headway in transforming urban infrastructure so as to make the city work more efficiently and sustainably.

The bottom line is that there are multiple negative externalities associated with the dramatic transformations in land-use generated by the mass production of housing in the urban periphery. From inadequate infrastructure to environmental degradation to unchecked sprawl, rapidly urbanizing cities often host a plethora of problems that persist despite—and sometimes because of—the growing income share accruing to middle classes and their newfound urban housing, as well as the

nation's transition from a purely industrial economy to a financial and commercial economy.

At the outset of this essay we noted that over-urbanization has prevented a more vibrant economic prosperity in the past. *We must be mindful of these legacies when we look towards the future.* Current urbanization patterns will be socially, spatially, and economically unsustainable if they saddle Latin American policy makers, investors, and citizens with a new round of insurmountable problems. If we fail to build cities that distribute the gains associated with a renewed focus on the relationship between urban economic growth and urban redevelopment that the current moment clearly offers, future generations will suffer. The challenge, then, is to use housing to produce patterns of urbanization that can prevent or mediate current risks—whether related to environment, violence, persistent poverty, or other vulnerabilities. The failure to do so will put Latin American cities on the path towards unsustainability, energy-related and otherwise.

Involving urban planners in decisions about the production and location of housing can go a long way in helping all levels of government formulate mid and long-term objectives to guide urban growth more efficiently and in a sustainable manner. A focus on producing housing that takes into account existent infrastructure and services investments (e.g. phasing, where and when investments will take place) could begin to help alleviate the severe financial strain on municipalities caused by rapid and disorderly urbanization. In the absence of such measures, we will see continue to see urbanization patterns that consume significant amounts of land per capita, and which will generate larger infrastructure installation and maintenance costs to extend water, sewage, and electricity networks over long distances in order to reach peripheral, landless, dense developments. To provide such necessities as waste collection and policing in new areas will require greater public sector expenditures, many of which are beyond the reach local authorities entrusted with such obligations.

RETHINKING HOUSING: A NEW THOUGHT PARADIGM FOR FUTURE URBAN PLANNING ACTION

So what is to be done? For one, involving urban planners in the monitoring and regulation of housing production will make it more likely that housing decisions are connected to existent infrastructure in ways that help create more efficient and sustainable urbanism. Planned, compact and dense housing will reinforce efficient spatial arrangements that, in turn, can reduce

initial capital investments in infrastructure as well as operating and maintenance costs. Such decisions will go a long way in laying the economic groundwork for wise housing investments, which can be defined as investments that create *urban value*, not merely housing value. Urban value is generated when the economic, social, and lifestyle gains associated with investment in housing accrue to the larger neighborhood and even city as a whole, and not merely to the individual buyer or seller of the house. Producing such value not only requires trained professionals with the willingness and capacity to assess the context and location of housing construction, not merely its construction and mortgage costs. It also requires an entirely *new way of thinking*: not just about urban planning and the relationship between housing and infrastructure, but also about the meaning and role of housing itself, particularly among housing professionals in the public and private sector.

With respect to the first issue, professionals overseeing and managing the housing industry must be willing to undertake the necessary steps to reverse the ordering of investment priorities. Rather than giving the green light to more housing and then struggling to insure that transportation and social infrastructure to create livability follows, government agencies at all levels must prioritize infrastructural investments in ways that connect housing production and supply to create socially vibrant and well-connected environments. Of course, this is easier said than done. This “backwards” temporal logic has a long history in countries like Mexico the rest of Latin America, owing to the growth of informal settlements that reinforced a supply-side logic in which the authorities attempted to remediate the infrastructure gaps generated by the proliferation of self-built housing, but after-the-fact. Surprisingly, however, the same logic prevails even when it comes to formal housing. Some of this owes to the fragmented organizational logic of governance in the urban sector. Federal, state, and local agencies are far too often institutionally divorced from each other, particularly with respect to the production, monitoring, and financing of housing. The sector is riddled with competing and overlapping agencies with mandates to focus on *either* housing or urban infrastructure and land use, but rarely on both domains simultaneously and even more rarely across all three scales of governance. Changing these fragmented relationships is a priority if infrastructural development is going to guide rather than respond to housing production, and cities are going to be built more sustainably.

Yet because institutional reforms of this magnitude are long-term goals that will be politically controversial and can take decades, urban planners must look elsewhere for new thinking

that can make a difference in the shorter-term. In that sense, those who care about cities and national economic prosperity must work together to make progress on the second objective noted above, which is to change the way urban planners, developers, and construction industry professionals think about housing. Most have been trained to consider housing as an *object*—shelter that protects against the elements; a dwelling typology that minimizes construction costs and maximizes user friendliness; or a built form whose materiality embodies a confluence of resource availabilities, design ingenuity, consumer desires, and market dynamics. Yet, some of the most inspired housing experiments both past and present have been produced by those who conceptualize the house as a *subject*: conceived as a material construct capable of generating new social arrangements, producing alternative spatial geographies, and transforming city landscapes in ways that fashion a more vibrant urbanism and thus the creation of new possibilities for *urban value creation*.

One way to recognize the subjective dimensions of housing is to conceptualize the built form of a house in terms of its agency, or better said, to see housing in light of its social and economic value *activation* potential. For good or bad, any given housing typology will structure the daily lives of its inhabitants, while also establishing the socio-spatial context in which they are isolated or integrated with other city dwellers. By assembling new social configurations through various building forms and their particular location, houses do much more than offer shelter. They also affect the social relations that occur in everyday exchanges within a household, a neighborhood, or a city. By thinking beyond the house as mere object, and by identifying its relationship to—and impacts—on the exterior worlds around it, urban planners, real estate developers, and home builders will find new ways to innovate housing form and function, and not merely vice-versa.

Acknowledging that the boundaries separating activities within and outside the house are permeable and at times artificially constructed will go a long way towards liberating a wide array of professionals from any proclivity to treat housing as just an object. Armed with the realization that housing serves as a foundational structuring element in the production of better urbanism and more vibrant social and economic environment, the task at hand is to focus more explicitly on housing's *activation* potential, and to ask what new types of socio-spatial, economic, or even political relationships a given housing investment will produce, at what scale, and with what impacts on the future of cities.

RESILIENT HOUSING AND THE NEW BLUE URBAN AGENDA

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More than 198 million people and approximately 58 million homes have been affected by natural and man-made disasters in Latin America and the Caribbean (LAC) in the last twenty years,¹ with more than 35% affected by water-related disasters, flooding and storms. The region is highly vulnerable to natural disasters due to the high rate of urbanization in vulnerable areas. It is important to consider that the residents of informal settlements—nearly one out of four people in the region (UN-Habitat)—are the most vulnerable group and are strongly affected by such disasters.

DISASTERS* IN LATIN AMERICA AND THE CARIBBEAN

Period	Housing Units**	Persons affected	Deaths	Cost in damages (USD)
1990 - 1994	1,389,094	5,278,557	4,826	95,703,085
1995 - 1999	2,896,031	11,004,918	37,083	82,055,926
2000 - 2004	5,573,260	32,518,692	10,183	102,730,572
2005 - 2009	8,557,551	20,007,217	7,413	253,929,761
2010 - 2014	5,265,057	108,784,356	229,950	226,437,344
2015 - 2017	28,627,462	21,178,387	3,537	342,226,510
TOTAL	52,308,454	198,772,127	292,992	1,103,083,198

STORM AND FLOODING DISASTERS IN LATIN AMERICA AND THE CARIBBEAN

Period	Housing Units**	Persons affected	Deaths	Cost in damages (USD)
1990 - 1994	1,102,899	4,191,017	2,45	3,865,985
1995 - 1999	1,451,480	5,515,624	32,172	15,896,550
2000 - 2004	2,808,619	10,672,753	7,963	12,812,527
2005 - 2009	4,264,082	16,203,512	3,038	12,265,021
2010 - 2014	3,083,378	11,716,835	3,379	9,165,844
2015 - 2017	5,383,059	20,455,623	1,526	105,378,510
TOTAL	18,093,517	68,755,364	50,233	159,384,437

* According to EM-DAT, the general classification of disaster includes earthquake, flood, storm, volcanic activity, landslide, and extreme temperature.

** Calculation based on those affected, using 3.8 persons per household (according to ALC CEPAL 2018).

Source: EM-DAT, The Emergency Events Database—Université Catholique de Louvain (JCL) - CRED, D. Guha-Sapir.

Retrieved from www.emdat.be el 19/07/2018 (Brussels, Belgium).

Given that rising sea levels and warmer ocean water can exacerbate flooding, erosion and other coastal hazards,² it is important to consider adaptation strategies for LAC coastal cities. Approximately 35 million people live in cities³ that are already suffering from the rise in recurrent and severe regional phenomena, such as El Niño and hurricanes (which particularly affect the Caribbean and North Atlantic coastal zones).⁴ In this region, the Small Island Developing States (SIDS)⁵ have high levels of coastal erosion and populations that live at low coastal elevations, making them highly vulnerable. For example, 82.8%



Housing subsidized by the National Housing Commission (CONAVI).
Ph. Alfonso Serrano (Hábita).

of the population of the islands of The Bahamas live in low-lying coastal zones. In the case of Brazil, a lower percentage of the population are similarly vulnerable (6.8%) but the numbers are significant: 13.5 million residents live in low-lying coastal zones.⁶

Given these global challenges, how can housing help increase the resilience of coastal cities, preventing impacts on human systems and ecosystems, and avoiding major economic losses? This article addresses this question from three perspectives: 1) opting for resilient coastal development; 2) implementing social housing projects with structures raised on stilts; and 3) incorporating resilience into urban plans and housing policies.

OPTING FOR RESILIENT COASTAL DEVELOPMENT

In recent decades, the financing of projects associated with climate change adaptation in coastal cities has been a priority for local governments, national agencies and international organizations. These efforts can be attributed to the shift

towards “green urban planning,” which has been supported by various city associations and international agreements like the “Our Common Future” report by the Brundtland Commission (1987) and the New Urban Agenda adopted at Habitat III (2016). The focus has been on economic development and its role in protecting economies, given that erosion and flooding can damage infrastructure (electricity, water supply, transportation, etc.) and reduce port trade.⁷ There is a growing literature on ocean economics that recognizes the increase in jobs in sectors such as construction, telecommunications and mixed cropping production.⁸

The planning and implementation of resilient cities is a challenge that involves minimizing the risk of disaster by improving services and ensuring adequate infrastructure for homes and neighborhoods. Additionally, it requires local capacity building and institutions for urban and risk development, and thus represents an opportunity for sustainable development.⁹

In the case of coastal areas, the consolidation of housing projects in areas prone to flooding represents a challenge for urban planning and necessitates risk evaluations to determine the applicability of adaptation projects. In terms of actions, there are three main strategies for the adaptation of critical and residential infrastructure: protection, managed retreat and accommodation.¹⁰

Protection corresponds to engineering actions that reduce impacts, which are classified as “soft” or “hard” depending on their magnitude. For example, the implementation of floodable public spaces, green areas, drainage and community-level solutions would be considered soft actions, while the construction of containment walls or breakwaters would be hard. Managed retreat means withdrawing from risk areas and minimizing human impacts through planning measures such as soil use and development control. One clear example of this is the consideration of sea-level change estimates when authorizing construction permits and urban zoning. In some cases, this high-impact measure creates areas where construction is prohibited and leads to community displacement. This is often accompanied by the loss of social fabric and support networks, which further increases the vulnerability of affected populations.

Finally, accommodation measures minimize impacts by modifying coastal zoning, utilizing early alert and evacuation systems, organizing risk insurance and improving flood resistance. An example of a strategy to increase flood resistance is to elevate critical infrastructure and housing. After the devastation caused by hurricanes Irma and Maria, several Caribbean nations

are modifying laws to require that new homes be built on stilts to withstand floods. These measures have been the subject of several debates on building codes and climate adaptability. There are supporters, like the Pan American Health Organization (PAHO), which only funds new hospitals if the suspended ground floor level is elevated at least 3.28 feet above the predicted maximum flood levels.¹¹ Additionally, there are new initiatives to build stilt housing, which different cultures have constructed throughout history for housing, public spaces, work areas and office development, among other uses.

IMPLEMENTATION OF SOCIAL HOUSING PROJECTS ON STILTS

Stilt constructions located on lakes or shores have allowed local communities to coexist in harmony with bodies of water and tides while developing their cultures and lifestyles. There are several cases of communities of this kind in Latin America and the Caribbean, including Iquitos, Peru; Belem, Brazil; Chiloe and Caleta Tortel in Chile; and Tomaco, Trojas de Cataca and Nueva Venecia, Colombia. The use of stilt constructions can be considered a local development strategy based on unique geographical and climate features, and a case in point of how architectural adaptations can contribute to the development of resilient cities.

On the other hand, neighborhoods built on stilts are in many cases the result of new informal settlements by vulnerable populations. This leads to the consolidation of settlements that suffer from poor access to sanitation services, overcrowding and high poverty rates. The establishment of neighborhoods on stilts—often self-built homes—in areas prone to flooding, erosion or other threats, leads to fragile settlements that can disappear as easily as they are constructed and expanded.¹²

Based on the experiences of neighborhoods on stilts and vernacular structures unique to informal settlements, there is an opportunity to transfer adaptation criteria and the search for strategies to build resilient coastal cities. In this regard, a series of government programs and projects have introduced adaptation strategies based on elevated or stilt constructions for sanitation and power infrastructure, hospitals and social housing. These have been restructured to avoid population displacement and increase the protection of vulnerable areas.

The Chilean Homes on Stilts project,¹³ part of the 2010 Post-Earthquake and Tsunami Reconstruction Program by the Chilean Ministry of Housing and Urban Development, is an



Stilt homes in Nueva Venecia, Las Trojas de Cataca and Ciénaga Grande de Santa Marta. Colombia



Stilt homes in Gamboa, Castro and Chiloé, Chile



Stilt homes in Tumaco, Colombia.

example of how social housing can be adapted to urban coastal zones. The project involves 180 single-family homes of residents affected by the tsunami who have decided to continue living on the shore. Family members have participated in workshops related to the design of the new housing. The cost of each home is approximately USD 25,000, higher than the traditional cost of social housing since these are earthquake and tsunami resistant. In this case, the home is provided at no cost to the families, who were previously social housing beneficiaries. Another project that was part of the reconstruction was Dichato Beach,¹⁴ an 88-apartment site similar to Homes on Stilts, with a ground floor level reserved for less important spaces.

Social housing projects built on stilts have also been implemented in different municipalities and rural areas of Mexico. As part of a project in the municipality of Campeche, 100 homes on stilts are being constructed to avoid damage caused by the overflowing of the Palizada River. The approximate cost of each of these homes is USD 8,421 and 91% of the cost is subsidized for families. In the Casa Amigo (Friendly Home) program in the municipality of Jonuta, Tabasco, 18 homes on stilts were built in 2016 to avoid potential damage from precipitation, flooding, and the overflowing of the Usumacinta River. The homes have equipment to filter, purify and store water, increasing resilience in the case of climate events. These homes were funded through an alliance between the municipality, the National Housing Commission (CONAVI) and the company Fomento Social Citibanamex, with a contribution from the beneficiary families.¹⁵

Once the cultural diversity of residents and the vernacular features of each home are recognized, it can be concluded that not all stilt homes are alike. The Inter-American Development Bank has supported and financed social housing programs in indigenous communities, specifically in Guyana, where stilt building techniques have been used in areas prone to flooding. With funding from the Guyana Second Low-Income Settlement Program (GY L1019), the Guyanese authorities were able to work with indigenous village councils to develop official standards for social housing on stilts and later build some 400 new dwellings. The program also created a new design in which space reserved for storage on the main floor of the dwelling also allows for the ventilation of the top floor. The roof allows rainwater to be harvested and the traditional cassava bread to be dried.

These cases illustrate how stilt homes can serve as a powerful symbol and a strong response to climate change and the housing deficit.



Stilt home - Tumbes, Chile



Dichato Playa Building.
Dichato, Chile



Social housing on stilts in
Campeche, Mexico



Social housing on stilts in
Campeche, Mexico



Social housing on stilts in Jonuta, Mexico

A FORWARD-LOOKING PERSPECTIVE: INTEGRATING RESILIENCE INTO URBAN PLANS AND HOUSING POLICIES

According to climate projections for the coming years, the region will be broadly affected, making investment in the development of resilient cities a priority. This means that measures for climate change adaptation must be designed and implemented. In this regard, international institutions like the IDB are firmly committed to combatting climate change and improving neighborhoods.¹⁶

The focus on social housing and vulnerable populations is critical to achieving this objective, but is not enough. Given the level of vulnerability of the region, it will be important to act on a larger scale to build resilience and adopt a “blue focus” in urban planning. This way, just as green belts play an important part of ecology, “blue belts” should be promoted to preserve the water resources of cities, connect public spaces along the shore and limit development in areas prone to flooding. Some cities are already applying this holistic approach when renovating city coastlines and are facing the challenge of rising property values in coastal areas that are located at higher elevations or have incorporated new infrastructure. Higher property costs have an impact on the housing market and frequently lead to the displacement of vulnerable populations, generating, in some cases, climate gentrification in coastal areas.¹⁷

At the local and city government level, one of the biggest challenges is thus to increase the adaptive capacity to reduce damages, manage recovery periods, ensure the availability of up-to-date information on coastal zones, and identify the areas and populations most prone to coastal hazards. The conso-



Social housing on stilts in Jonuta, Mexico

Validation of government institutions on the coast is critical to this objective; in this regard, the Coastal Zone Management Unit (CZMU) of Barbados illustrates the importance of training professionals in coastal management in cities. This unit works with development and planning offices, taking an active role in actions ranging from physical interventions to the revision of drainage requirements, buffer zones, restrictions and regulations.¹⁸ Additionally, the CZMU finances and develops public information campaigns to educate and build support between different actors and communities while raising awareness about rising sea levels and the importance of coastal management.

Fortunately, we are now at a time in which the gap between environmental and housing issues has diminished and there is increased collaboration between water and land agencies (i.e. zoning commissions). Even countries like Paraguay that are exposed to fewer hazards have acknowledged the need for housing policies that encourage the implementation of adaptation strategies on different scales. The National Housing and Habitat Policy of Paraguay “acknowledges the need to apply strategies for climate change mitigation and adaptation and the reduction of disaster-related hazards in all proposed housing solutions and in all cities and communities subject to interventions.”¹⁹ Now is the time to enhance resilience in the region's housing policies, build momentum and produce lasting results.

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THE IMPORTANCE OF THE HOUSING FINANCE MARKET FOR BRIDGING THE HOUSING GAP

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THE HOUSING GAP IN LATIN AMERICA AND THE CARIBBEAN

Latin America and the Caribbean is one of the most urbanized but least dense regions of the planet, characterized by a severe housing shortage and low wages, as well as a demographic dividend that will require housing solutions. Over 80%¹ of the population lives in urban areas, and by 2050 that figure is expected to be 90%, with no clear subsidy or financing programs in place to promote adequate housing solutions, particularly for low-income families, informal workers, minorities and migrants.

As compared to dynamic emerging economies in Asia, LAC countries save between 10 and 15%² less of their GDP, resulting in insufficient resources to finance and subsidize housing solutions. Moreover, the penetration of the financial market is low. Savings are not earmarked for housing projects or home improvements and institutional investors do not invest in the residential building sector.

Although there is also no platform for housing gap indicators in the region, the quantitative—and above all, qualitative—housing deficit is known to be very high, due to the low incomes of families working in informal sectors of the economy.³ Moreover, this deficit is compounded by the annual rates of household formation and the significant migratory phenomena in the region.

PROBLEMS RELATING TO FISCAL RESTRICTIONS, PAYMENT CAPACITY, RISK CAPACITY AND THE NEED FOR HOUSING SOLUTIONS

The problem in the Latin American and Caribbean region is that the bulk of the housing deficit is found among low-income workers employed mainly in informal sectors of the economy.⁴ In response, governments have promoted subsidy schemes to support affordable housing. However, there are not enough fiscal resources to bridge the current and potential housing gap, which is why it is vital to channel resources from the domestic and foreign private sector to meet housing needs in the region.

The housing gap can be divided into qualitative and quantitative deficits. Persons may be living in overcrowded conditions, in substandard housing or have no housing at all. Given this, it is important to define the type of deficit in order to then determine what kind of solution should be employed. The table below shows the type of deficit experienced in each country in Latin America and the Caribbean:

HOUSING DEFICIT IN LATIN AMERICA AND THE CARIBBEAN 2009 (% of households)

COUNTRY	Cuantitative deficit	Cualitative deficit	Housing deficit
ARGENTINA	5	27	32
BOLIVIA	30	34	64
BRAZIL	6	25	31
CHILE	3	16	19
COLOMBIA	9	19	28
COSTA RICA	2	10	12
EL SALVADOR	8	41	49
ECUADOR	10	31	41
GUATEMALA	11	46	57
HONDURAS	2	41	43
MEXICO	2	26	28
NICARAGUA	12	58	70
PANAMA	8	29	37
PERU	14	46	60
PARAGUAY	3	36	39
DOMINICAN REPUBLIC	3	32	35
URUGUAY	0	25	25
VENEZUELA	8	20	28

A deficit caused by overcrowding or precarious housing conditions can usually be solved through home improvement programs, self-production or incremental housing; this type of shortfall is defined as a qualitative deficit. In turn, rented accommodation, self-production, incremental housing and the acquisition of new or used dwellings can be used to meet the needs of persons who do not own a home; this is defined as a quantitative deficit.

Given that the region's housing shortage is prevalent among low-income families with little disposable personal income,⁵ it is necessary to develop a financial market that can supplement government subsidies to promote affordable housing solutions. When it comes to tackling the qualitative deficit, medium and short-term microfinance products must be developed with financial intermediaries that can work with families employed mainly in the informal sector. In addition, addressing the quantitative deficit requires a more sophisticated market over the long term, one that can provide financing for builders of homes for sale or affordable rent, as well as for potential buyers through

mortgages, guarantees and home loan insurance, which promote affordability.

International experience shows that there is a positive correlation in housing deficit reduction in countries that have achieved more sophisticated housing finance while increasing housing's contribution to their GDP. Similarly, countries such as Chile⁶ and Mexico,⁷ which have well-developed medium and long-term housing finance markets, present a lower risk of informal settlements due to the high penetration of home financing products. In contrast, in those countries with an underdeveloped market for financing the sector, such settlements have drastically increased.⁸

THE NEED FOR DOMESTIC AND FOREIGN PRIVATE SECTOR RESOURCES TO FINANCE HOUSING SOLUTIONS

It is of the utmost importance to channel domestic and foreign private sector resources to support governments in providing housing solutions. However, governments must ensure that this sector proves attractive to investors by strengthening the following pillars:

- a) **Transparency:** putting in place national systems of indicators and online housing data that provide all market stakeholders with nation-wide information on housing solutions; data of this kind streamlines and clarifies processes of construction and quality in housing and offers input that is crucial for decision making and the design of new financing and subsidy products.
- b) **Profitability:** financing products that leverage resources invested in the sector and increase the returns on projects and loan insurance or housing microfinancing; first loss guarantees that reduce the likelihood of default or the severity of the losses suffered by financing projects.
- c) **Reduction of entry and exit barriers:** national housing policies that promote a “level playing field” and help both small and mid-level investors to be able to enter and exit the housing market with the necessary funding.
- d) **Certainty:** governments must promote certainty in terms of the free entry and exit of capital, long-term financing markets with low volatility of financing rates, inflation and the exchange rate. Furthermore, there needs to be clarity about housing

subsidy and support programs and, preferably, these should provide stability over time.

DESIGNING FINANCING PRODUCTS THAT CHANNEL PRIVATE RESOURCES TO THE HOUSING SECTOR

The financial market can act as the link between, on the one hand, domestic and foreign investors interested in investing in the housing sector over the medium and long term, and on the other, construction companies and those in need of housing solutions.

In order to develop a deep market for housing finance in each country in the Latin American region, the following are thus required:

- a) a market of domestic and foreign institutional investors that invest repeatedly in the sector and over medium and long-term;
- b) the support of government development banks that provide financing or act as guarantors in the housing sector;
- c) financing mechanisms linked to risk and term profiles, which take into account whether the goal is to address the quantitative or qualitative deficit of the country in question;
- d) the active participation of financial intermediaries capable of financing both the supply and demand side of housing (commercial banks, microfinance institutions, housing credit insurers, etc.);
- e) a stock exchange to access the wider community of investors;
- f) superintendencies of banks, the securities market and pension funds with prudential regulations on housing to protect financiers in this market.

a) A market of domestic and foreign institutional investors

Since the region's housing gap mostly affects low-income families and there are insufficient public sector resources to meet all their needs, it is essential to obtain financing from investors with a long-term investment horizon.

Countries such as Chile, Mexico,⁹ Germany,¹⁰ and the United States,¹¹ among others, have introduced changes to their pension funds, insurance companies and investment firms to ensure that, using different financial instruments, they are responsible for financing both housing providers and housing seekers.

b) The support of government development banks that provide financing or act as guarantors in the housing sector

In order to foster access to housing with financing products, some countries have set up government development banks specializing in this sector. These institutions grant loans, home loan insurance and guarantees that promote the construction and acquisition of low and medium-cost housing.

There are also other public-private partnership organizations that have been created to ensure that, through employer-employee contributions, families have access to sources of long-term financing to solve their housing needs. The most successful example has been the National Housing Fund for Workers (INFONAVIT) in Mexico, whose main function is to provide workers with mortgage and non-mortgage housing loans, as well as to achieve returns on the retirement pension savings of the National Pension Fund.¹²

c) Financing mechanisms linked to risk and term profiles, which take into account whether the goal is to address the quantitative or qualitative deficit of the country in question

Each country in Latin America and the Caribbean presents different challenges in terms of both quantitative and qualitative deficits, depending on their current and potential demographic indices. It is extremely important, therefore, that each country develop measurement models for wage levels and demographic data so as to be able to assess:

- 1) the amount of resources needed to tackle the current and potential deficit;
- 2) the population that will be covered (young people, seniors, female heads of household, etc.);
- 3) the wage level of the potential beneficiaries and the volatility of their income (low, medium, high income);
- 4) sources of income of the population that will be covered (formal sector, informal sector, self-employed, etc.);
- 5) location of the dwelling (urban, semi-urban or rural housing), among other aspects.

Once each of the aforementioned demographic indices has been identified, with the support of the development bank and the Ministries of Housing and Finance, it is necessary to design the financing products and funding channels (private financial intermediaries) that can be used to funnel public and private resources to reduce the deficit (short-term microfinancing for a qualitative deficit, long-term mortgage loan, loan to build housing for rent or for sale, etc.).

d) The active participation of financial intermediaries capable of financing both the supply and demand side of housing (commercial banks, microfinance institutions, home loan insurers, etc.)

Given that the resources provided by development banks, the Ministries of Finance and Housing and national housing agencies will not suffice to close the housing gap in the region, the active participation of domestic and foreign financial intermediaries will be necessary to fund the housing sector.

International experience has shown that in countries such as Spain, the United States, Chile, Mexico and Colombia, the bulk of mortgage financing comes from the commercial banking sector.¹³ Similarly, families from Central America, the Andean region and the Southern Cone meet their housing improvement, expansion and self-production needs with microfinancing from cooperatives, microfinance institutions or commercial banks dedicated to the base of the pyramid.

It is crucial, therefore, to encourage their participation, either through prudential regulation that offers benefits in terms of their balance sheet reserves if they grant home loans, or by designing development banking products that can mitigate the risks of commercial banking (home loan insurance or first loss guarantees). For example, countries like the United States, Canada and Mexico have developed home loan insurance or first loss guarantees¹⁴ on housing loan portfolios, which can mitigate the risks financial intermediaries face in terms of the severity of losses and the likelihood of default by their customers, and have thus increased the amount of housing financing in their portfolios.

In this regard, countries including Colombia, Chile, the United States, Canada and Mexico have developed markets for mortgage securitizations or “covered bonds” to reduce the levels of reserves and capital required on the balance sheets of financial intermediaries with the aim of enabling them to raise more credit, which has undoubtedly increased the amount of investment coming in through housing finance markets.¹⁵

e) A stock exchange to access the wider community of investors

It is necessary to set up stock exchanges to carry out purchase and sale transactions of financial instruments related to the housing sector. The goal is to: 1) facilitate securities transactions; 2) develop the market; 3) foster its expansion and competitiveness; 4) issue rules to establish operating and behavioral standards and frameworks that promote fair and equitable practices in the securities market; and 5) monitor compliance and impose disci-

plinary and corrective measures on investors, issuers, etc.

Over the course of their existence, the housing finance markets have witnessed a number of changes that have temporarily or permanently suspended the channeling of resources due to real estate crises. The case of the 2009 sub-prime mortgage crisis in the United States underlined the need for stock exchanges that can protect investors who participate in this market.

f) Superintendencies of banks, securities markets and pension funds with prudential regulations and effective oversight for housing finance to protect financiers in this market.

With the aim of encouraging the wider community of investors to participate in financing the housing market, superintendencies of banks and financial institutions, as well as pension funds and investment firms must issue prudential regulations that protect both issuers and investors.

The Basel Committee, for example, set out the capitalization and reserve levels required by financial intermediaries when granting loans to finance housing solutions. These levels must be linked to the portfolio quality (delinquent and current loans) and the likelihood of default, as well as the severity of the loss in such an event. This information must be disclosed to the wider community of investors in a transparent and simple manner, offering reassurance should they decide to participate in this housing finance market.

Moreover, the monitoring and oversight provided by these organizations will be of vital importance as the aim is to sanction those participants in the housing finance sector who fail to comply with the prudential regulation.

**INTERNATIONAL EXPERIENCE IN HOUSING
FINANCE DEVELOPMENT IN LATIN AMERICA
AND THE CARIBBEAN**

A number of countries in Latin America and the Caribbean have developed national housing policies accompanied, in some cases, by financing products and housing subsidies; in particular, Panama, Chile, Mexico and Colombia have been the most successful. A brief summary of several of these countries' cases serves to illustrate how these efforts have been carried out.

CHILE

Due to the significant growth in housing finance in Chile over the last 25 years, it now boasts one of the most extensive housing finance markets in the region.

Numerous economic reforms fostered the development of a financial and capital market with access to long-term resources that facilitated housing finance: 1) the creation of a credible and transparent indexed unit of account; 2) the liberalization of financial markets together with the implementation of effective and robust supervision; 3) the reform of the pension systems of the early 1980s; 4) the consolidation of a macroeconomic framework capable of providing economic stability.

To encourage financing, a state social policy designed to meet the housing requirements of those groups in greatest need has been in place since the early 1970s. Until the beginning of 2004, mortgage bonds were the main instrument used to provide home financing. Thereafter, mortgages (mutual home loans) began to gain importance, along with mortgage securitization. In addition, the financing provided by BancoEstado, the housing development bank, focused on low-value properties purchased by low-income families.

BancoEstado is the frontrunner in the housing finance market: it is one of the four largest banks in the country and had 16% market share as of June 2010. This bank also guarantees mortgage loans for low-income families.

The support of BancoEstado and the development of the private financing market in Chile have played an extremely important role in reducing the country's housing gap. In fact, according to reports from the Chilean Banks Association (ABIF), at the end of 2012 its mortgage loan portfolio had reached 18.7% of GDP, surpassed only by Panama. The figure stands in stark contrast to the situation 15 years ago, when this indicator stood at 8% of GDP.

COLOMBIA

Housing financing in Colombia has experienced significant development in recent years. This has been achieved on the basis of four pillars: 1) reducing the effect of inflation on the price of long-term debt by developing a credible and transparent unit of account indexed to inflation (the UVR), 2) a disciplined monetary policy that has brought down inflation, 3) reform of the financing system with the enactment of Law 546/99, a key element in the creation and progress of a mortgage securities

market; 4) a demand subsidy program to enable low-income sectors to reduce their loan-to-value ratio and leverage the remaining payments on homes through the financial market.¹⁶

The successful housing policy on which the government relied, including the subsidies to reduce the loan-to-value ratio and allow families to access financing through the Mi Casa Ya (My House Straightaway) Program, has enabled millions of Colombians to own their own home and has consolidated building construction as the most important driver of the national economy. In 2016, the GDP of the building sector increased by 8.1%, while the total GDP of the country grew just 2%. However, in recent years, Colombia has suffered a slowdown in the housing finance market due to increases in interest rates and the rise in mortgage delinquencies.

MEXICO

The housing finance market in Mexico laid its foundations with the creation of national housing agencies such as INFONAVIT and the Social Security and State Worker Services Institute (FOVISSSTE, founded in 1972). The right of Mexicans to an adequate home is enshrined in the constitution and it was thus established that private and public sector workers along with their employers would make bimonthly contributions to a housing subaccount that could give families the opportunity to purchase a home with a mortgage.

INFONAVIT, in particular, has become a highly efficient mechanism for housing finance; in the period from 1972-2016, the agency issued over 9.3 million loans for the purpose of improving, adding additions, renovating, self-building and purchasing housing.

In 1997, an unprecedented reform was made to the Retirement Savings System with the aim of creating individual retirement, severance and old age subaccounts and setting up the Retirement Fund Managers (AFORES), which, together with the investment funds, became the main institutional investors that now finance the housing sector through the Mexican Stock Exchange.

In addition, 2002 saw the creation of Sociedad Hipotecaria Federal, a development bank specializing in financing for the housing sector, whose funding, guarantees and loan insurance are used by commercial banks, microfinance institutions and other intermediaries to finance housing developers and grant mortgage loans and microloans to families to meet their housing needs.

Furthermore, in 2008, the Mortgage Securitization Market was developed using the instruments BORHIS, CEDEVIS and TFOVIS to enable banks, INFONAVIT and FOVISSSTE to package their mortgages, remove them from their balance sheets and allow institutional investors to purchase mortgage-backed securities. This market invigorated the sector and there are now over three million mortgages backed by the financial market.

Finally, in 2006, the Mexican government created the National Housing Commission (CONAVI), which grants subsidies to low-income families so they can access home financing with affordable monthly payments.

At present, the housing sector in Mexico accounts for 14.9%¹⁷ of national GDP and employs over three million people; it is larger than mining, education and agriculture and has become an engine of the economy. In 2000, 42% of all households in Mexico were affected by the housing deficit, in 2017, that figure was 28.4%.¹⁸ During the intervening period, over 450,000 homes were built each year, which would not have been possible without a dynamic public-private market to finance the housing sector.

CONCLUSIONS

The current and potential housing deficit in the Latin America and the Caribbean region presents significant challenges in terms of the resources required. In addition, there are fiscal problems that prevent governments from allocating the sums required to meet the needs of their populations. It is thus essential to channel resources from the private sector to provide housing solutions in the region. Financing markets must be strengthened to increase products designed to finance housing purchases, improvements, extensions and renovations, as well as self-production.

Faced with the impossibility of participating in the housing finance markets, low-income and informally-employed households resort to informal loans from friends or family members, loan sharks charging high interest rates, or incremental housing schemes; this has led to the creation of informal settlements in at-risk areas. Improving the housing situation of low-income families thus entails introducing subsidies and developing financing markets that benefit them.

This is why countries such as Chile, Brazil, Panama, Colombia and Mexico, among others, have developed housing finance markets. In recent years these countries have established

cornerstones for developing affordable financing products which include most notably:

- 1) a market of domestic and foreign medium and long-term institutional investors that repeatedly invest in the sector;
- 2) government development banks that are geared toward financing or act as guarantors in the housing sector;
- 3) financing mechanisms linked to risk and term profiles, which take into account whether the goal is to address the quantitative or qualitative deficit of the country in question;
- 4) the active participation of financial intermediaries in housing;
- 5) stock exchanges with access to the broad community of investors
- 6) superintendencies of banks, the securities market and pension funds with prudential regulations on housing to protect financiers in this market.
- 7) subsidy products for families at the base of the pyramid.

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8 — <<https://publications.iadb.org/bitstream/handle/11319/8310/Financiamiento-del-mercado-de-vivienda.PDF?sequence=3&isAllowed=y>>

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THE GENEALOGY OF HOMES SERIES

DIEGO GRASS

INTERVIEW WITH IÑAQUI CARNICERO

1 – PITCH HOUSE (2007)

I made Pitch House because I needed a place of my own. I compared the option of buying a house in Madrid proper—the amount of money I had at that time would have been enough to buy a 650-square-foot property—with the option of going outside city limits, which was much more affordable. A friend put up as much money as I had and we bought a lot. This was any architect's dream: to build yourself a house with a friend who placed all his trust in you. And so we began.

There was a lot going on with me then. I was considering writing my dissertation on Paulo Mendes da Rocha, whom I admire a great deal. I ended up writing about Louis Kahn and Robert Venturi, comparing their experiences in Rome. But I am interested in Mendes because of how freely he uses concrete in all of his constructions. The main thing I discovered in his works was a sense of flexibility. That was central to him: underlying each of the operations in his projects is an understanding of the home as a changing atmosphere that harbors many different things in its interior. If we compare him to someone like Tadao Ando, who also used concrete extensively, we see how Mendes's work can include many other materials as well. He envisions a room not only in conventional terms—that is, as a closed space—but also as a space of transit that can be opened up to form part of other areas in the home. In his own home, for instance, the bedroom is reconsidered to become something more than a space to sleep in. It is extended to include a table where people can work without clashing with the scale of the rest of the house: the table is as large as the entire façade. Simple decisions like that one are among the reasons why his domestic spaces interest me—his influence is evident in my projects.

Getting back to Pitch House, my chief constriction was the budget. I also had a maximum of 1,300 square feet for each house. The project was an opportunity to have two residences together that might, in the future, house just one family. So those, and the use of concrete as the main material, were the project's parameters. The idea was for concrete not to be envisioned and used as a heavy material resting its weight on the ground, but as a mass that can defy gravity by mixing with other materials, like the rocks at the site.

The house is actually very simple. It attempts to take into account all the changes that a person experiences over the course of their lifetime. That is why it has so few inner partitions. All of the closets are against the façade on the upper level, where the bedrooms are. That means that the inner partitions can be taken down to change the distribution of the interior; it also contributes to the house's insulation. The ground level consists of an open 550-square-foot space that extends onto the deck, which has a view of the landscape to the south. The cross section explains the house perfectly. The basement, where the lower house's bedrooms are located, is a concrete box that hovers five feet off the ground to block the sunlight in the summertime, but allow it through in the winter to heat up the lower level.

When we decided to embark on this adventure, both my friend and I were single. By the time we bought the lot, my friend was married. So now it was a project for me, my friend and his wife. I got



married after we finished the design, so we became two couples. Then my friend and his wife decided to leave the house to be closer to their family, so that part of the house was rented out. Later, we left to teach in the United States, and I rented out my part as well, though we did keep our office in the basement, where the garage had been. We are currently considering turning it into a single-family home: one of us would buy out the other to become the sole proprietor. So Pitch House has been through a lot of changes. It is, in a way, the story of my own life in recent years.

This project was my first design to be published in magazines. After that, people got in touch with us about designing their houses, which was how we learned that there are very few concrete houses in Spain. Using concrete was usually one of the components of later commissions, which was great for us because we love concrete. We love how it exposes the construction process with the marks that, like a decorative element, remain on it forever after being removed from the formwork.

2 – RADA HOUSE (2014)

Rada House, unlike Pitch House, is in Madrid, in Puerta de Hierro, on a site shaped like two skewed squares. The origin of the idea of fragmented volumes lies in the lot itself. We designed the house in its entirety, but when we had finished the project the client redesigned it.

We spent a great deal of energy trying to handle our clients, but we ultimately gave up. We realized there is a limited amount you can do to change the way certain clients think. This was, for me, an important project, not because we discovered something new in the space or developed a novel stereotomic approach—not at all. We learned, rather, how to deal with clients. We decided to call it quits when the quality of the project was in peril. And that is probably all I have to say about this project.

3 – STRIP HOUSE & SPIRAL HOUSE (2014)

We were approached about this commission while we were teaching at Cornell, where we met Val Warke and Andrea Simitch. It was an opportunity to do a project in Nalati, on the other end of the earth. The commission entailed much more than two houses: it encompassed a national park and a public building with a hotel and other functions, as well as a complex of twenty-five houses. We went to visit the site and it was amazing: a beautiful natural setting with mountains—a truly impressive spot. There were nomads (Kazakhs) who had settled in the area temporarily. The client wanted us to make houses for tourism.

The main challenge was how to control the materiality and oversee the construction of something we would design off-site, indeed thousands of miles away. Furthermore, how could we design houses in this beautiful landscape without polluting it visually with what would ultimately become private homes?

After talking it over a great deal, we decided—in the case of Strip House—to divide the house's wall into a sequence of low walls. Each low wall would be a different shape to work around a tree we might



not have seen in the survey plans. The documentation they sent us was not very precise. If we designed a perfect cube, we might have had to remove a tree, which would have been unthinkable. So we forgot about perfect shapes and focused on finding a way to work around all the possible natural disruptions. The low wall would, in a way, break with the conventional wall understood as divide between interior and exterior. This would be an unfolding wall with layers that explored the limits between exterior and interior. That was the project's underlying logic.

We used a similar logic for Spiral Villa. We wanted to simplify the material presence of the house as much as possible, hence we envisioned the structure as a self-sustaining element of four volumes on a cantilever in a spiral shape that envelops the interior. The spiral is a means to make the interior space inhabitable and to provide a 360° view of the amazing landscape. That was this house's basic logic. The pile of four volumes is not only a compact form, but also a fragmented sequence of elements that can be understood in a number of different ways.

4 – REVOLUTION_ARY HOUSE (2014-)

My experience working on Hangar 16 at Matadero in Madrid is, I think, more important to understanding my work than my dissertation. That project, which was not for domestic use, was crucial to coming to an understanding of a more dynamic architecture for structures that would change in use over time. For Matadero, we used revolving doors for a very specific function but also because they reflected the idea of change that has been present throughout our lives and work. Revolution_ary House—a project that has not yet been built—cannot be any larger than 16.5 x 16.5 feet (270 sq. ft.); it had to make use of a double enclosure. The steel outer layer turns into the four boxes that

open up when the windows are displaced, and 270 sq. ft. turn into 540.

The project uses movement as mechanism to maximize the surface area and space. That is tied to our interest in flexibility—I mentioned Mendes da Rocha earlier—and to the consequences of the Matadero experience, which was a public call for submissions. I would, in writing my dissertation, have loved to have a clearer vision of the engine behind my architecture, of a clear and coherent logic, but my experience has made that impossible. I often say how much I admire architects who have been able to find the perfect mechanism, their own methodology—I will not name names. But the fact is I am more and more interested in an eclectic way of responding to different contexts, societies, and materials, to things that come to me by chance or as a result of a life decision.

Revolution_ary House was a commission that came by chance, as they all do, from a client who wanted to construct a Pitch House in his town. But the local regulations prohibited building anything more than 270 sq. ft. To make the best of it, we tried to turn limitations into tools, into opportunities to discover unexpected solutions. Looking to Matadero once again, we presented the idea of a second covering as the only way to construct enough space while complying with the regulation. We pursued the details, and ultimately contacted a company, planned to build the structure in a factory and then bring it over in a truck and use a crane to put it in place before completing construction on site.

But then the client decided to buy the lot adjacent to Pitch House. He told us, “Ok, let’s go ahead with the Revolution_ary House project, but for now let’s focus on this new house, which is much bigger. Let’s forget about making it like Pitch House and do something entirely new.” And since then we have been working on this new project (the other one is on standby).

We will definitely build it one day, because it is really special to us. In working on it, we made an animation, a video that was a lesson in how to use audiovisual materials to communicate with clients. But now we are putting all our energy into Lens House, a project we have not yet published anything on. I can say that, in the initial sketches, it looks a lot like Casa Santos (1958) in Papudo, Chile, designed by Bresciani Valdés Castillo Huidobro.

5 – LENS HOUSE (2017-)

In working on Pitch House, I did not pay much attention to the ground, the terrain or its topography. I remember being much more interested in each piece in its own right; the location—its trees and so forth—did not capture my interest, except for the two rocks that we did bring into the design. Basically, we designed a podium as a starting point for the design process.

In the case of Lens House, the house we are working on now, we see the terrain differently, even though the hillside typography is very much like that of Pitch House next door. This time, we intend to respect it, to interfere with it as little as possible. That means making the house hover above the ground so that rainwater can flow, without making the location any less permeable than it is. The idea is to look to more traditional spaces like the Roman villa or atrium. So we have



raised the house above the ground, as if it were floating. The atrium, then, turns not only into an extension of the inhabitable space but also into a garden that connects the house's interior to nature in a different way.

6 – PERISCOPE HOUSE (2017-)

Since neither Lens House nor Periscope House has been built, intuition is my guide. You say that Periscope House is not as rational as Lens House, which strikes me as funny because Periscope House is a clear response to the site even if it does not make use of orthogonal geometry. Because the lot is trapezoidal, we have to stay 10 feet away from its periphery. That means that the design is basically a deformed box; we try to fit as much surface area as possible into the lot without violating regulations. And since we could not make a perfect box, we wedged it into the corners. The entrance to the house is at the terrain's highest point—the only way to meet most of the client's needs while keeping the design as open to the landscape as possible. The house looks out onto the horizon. The views are quite vast—you can see all the way to Madrid.

Lens House is different. It is a house in a garden, where there are no grand views. The house largely looks in on itself. It envisions nature as a filter through which to observe domestic life or as part of a home's domesticity. That is why the house envelops that empty space that, in a way, connects the slope to the rest of the project.

7 – POSTSCRIPT/GEF¹

I have participated in two workshops in Argentina, and I feel very drawn to these public housing projects. That said, there is not much

freedom in designing this type of housing because of limitations regarding, for instance, square feet, materials, etc. But I am very interested in a certain component of this work, something like what I experienced at Pitch House: I was not striving to make a monumental space, but rather to make something as big as possible to enhance the experience of inhabitation in qualitative rather than in quantitative or numerical terms. Pitch House also had budgetary restrictions, though of course there was more money available there than in South America.

Here in Argentina, the idea is for every square foot of a house to be experienced spatially, for everything to feel as big as possible. In a lot of my interactions with designers, we have discussed topics like circulation and other conventions: the size of a bedroom, the location of a door, the best use of the space between the roof and the sky, and—mostly—the visual connection between the house's interior and exterior as a way to bring a sense of luxury to public housing. It is a conception of luxury that does not have anything to do with a marble atrium; it is about being able to think your living room is twice as big as it really is. That is possible by choosing a certain window or a construction detail that provides a sense of continuity between the outdoor pavement and the indoor flooring. Those small decisions make all the difference.

What I have noticed in these social housing workshops is that city governments are not always aware of how design can be a powerful tool to give poor families something luxurious. They cannot seem to consider the possibility that there be no difference between public housing and housing for the rich. The difference lies in how much I can do with architecture. I really enjoy these workshops. The participants are really starting to think differently, and the process will soon produce truly good results.

But let's not sing victory yet. Robert Venturi was the one who said that Farnsworth House was so good because it denied a lot of things, which worked terribly, but it did other things, which worked wonderfully. So I think the best way to make a project that is sustainable but terrible is to use formulas that are like shopping lists, where to have solar energy—for instance—you have to have windows that reach a certain U-factor. The architect is, ultimately, the one who decides what things must be forfeited to improve other things. That is architecture.



1 — Global Environmental Facility (GEF). Through the Inter-American Development Bank, this fund supports a sustainable public housing program in Argentina. Iñiqui Carnicero was invited to Argentina twice in 2018 to review pilot projects that began to be implemented in eight provinces in that country in early 2019.

INTERVIEW WITH CARLA JUAÇABA

1 – SINGLE-FAMILY HOME PROTOTYPE/WITH AND WITHOUT A CLIENT



I do not see the single-family home as a prototype. I do not believe there are such things as prototypes in architecture: each situation is new, regardless of the scale.

In Latin America, single-family homes are very common commissions for architects. It is also a way to explore construction and develop a language, but never a prototype.

I do not believe there is any difference between tackling housing and non-housing projects. I think the client's boldness defines how far you can go. For example, in the case of the Vatican Chapels that we produced for the Venice Biennale of Architecture (2018), the curator chose the architects and gave us total freedom. It is easier when the client trusts us so completely.



2 – MUSEOGRAPHY AND ARCHITECTURE

There are indeed connections between my museum work and my architectural work. For example, *Viagem das Carrancas* [The journey of the Carrancas] (2015) uses the same language as *Ballast*, the work we did for the Venice Biennale of Architecture (2018).

Working with Gisela Magalhaes—before starting my own studio—was very important for me. I was quite young at the time and did not really want to be an employee at an architecture firm. The process with her was much more interesting: there was always a subject to study, jointly with philosophers and historians, and it was only after all of that research that we began the design process. I still think it was fascinating. And I also think architecture work can be pretty miserable in the daily routine of an office.

3 – SÉRGIO BERNARDES/CASA LOTA

Sérgio Bernardes (1919-2002) was not my professor at Universidade Santa Úrsula, but we met periodically while I was a student. Casa Lota (1951) is one of his best works and had an obvious influence on my design for Casa Varanda (2011) and, later, Casa Santa Teresa (2017), with its light steel structure. Sérgio built the Lota beams on site, cut them and bent them into shape because it was not possible to buy them back then. He used striated steel for reinforcing concrete in his beams, which are very beautiful. One part of the house sits atop stone walls and the other is suspended above nature. He designed a house with Rio de Janeiro especially in mind, immersed in nature and combining rustic and industrial materials.

4 – HOUSES/ CASA ATELIER, CASA RIO BONITO, CASA MINIMAL, CASA SANTA TERESA & CASA POSSE

I do not think Casa Atelier (2000) was a manifesto. I was very young and was also working on Casa Rio Bonito (2005). Rio Bonito was more authorial, more experimental and, for that reason, I needed more courage.

Casa Minimal (2015) is different from these two pavilions: the design is a cross-shaped floor plan. But, in fact, the idea began with aligned walls that could provide shelter from the intense sun at the site, and an opening in the center for views. After that, we started to think about the material. A double brick wall seemed to be the best option in terms of temperature control. It was not necessary to suspend the house, as was the case for Rio Bonito, because this one was perched on top of a mountain, with no humidity. And it was all very economical. I think those types of jobs can vary from a very lightweight project to a heavy stone one, like [Casa] Minimal.

In the case of Casa Santa Teresa (2017), the most obvious reference was the Australian Glenn Murcutt, but there is also a very similar hallway in one of Sverre Fehn's projects.

In Casa Posse (2015-) there were no conscious references. The house is not yet finished; the construction is on hold. I have to say that I really respect (Kazuyo) Sejima, but, unfortunately, I feel like what we do is too different for any of her work to be reflected in mine. I should clarify, however, that there is a lot of Villa Rotonda in Posse and—again—a lot of Fehn.

5 – POSTSCRIPT: SINGLE FAMILY HOMES IN THE GLOBAL SOUTH

We must always keep our eyes open to discover what makes sense in each place. It is not always possible to use local materials.

In our case—the Global South—I have to say that all the houses I have designed are very small compared to other single-family homes in Brazil. None exceeds 1,500 sq. ft. That is very important to emphasize, because it makes a lot of sense to keep things economical in a nation like ours. Before going in search of the essence, one should look out for the budget. And, I am quite proud to say, that is something I have done in all my projects.







INTERVIEW WITH JO NOERO

1 – SINGLE-FAMILY HOME PROTOTYPE/WITH AND WITHOUT A CLIENT

In all of my work, I use the idea of a single-family home as a prototype, though there are times when it is necessary to consider very different prototypes—for example, the case of families without parents, which became all too common when the AIDS epidemic struck South Africa.

Obviously, the best way to design a house is to talk directly with the family. That is the way we generally handle things when we get commissioned to do individual homes. Collective housing requires that we think about a great number of people whom we cannot get to know personally, people whose specific housing needs we are unaware of. The approach to collective housing is thus different, and usually requires incremental designs—like houses that are not finished until after the residents move in. This is the most suitable way to approach families who are otherwise just a number on a list.

2 – THE ARCHITECT AS A PROPERTY DEVELOPER

The type of business we prefer to take on is that which closes the gap between the specific needs of a family in a single-family home and the anonymous home that all real estate developers build. We buy small lots and hire advertisers to target families who would otherwise be excluded from any type of discussion of their architectural needs. Once these needs have been established, we proceed with the design and cost estimates before working to acquire capital—getting banks involved—and to mobilize the respective families. Normally, this works when the housing density is relatively high, say two or three-story buildings with a maximum of six families per lot.

3 – HOUSES WITH FLOOR PLANS OF UP TO 1,600 SQ. FT.

There is some truth to what they say about my approach to housing being the opposite of Lacaton & Vassal's strategy. But it is important to understand that we work in very different contexts: it is impossible to compare the situation in France with that of South Africa. Here in South Africa, we live in one of the world's most unequal societies. Many families live in tiny shacks measuring no more than 100 square feet, while a handful of rich families lives in home exceeding 10,000 square feet. That is just obscene. What we want to do is ensure equal opportunity and give each family the share they deserve of the available living space.

In my experience designing many single-family homes, I have come to the conclusion that 1,600 square feet is an adequate size. That is my approach to the problem and I think it is appropriate for the South African context. I am not sure whether it would work in France or whether or not I particularly care: I want my country to resolve its own problems. What others do elsewhere is their business.

In terms of space versus luxury: in my view, space is luxury. It costs a



pretty penny, which is why the challenge lies in differentiating between luxury and need. I am not going to waste valuable space available at a site. I will build a small house there, although I may use costly materials. It would be something else if I built a big house that takes up all the available space—that is, space that could be used by other families to live decently. I am all about defending that available space.

I think it is also important to understand that money is not a resource—it simply oils the wheels, speeds things up. Space is a resource. And it is an increasingly scarcer one, as our cities grow and population density increases.

4 – TABLE HOUSE (2016-)

Personally, I think that Table House makes an important contribution to my country due to South Africa's very specific housing conditions, but I am not sure if this is something we could export or replicate elsewhere. Locally, it adds to the repertoire of ideas about housing and the methods or resources to make decent housing available for the poor.

This project keeps the architect's contribution to a minimum. Yet, at the same time, it is a powerful metaphor about what shelter means: it seems to bring people back to the most basic idea about protection against the elements. It also takes us back to our childhoods, when we would build forts beneath the dining room table.

Today, we are working to build a set of prototypes that range from one to three-story “tables” to groups of two, three and four “tables.” We have found a site that is suitable for this development and we have already built the first generation of “tables.”

Now we are raising funds to complete the development of these prototypes. We are funding it ourselves, which makes things difficult, but it is better than going to a government agency, which would interfere to such a degree that we would never get anything done. I say this because our initial premise is that people know their housing

needs better than anyone, which is why this must be the basic premise of each and every housing project. It goes against the state's idea of housing. For the state, control is paramount and people are treated like children who need to be dependent on the government to satisfy their most basic needs. It is very similar to the idea of the pass laws, where the public does everything the state requires it to do.

5 – POSTSCRIPT: SINGLE-FAMILY HOMES IN THE GLOBAL SOUTH

The only lesson that should be learned is that we need to give families the trust and freedom to take charge of their own lives through the processes that comprehend what we commonly refer to as “housing.”

The other very important topic is that we need to build as many options as possible to attempt to address the infinite variety of needs. We need to be careful and not try to invent something similar to the so-called universal systems model so in vogue with governments across the world.

Ideally, what we need is a catalogue of all the housing initiatives in the Global South, one in which these initiatives are presented in a way similar to the Urbanization Primer published by Horacio Caminos in the 1970s. It is vital that all this material be organized in an appropriate way, both synchronically and diachronically.



THEMES & CASE STUDIES

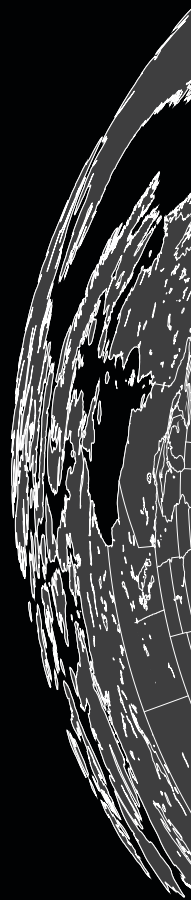
1 — Florestan Fernandes and José María Amaral	Brazil
2 — Haiti HOME	Haiti
3 — Reblocking and Empowered Shack	South Africa
4 — uTshani Fund	South Africa
5 — Zero Energy Housing	South Korea
6 — Assisted Integral Improvement	Mexico
7 — Community Mortgage Programs	Philippines
8 — Hipoteca Verde and ECOCASA	Regional
9 — The Asian Coalition for Community Action Program	Thailand
10 — FOGARIM	Morocco
11 — Priority and Eligibility Policies	Singapore
12 — Citiq Students Mill Junction	South Africa
13 — Sharing City Seoul	South Korea
14 — Mahila Housing Trust	India
15 — Cooperatives in Kenya	Kenya
16 — National Sustainable Land Institute	Mexico
17 — Social Housing Institutions	South Africa
18 — Georgetown Housing Support Project	Guyana
19 — Nagari Nivara Parishad Housing	India
20 — TT Neighborhood Upgrading Program	Trinidad and Tobago
21 — VINTE and PROCSA	Mexico
22 — Parque Novo Santo Amaro V	Brazil
23 — La Playa Apartments	Colombia
24 — Empresa de Desarrollo Urbano of Medellín	Colombia
25 — Quinta del Batlle	Uruguay
26 — Elemental	Chile
27 — SOS Children's Village	Djibouti
28 — Housing for the Fishermen of Tyre	Lebanon
29 — Umusambi House	Rwanda
30 — SkyVille @ Dawson	Singapore
31 — B31 Housing Laboratory	Argentina
32 — Teachers' Housing	Burkina Faso
33 — Plugin House	China
34 — Cement Block Bank	Gambia
35 — FUPROVI	Costa Rica
36 — Patrimonio Hoy	Regional
37 — Pedregulho Housing Complex	Brazil
38 — Housing and Habitats	Nicaragua
39 — Microfinance of Poor and Low-Income Housing	Egypt
40 — SECU, SIBU, MACU	Ethiopia
41 — Microfinance for the Self-Employed	Ghana
42 — Housing Finance Group	Kenya
43 — Stone Centre	Kenya
44 — Maternity Waiting Village	Malawi
45 — Build it Microfinance	Mozambique
46 — Freedom Square Water Services Installation Project	Namibia
47 — Plastic into Homes	Nigeria
48 — Floating Houses	Nigeria
49 — Reusable Materials	Rwanda
50 — PPC Home Owners Support Programme	South Africa

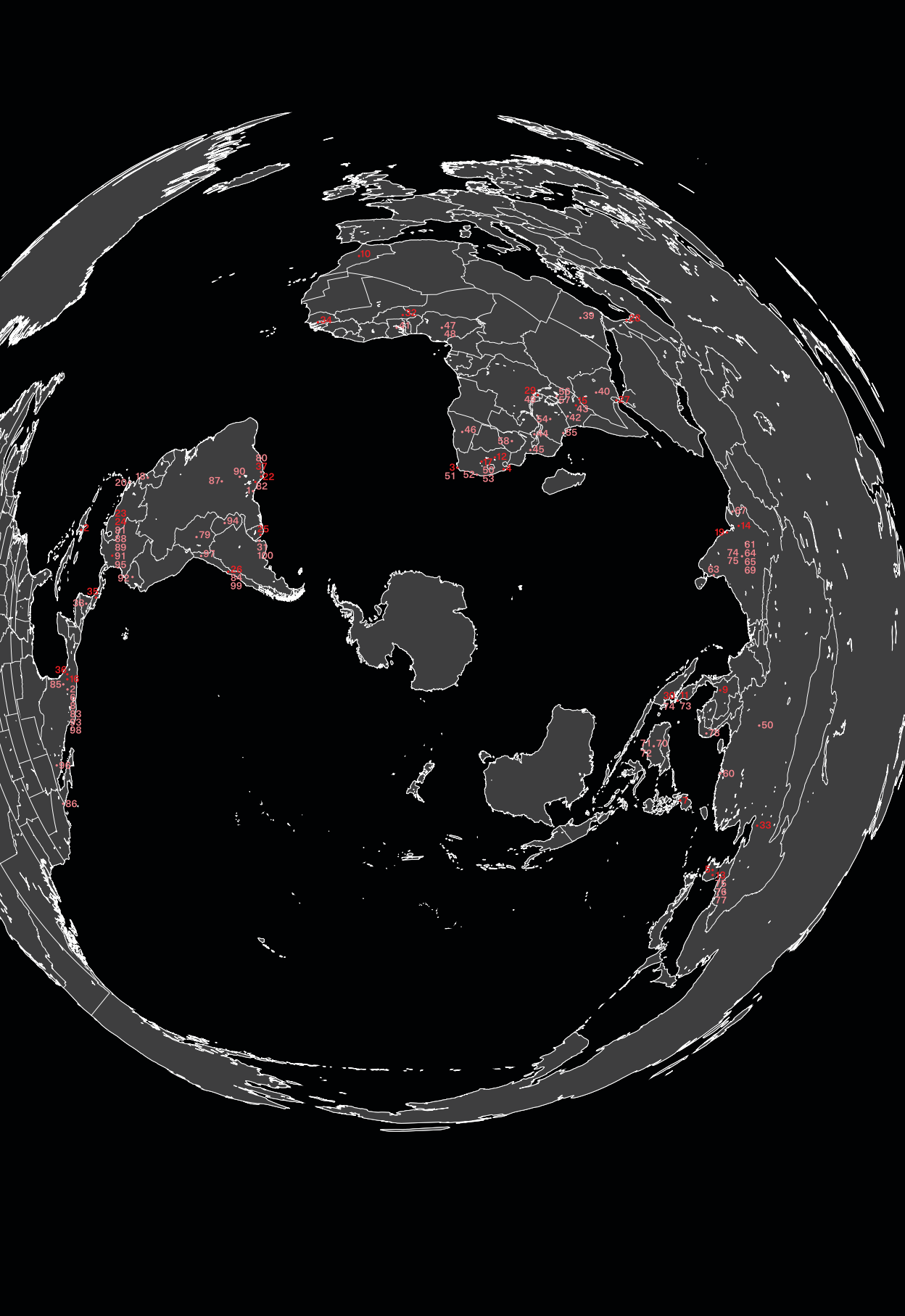
51 — Khayelitsha Open Space Upgrading	South Africa
52 — Moladi	South Africa
53 — Abōd™ Prototype Affordable Prefab	South Africa
54 — Terra Block System	Tanzania
55 — Vinguguti Household Sewerage Connection	Tanzania
56 — Smart Havens Housing Solutions	Uganda
57 — Jinja Materials Workshop	Uganda
58 — Stoneridge Transit Housing	Zimbabwe
59 — 1K House - Pinwheel House	China
60 — OPod Tube House	China
61 — Affordable Housing Technical Assistance Centre	India
62 — Aranya Low-cost Housing Project	India
63 — Auroville	India
64 — Building Services for Urban Poor (BSUP)	India
65 — Development Alternatives	India
66 — Belapur Incremental Housing	India
67 — Hunnarshala Foundation	India
68 — Inventure	India
69 — Tabula Pronta	India
70 — Bamboo Frame	Indonesia
71 — Jaringan Udeep Beausaree (JUB)	Indonesia
72 — Pemulung House,	Indonesia
73 — Government Land Sales	Singapore
74 — Singapore's Housing and Development Board (HDB)	Singapore
75 — Korea Land & Housing Corporation	South Korea
76 — Lowcost House	South Korea
77 — Self-Sufficient Net Zero Energy House	South Korea
78 — Transitional Shelters	Vietnam
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81 — Ecoparque 13 de Noviembre	Colombia
82 — COPROMO	Brazil
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87 — Jardim Edite Social Housing	Brazil
88 — Rehabitar la Montaña	Colombia
89 — DINCS	Colombia
90 — Cooperativa Habitacional Esperança	Brazil
91 — Ecoaldea - Aldeafeliz	Colombia
92 — Los Pinos, Comunidad del Buen Vivir	Ecuador
93 — Reconstrucción del Hábitat en la Montaña	Mexico
94 — Cobañados	Paraguay
95 — Plaza de la Hoja	Colombia
96 — Bosco Residencial	Mexico
97 — Casas Post-terremoto en Tarapacá	Chile
98 — Prototipo para INFONAVIT	Mexico
99 — Techo	Chile
100 — Villa Palito - PROMEBA	Argentina

In recent years, a number of cases, in both the private and public sectors, have demonstrated new and compelling ways to address housing development in the Global South. After studying and gathering a significant number of such cases, we have compiled a sample of one hundred examples that we believe represent innovative, effective or meaningful approaches to building and administering housing. While some of these cases are mentioned only briefly, others are presented in greater detail with a focus on the housing production value chain; issues explored range from design and public policy to the financial dimensions of the housing market. This selection of cases serves to illustrate various phases and practices in the real estate market and the construction industry,

presenting useful strategies for generating accessible, inclusive, resilient and culturally significant housing, with a comprehensive approach to the qualitative deficit. The cases compiled here reflect phases relevant to every housing project: land provision, which includes access to physical and social services; the construction of housing units, with reference to architectural elements, construction materials and technology implemented; and the evolution of housing, which includes the extension and renovation of housing units. In addition to following the logic of the value chain, we underline a major attribute in each case that, for the purposes of this publication and the accompanying exhibition, we refer to as a “modifier.” We believe

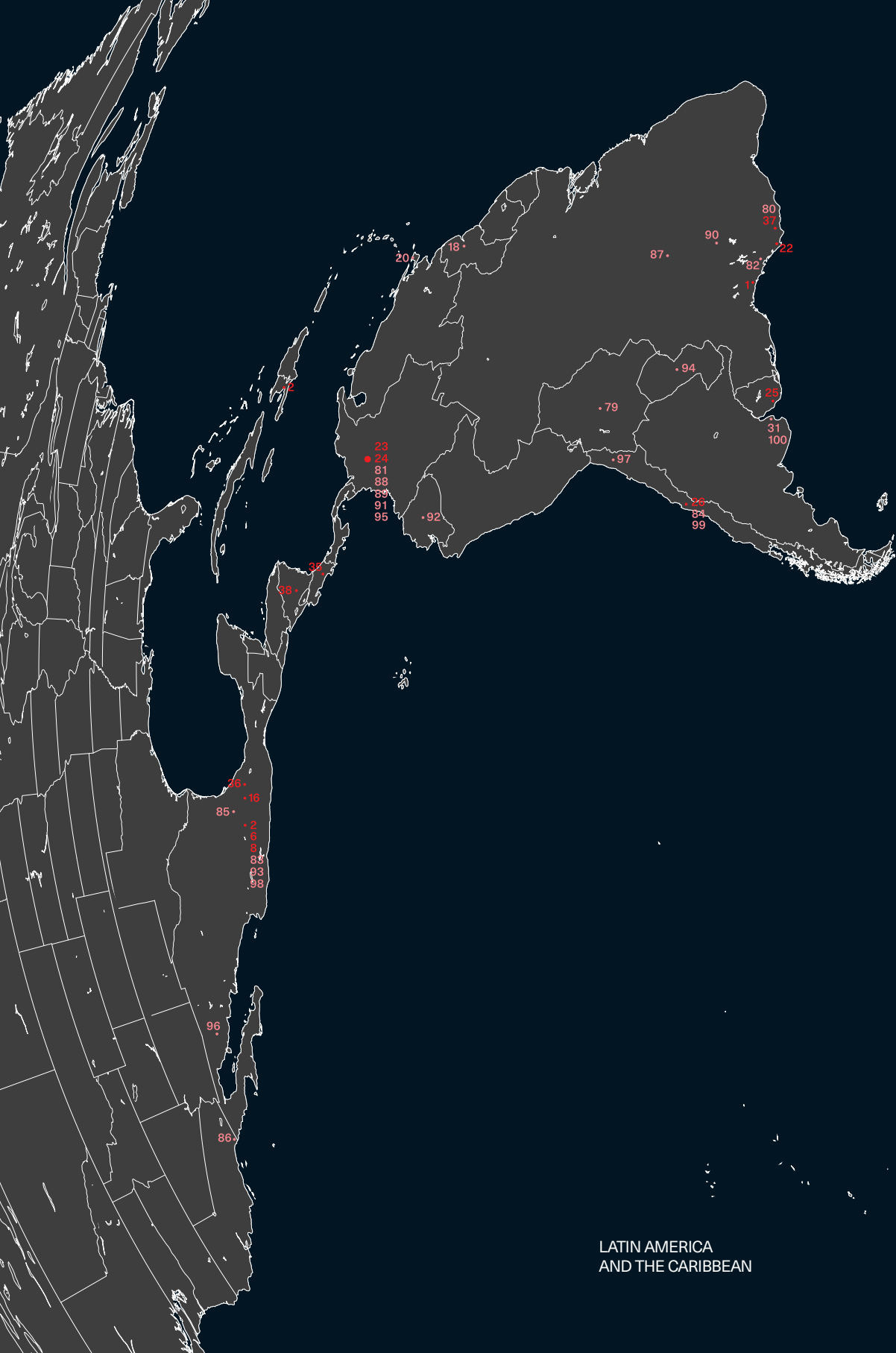
that each modifier can contribute in some way to a rethinking of housing alternatives and invite reflection on the role of housing in building cities.











LATIN AMERICA
AND THE CARIBBEAN



ASIA

NORMS AND
STANDARDS

EQUITABLE
PROVIDING REWARDS
NEGOCIATED

SUBSIDIES
AND FINANCING

PARTICIPATORY
ENERGY-EFFICIENT
THE RURAL-URBAN FRINGE
COMMUNITY
GREEN

ELIGIBILITY,
REQUIREMENTS
AND APPLICATION

SCALABLE
GUARANTEED
SOCIALLY MIXED
TEMPORARY

LAND AND
TITLES

SHARED
INCREMENTAL
SOCIAL
SECURE

INFRASTRUCTURE

CENTRALLY LOCATED
DISASTER-RESISTANT
SELF-FINANCED
REGULARIZED

MASTER PLAN

SUSTAINABLE
INTEGRAL
LOCALIZED
COORDINATED

ARCHITECTURE
AND DESIGN

COOPERATIVE
INCREMENTAL
HEALTHY
CULTURALLY RESPONSIVE

MATERIALS AND
CONSTRUCTION

PRODUCTIVE
HIGH-DENSITY
EXPERIMENTAL
LOCAL

IMPROVEMENT
AND MAINTENANCE

FLEXIBLE
AFFORDABLE
SELF-MANAGED
SOLIDARITY
RECLAIMABLE
DISRUPTIVE

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510	Umusambi House
516	SkyVille @ Dawson
524	B31 Housing Laboratory
530	Teachers' Housing
538	Plugin House
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552	FUPROVI
558	Patrimonio Hoy
564	Pedregulho Housing Complex
570	Housing and Habitats

EQUITABLE

According to the Office of the United Nations High Commissioner for Human Rights, non-discrimination and equality are basic principles of human rights and fundamental components of the right to adequate housing. To effectively protect the right to housing, it is necessary to focus on the situations of certain individuals or groups, particularly the vulnerable. States should adopt effective measures to prevent the discrimination of these groups and individuals, be it deliberate or unintentional. Housing laws and policies should be adjusted to the needs of these sectors and not merely target majority groups.

FLORESTAN FERNANDES AND JOSÉ MARIA AMARAL

Social Housing and Gender Equality

SÃO PAULO, BRAZIL

Population: 12.11 million (São Paulo, 2017);

207.7 million (Brazil, 2016)

GDP per capita: USD 8,649.95 (2016)

Urban population: 86.6%

TIME FRAME

Year project was approved: 2009

Year project began: 2013

Year project was completed: 2018

ACTORS

Project management: Minha Casa, Minha Vida

- Entidades (My House, My Life, or MCMV-E),

National Housing Department (SNH) and

Ministry of Cities

Project implementation: Landless Workers

Movement East 1 (community organization)

Project design: Ambiente Arquitetura and

Landless Workers Movement East 1

FINANCING

Type: Social housing loan (Minha Casa, Minha

Vida – Entidades) promoted by the Brazilian

federal government

IMPACT

Units or solution: 396 homes, plot area: 190,520

sq. ft. floor area: 286,350 sq. ft. floor area of each

residential unit: 620 sq. ft.

Estimated population benefited: Approximately

1,600 families

Women from the Landless Workers Movement East 1.
Ph. Felipe Garofalo.



The Florestan Fernandes and José María Amaral Social Housing Project is an exemplary case of self-management with strong women's leadership. It is part of the social housing program launched by the Brazilian government in 2009, Minha Casa, Minha Vida – Entidades. In this program, community organizations oversee the entire social housing process from design to execution and construction. The program mainly targets female household heads.

The Minha Casa, Minha Vida – Entidades Program was created in 2009 to make housing accessible to families organized in housing co-ops, associations and other private non-profit entities. The program, which is overseen by the National Housing Department and the Brazilian Ministry of Cities, targets families with a gross monthly income of up to BRL 1,600 (USD 390, or the equivalent of three months' earnings at minimum wage). It strengthens cooperation and the population's active involvement in the solution to its housing issues. For a proposal to be considered for the program, the presenting organization must be previously authorized by the Ministry of Cities and the project must be analyzed, approved and selected for the program by Caixa Econômica Federal. This entity is responsible for accompanying and informing participants once they have been selected, allocating the budget to the financial agent as outlined in the framework

agreement, and monitoring how resources are used during the interest-only period and amortization.

The Florestan Fernandes and José Maria Amaral Social Housing Project is an exemplary case of self-management with strong women's leadership. It is part of the social housing program Minha Casa, Minha Vida – Entidades, which the Brazilian government launched in 2009. Under this program, community organizations oversee an entire social housing project from design to construction. In the case of the Florestan Fernandes and José Maria Amaral project, the community organization known as the Landless Workers Movement East 1 was in charge of managing resources and supervising construction. This included the purchase and regularization of the land and the possibility of getting the future residents to work with the technical assistance team on the design of the apartments.



Women from the Landless Workers Movement East 1.
Ph. Felipe Garófalo.



Florestan Fernandes and José Maria Amaral Social Housing Project. Ph. fablablivresp

Since many low-income families that live on the periphery in Brazil are headed by women, the program mainly targets female headed households with a gross family income of up to BRL 1,600. The program also prioritizes the elderly, families with a member with a disability, and those who live in hazardous areas or who have lost their homes to a natural disaster.

Founded in 1987 in order to promote the right to housing among people in low-income brackets, the Landless Workers Movement East 1 oversaw housing project selection and construction. It was the first social housing project of the MCMV-E program. As the program prioritizes female headed households, the women led the process, made decisions about the building design and components and actively participated in the construction and oversight of the works. The women thus played a critical role in all project stages. These future residents also helped keep costs down by helping to complete a number of construction tasks. Their contributions, which included cleaning, gardening and the transportation of materials, would have otherwise required additional manpower.

This project benefited 396 families who currently live in informal settlements and slums on the periphery of São Paulo. It consists of eight buildings with eight to fifteen floors each, all with common areas and community facilities. The floor area of each apartment is 620 sq. ft., which is above the minimum floor area required by the program (450 sq. ft.). This space is frequently utilized by construction companies as part of the program's commercial branch. It is important to emphasize that the project promotes access for persons with disabilities and includes elevators, a bold and innovative addition to social housing projects in Brazil.

Besides actively participating in the project's design

and construction, the female heads of household can sign the loan contract independently from their spouse. The property titles, in the case of nuclear families, are in the women's names. Additionally, the women's property rights are guaranteed even in the case of divorce.

The attitudes, beliefs and practices utilized to exclude women are profoundly rooted and often closely associated with cultural, social and religious norms. These have a major impact on the material aspects associated with social reproduction, like access to an adequate home. For example, according to the World Economic Forum's Global Gender Gap Report, only 23% of the workforce in energy, mining and construction are women. Equal housing initiatives with gender perspectives like the Florestan Fernandes and José Maria Amaral project, a solid example of self-management and strong women's leadership, are essential in Latin America. Besides actively participating in the project's design and construction, the female heads of household receive greater legal protection since they are allowed to sign the loan contract independently from their spouse, the property titles are in their names, and their property rights are guaranteed even in the case of divorce.

PROVIDING REWARDS

Unlike a direct housing subsidy, a rewards system requires that certain quality, efficiency, and responsibility standards be met before funding is provided on the side of both supply and demand. By making financial rewards contingent on specific results, capacity building coincides with a change in behaviors and modus operandi.

HAITI HOME

Mortgage Expansion Program for Homes

HAITI

Population: 10.85 million (2016)
GDP per capita: USD 739.60 (2016)
Urban population: 59.6%

TIME FRAME

Year project was approved: 2015
Year project began: 2015
Year project was completed: underway

ACTORS

Project management: IDB, MIF, IDB Invest and the Haitian government
Project implementation: World Council of Credit Unions (WOCCU) and the Affordable Housing Institute (AHI) of Haiti, Habitat for Humanity International (HFHI)
Project design: IDB, MIF and IDB Invest

FINANCING

Type: USAID
Estimated budget: More than USD 21 million in local private capital invested in the Haitian real estate market and more than USD 6 million in housing loans disbursed

IMPACT

Number of residential units or solution: 5 financial institutions with improved housing financing products; 2 local developers with affordable and market-driven housing projects; 3 affordable housing projects with EDGE Green Building certification
Estimated population impacted: More than 700 homes benefit from the access to home financing and have seen their living conditions improve

House developed by the Haiti HOME program. Ph. Ministry of Housing and Urban Development, Haiti



HOME is a program that seeks to mobilize the private sector, creating public-private partnerships for the construction of affordable housing in Haiti. Its model is based on facilitating and incentivizing market actors on both the supply and demand side through a pay-for-performance model. Instead of imposing predefined solutions, it provides rewards and encourages creative thinking to mitigate risks, increase efficiency and manage human resources.

Haiti has an estimated housing deficit of 500,000 units, nearly 25% of the total housing stock for a nationwide population of 10 million inhabitants. This high percentage reveals that formal housing is out of reach for most. The average house in Port-au-Prince costs USD 250,000 while average wages are under USD 800 per year. On the other hand, access to home financing continues to be limited, with approximately 400 mortgages across the country. In Haiti, the formal real estate market has focused nearly exclusively on high-income housing while the international community has provided housing assistance for the most vulnerable sectors, principally after the 2010 earthquake. As a result, the housing needs of the Haitian middle class have yet to be addressed, since real estate developers and financial institutions perceive this social group as high-risk.

HOME is a three-year program funded by USAID for capacity building in the private sector to achieve the financing and construction of affordable housing and infrastructure in Haiti. Working with Haitian companies on the supply (construction) and demand (financing) side of the housing economic value chain, HOME has established a system that provides incentives and technical assistance to encourage affordable housing projects by the private sector.

On the supply side, HOME is working with real estate developers and land owners to support affordable and market-driven housing projects. Through pay-for-performance mechanisms, HOME creates incentives for developers to target low-income households, go to market, whet their appetite for risk, and construct and sell more quickly while reducing



House developed by the Haiti HOME program.
Ph. Ministry of Housing and Urban Development, Haiti



House developed by the Haiti HOME program. Ph. Ministry of Housing and Urban Development, Haiti

the sale price of the home. This way, the houses are more affordable and developers learn to adapt to the market while also earning high profits. By offering small incentives, HOME can leverage private sector funds to build a stock of affordable homes. In addition, in order to guarantee that the selected projects meet high environmental standards, HOME has partnered with the International Finance Corporation (IFC) to allow partner developers to obtain EDGE certification. Under these partnerships, HOME offers special incentives for developers to offset the additional investment of adopting international ecological building standards. These incentives aim to prevent price hikes in residential units for buyers.

On the demand side, HOME works with financial institutions to address the limitations affecting housing access in Haiti. HOME encourages the larger banks to increase their mortgage portfolios while expanding to lower income segments. The program also supports the capacity of smaller institutions through technical assistance that aims to improve credit underwriting procedures, sales force training, monitoring and sales to foster growth of the housing portfolio. Through pay-for-performance, financial institutions are incentivized to expand their portfolio while maintaining a low portfolio at risk (PAR) and to increase the participation of households headed by women.

Haiti HOME has catalyzed a fledgling real estate market and strengthened local actors to continue building and financing affordable homes long after the program ends. HOME has already trained three local developers to design, build and sell homes that target the lower-middle class. In total, three sites are under construction and two have already received the EDGE Green Building preliminary certificate. To date, real estate developers have mobilized over USD 10 million of their own capi-

tal, which represents a major investment for this Haitian sector. HOME continues to work with these developers to help them design larger projects that can begin to satisfy the needs of the Haitian population. On the demand side, HOME works with banks and credit cooperatives to increase access to home financing, especially informal homes, and has already mobilized over USD 6 million in mortgages and other home loans, benefiting more than 700 families.

The most important component of HOME is the program model itself. HOME is focused on facilitating and incentivizing existing actors on both the supply and demand side of the building market through a pay-for-performance model. Instead of imposing predefined solutions on the Haitian housing market or employing a traditional direct financing model for construction, the HOME program rewards financial institutions and developers for specific results through its HOME Facility fund. Contractors are thus encouraged to think creatively about measures to mitigate risks, increase efficiency at the organizational level and improve human resources to create affordable housing options in Haiti.

NEGOCIATED

Negotiated housing illustrates how different actors in the value chain can define standards and norms while setting a common agenda for a housing project's development. This can be seen in different ways, including participative processes, negotiating tables, decision-making committees and assemblies. The negotiation processes involve a more democratic distribution of control over habitat construction, increasing political credibility and ensuring better social results for the community.

REBLOCKING AND EMPOWERED SHACK

Innovation for Incremental Compliance with Urban Directives

CAPE TOWN, SOUTH AFRICA

Population: 55.91 million (2016)

GDP per capita: USD 5273.59 (2016)

Urban population: 65.3% (2017)

TIME FRAME

Year project was approved: 2008 (first experience),
2014 (political approval for reblocking)

Year project began: Seven projects between 2009-
2014 and one currently underway.

Year project was completed: ongoing

ACTORS

Project management: Ikhayalami and the South
African SDI Alliance

Project implementation: Ikhayalami.org, SDI South
African SDI Alliance, Community Organization
Resource Center (CORC), Ikhayalami and
neighborhood communities

Project design: Ikhayalami, SA SDI Alliance and
Urban Think Tank/ETHZ

FINANCING

Type: Community savings system, micro-financing
and governmental cooperation, donations by
Selavip and the Percy Fox Foundation for the
structures; infrastructure and public utilities
financed by the city; grant from the Swiss Re
Foundation.

Estimated budget: USD 800 for the aboveground
structure, development of infrastructure that
includes civil engineering, water and sanitation
at an estimated cost of ZAR 25,000 (USD 2085)
per installation; 72 aboveground structures with
a budget of ZAR 18 million (USD 1,384,615) and
ZAR 4.9 million (USD 376,930) for infrastructure:
highways, roads, water and sanitation.

IMPACT

Number of residential units or solution: 1,210
shacks improved by reconfigured designs;
installation of 297 additional toilets and 162
potable water taps, 72 two-story homes, 72
water taps, 72 bathrooms and all infrastructure,
including roads and paths.

Estimated population impacted: 4,840 people

A community participating in the reblocking process.
Ph. Andrea Bolnick for Ikhayalami.



The Reblocking-Empower Shack system entails a spatial reconfiguration of informal settlements achieved through a community negotiating model and a credit system that reduces the construction costs for residents who relinquish space to the project. The system proposes incremental compliance with urban directives through progressive solutions that propose to satisfy some standards while leaving others in a state of informality. Agreements are reached in negotiations with the government on gradually formalizing the houses and the neighborhood, without the need to wait for big plans or investments.

According to the 2011 South African Census, 20.5% of the homes in Cape Town are informal dwellings. Specifically, 13.5% of the city's homes are distributed between 204 informal settlements while 7% of the population resides in informal dwellings built as additions to formal homes. These informal settlements generally lack adequate municipal services or the community infrastructure to ensure a decent quality of life. At the government level, urbanization of the settlements is overseen by the Upgrading of Informal Settlements Program (UISP), though local governments are responsible for the implementation of specific policies. At the end of 2017, Cape Town proposed increasing the budget for 2018-2021 to USD 70 million for urbanization, USD 53 million for

the provision of infrastructure and social services, and USD 11 million for expanding power service to informal areas.

In 2006, Ikhayalami (which means "my home" in Xhosa) was established to research, develop and design innovative technical solutions for the formalization of irregular settlements. Reblocking involves a spatial reconfiguration of informal settlements designed and led by the community. In this process, houses are reorganized and rebuilt to maximize the space within a complex, dense urban fabric. The purpose is to organize the layout in a way that facilitates access to infrastructure, opens streets and creates public spaces. What is unique about reblocking is that it pro-



A community participating in the reblocking process.
Ph. Andrea Bolnick for Ikhayalami.



Building an Empower Shack.
Ph. Andrea Bolnick for Ikhayalami.

poses an on-site process, minimizing the disruption to residents' lives. At the same time, it contributes to community building: the residents are the ones to negotiate the project terms amongst themselves and with the authorities.

Reblocking is possible thanks to a community negotiating model and a system for Land Release Credit in which residents who relinquish space to improve the urban grid receive credit that later translates into a cost reduction when building a new home. Through Ikhayalami or another intermediary institution, the community transfers the state subsidies and donations, covering up to 60% of the building costs for residents who receive the credit. Community members choose the new typology based on their payment capacity and the level of community contribution determined by a leadership score designed by the members of each neighborhood. This system also facilitates fair redistribution and makes the most of state subsidies, particularly when those resources are limited.

The new housing typology, Empower Shack, is a collaborative project between Ikhayalami, the community, and the Urban Think Tank at ETH Zurich. The new house model proposes two stories to reduce the size of the ground floor and allow families to relinquish space for reblocking. The developed methodology incorporates evaluations of home affordability, the drafting of contracts and reimbursement management so that each family can choose a model from among the different typologies. The new houses are designed jointly with the community and are aimed at incremental compliance with regulations. In other words, the new houses strategically respect certain standards but leave others in the hands of families,

allowing them to gradually advance towards compliance with the city's other design and building directives in accordance with their needs. This way, agreements are reached in negotiations with the government on gradually formalizing the houses and the neighborhood, without the need to wait for big plans or investments.

In 2014, the municipal government adopted this system as a response to environmental disasters and one of the main official strategies for the formalization of settlements.

Reblocking is a tool for building both a physical and social structure; it gets communities to work towards a common agenda by improving houses and public spaces. Both prove important because one of the main challenges in the urbanization of informal settlements is the social complexity that accompanies the legalization of the land. Reblocking and incremental compliance with regulations are systems that propose progressive—not temporary—solutions to issues of land tenure, infrastructure access and compliance with urbanization and construction standards. There have been no cases of displacement during the project, despite the fact that spaces have been liberated for community patios, the provision of water and sanitation services, electricity, and the introduction of road hierarchies of primary and secondary streets.

PARTICIPATORY

Community participation can be defined as people from a neighborhood or group engaging in projects to solve their own housing problems. As a model, participatory management can be defined as a small-scale, step-by-step approach to produce a certain type of habitat. From a multidisciplinary viewpoint, participation is understood as a mechanism that gives subjects full awareness of their decisions based on an in-depth understanding of their own reality and provides collective access to knowledge and information.

UTSHANI FUND

From Self-building to Community Control in
Housing Construction

SOUTH AFRICA

Population: 55.91 million (2016)

GDP per capita: USD 5,273.59 (2016)

Urban population: 65.3% (2017)

TIME FRAME

Year project was approved: 1995

Year project began: 1998

Year project was completed: ongoing

ACTORS

Project management and implementation: uTshani
Fund, Community Organization Resource Centre
(CORG) and Slum Dwellers International SDI

Project design: Federation of the Urban Poor,
South Africa

FINANCING

Type: subsidy, donations and collective savings
systems

Estimated budget: USD 2.5 million seed capital

IMPACT

Number of residential units or solution: 13,000
homes

Estimated population impacted: 55,000 people

Homes built by the community.
Ph. uTshani Fund and Sibalawe Mona.



uTshani fund is the largest NGO working on housing policy in South Africa and it provides administrative assistance and bridge financing to support the community. By administering the subsidy fund, the community is involved in the housing decision-making process; specifically, in determining quality standards, the types of public spaces and their characteristics, as well as ensuring that pre-agreed conditions are met, etc. This case highlights the importance of participatory housing and including alternative developers in the housing market to meet higher quality standards.

uTshani fund is the largest Housing Support Center in South Africa's People's Housing Process (PHP) policy. The PHP was created in 1998 to support low-income communities in need of housing, land, services and technical assistance. The PHP program yields higher-quality housing than traditional approaches by focusing on self-building, strengthening social cohesion, improving the local economy and training inhabitants. The PHP policy does not offer individual subsidies; it only finances communities where there is already cooperation between the beneficiaries or where the beneficiaries agree to pool their resources (money, labor) to create a housing project. The subsidy can be accompanied by a donation to start up a new "support organiza-

tion" (NGO or grassroots organization) or enable an existing "support organization" or Housing Support Center to complete the project application process, which includes preparatory work, submission to Provincial Housing Development Boards and community workshops.

uTshani Fund was set up in 1995 as the financial arm of the Federation of the Urban Poor (FEDUP) to provide loans and manage subsidies for community-led initiatives related to housing construction, land acquisition and incremental informal settlement upgrading. Although uTshani works in the housing field, it is not a "housing delivery" agency, but instead provides administrative assistance and bridge financing.

ADVANTAGES OF COMMUNITY-DRIVEN HOUSING

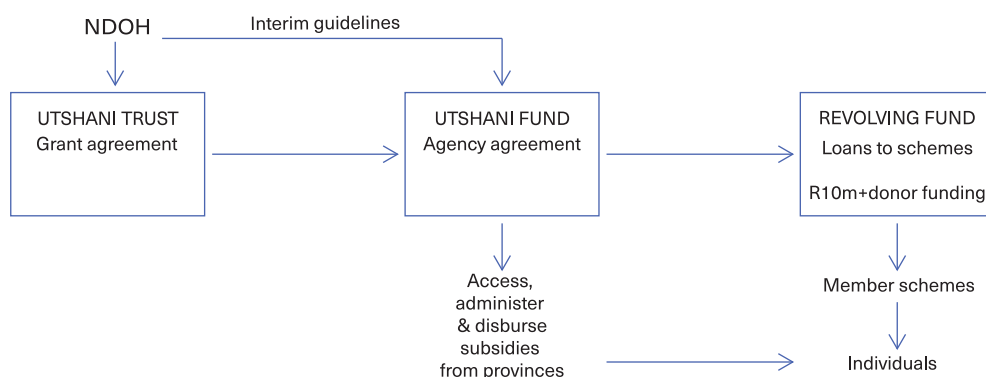
How do uTshani Fund projects compare to developer-driven RDP housing?

The Fisantekraal development in the Western Cape has had two major housing projects, one an uTshani-facilitated Peoples Housing Process (PHP) development and one a government-funded Reconstruction and Development Programme (RDP) project. Through a comparison of the experiences of the beneficiaries of both projects,* it is evident that uTshanis community-centered approach to tackling the housing deficit in South Africa is more beneficial, cost-effective and successful than mass government-funded housing.

*based on a comparative study by Derek Farman (2012) at the University of Cambridge

uTshani Fund			Developer driven housing
Community Building	92%	% of beneficiaries that participated in building their own and others' homes	0%
	52%	% of beneficiaries that are involved in community activity	6%
	94%	% of beneficiaries that feel a sense of community	18%
Skills Development	% of beneficiaries who learnt skills		
	70%	Cement mixing	0%
	22%	Plastering	0%
	12%	Brick laying	0%
	10%	Painting	0%
	16%	% in employability and earning power	2%
House Quality	16%	% of beneficiaries that changed occupations because of skills gained	0%
	28%	% of beneficiaries that report faulty workmanship and failed roofs	62%
Sweat Equity	56%	% of beneficiaries that report issues with infrastructure services	76%
	88%	% of beneficiaries that contributed savings and labour to their homes	48%

Comparison of the uTshani Fund and RDP projects. Source: Derek Farman.



The uTshani Fund organization. Source: uTshani Fund.

The fund supports the system of PHP subsidies through Housing Savings Schemes. uTshani Fund started with an initial capital of USD 2.5 million from community savings groups, government grants and private donors. By 2016, the fund had facilitated the construction of 13,000 houses worth over USD 33 million throughout South Africa. Initially, the fund's priority was to use donated capital to pre-finance community-led housing delivery and design, recover bridging loans through successful subsidy applications and revolve these funds back into new innovative initiatives. For example, the fund is now part of Total South Africa's Awango Solar Project, which aims to supply solar energy to informal settlements and low-income neighborhoods.

The uTshani projects ensure that delivery to communities is more efficient and socially just. By way of comparison, the construction of the Fisantekraal housing complex in the Western Cape received assistance from both uTshani and the traditional Reconstruction and Development Program (RDP). The results of the two experiences illustrate the success of housing development led by and for the community. In the uTshani project, 94% of residents reported feeling a sense of belonging to the community, while only 18% of those in the RDP responded positively; 16% of the uTshani beneficiaries increased their access to employment and income while none of the RDP residents reported benefits in terms of employment or training. Moreover, while 26% of uTshani residents reported construction problems in their homes, this figure rose to 62% for the RDP project.

In line with the recent emphasis on informal settlement upgrading policies, uTshani Fund has started up the Community Upgrading Financing Facility (CUFF), which funds small upgrading projects ini-

tiated by communities living in informal settlements. CUFF's goal is to demonstrate to local and national government how they can optimize the use of funds.

Unlike individual subsidies, PHP projects provide a network to connect households with a common interest in cooperating on a housing project. uTshani Fund has been a national and international pioneer in the field of land tenure security, incremental development, innovative financing and the creative use of policy instruments and subsidies through pragmatic partnerships with government. By governing and managing how the subsidy fund will be used, each community can participate in the housing decision-making process, defining quality standards and the typologies and characteristics of public space, etc. In addition, by taking charge of the construction of the neighborhoods and infrastructure, the community can oversee the materials and ensure that the work is being carried out according to the pre-agreed standards.

ENERGY-EFFICIENT

Bioclimatic or ecological homes are those that achieve optimal habitability conditions with minimum energy consumption by taking into account the orientation of the building, the land and surrounding nature. They are inexpensive to maintain and do not depend on non-local sources of energy. In some cases, the materials used for their construction meet responsible production standards.

ZERO ENERGY HOUSING

Technological Innovations that Save Energy

SOUTH KOREA

Population: 51.25 million (2016)

GDP per capita: USD 27,538.81 (2016)

Urban population: 82.59% (2016)

TIME FRAME

Year project was approved: 2012

Year project began: 2016

Year project was completed: 2017

ACTORS

Project management: Nowon District Government

Project implementation: Consortium led by

Myongji University, Nowon District Government, Seoul Metropolitan Government, the construction company KCC E & C and SH Urban Research Institute

Project design: Professor Myuongju Lee, from the Faculty of Architecture at Myongji University, and the head of the Nowon district, Sunghwan Kim

FINANCING

Type: Public-private consortium

Estimated budget: USD 45 million

IMPACT

Number of residential units or solution: 122 homes

Estimated population impacted: around 488

people

The EZ HOUSE residential complex, in the Nowon district, is the first zero-energy apartment building in South Korea. It was designed in 2012 by Myuongju Lee and Sunghwan Kim. Dozens of new technologies were utilized, many for the first time in the country, on different building components. EZ HOUSE is expected to achieve much more than its original goal and produce more energy than it needs. A residential building thus becomes a potential urban power plant.

Addressing energy consumption in buildings creates important long-term benefits, such as a reduced environmental impact, lower operating and maintenance costs, resistance to power outages and greater energy security. In South Korea, residential and service buildings account for 20% of energy consumption, exceeding even the transport sector. In the late 1990s, the Ministry of Construction and Transportation introduced the concept of sustainable development and design into residential community projects and new city development. An interdisciplinary team of researchers hired by the national government established design guidelines for sustainable residential communities and created assessment tools to measure a community's sustainability. As a result,

the government developed the Green Standard for Energy and Environment Design (G-SEED) System, which was finally launched in 2002.

The EZ HOUSE residential complex, in the Nowon district, is the first zero-energy housing complex in South Korea. It was devised in 2012 by Professor Myoungju Lee, from the School of Architecture at Myongji University, and the district head, Sunghwan Kim. The Nowon District Government and Myongji University embarked on the construction of three apartment buildings; however, their budget of USD 4.5 million could only cover a tenth of the total resources needed. A consortium was thus set up, led by Myongji University, the Nowon District Government,



EZ HOUSE Building.
Ph. Courtesy of Dr. Eung-Shin Lee.



EZ HOUSE Building.
Ph. Courtesy of Dr. Eung-Shin Lee.



EZ HOUSE Building.
Ph. Courtesy of Dr. Eung-Shin Lee.

the Seoul Metropolitan Government, the construction company KCC E & C and SH Urban Research Institute

The Seoul Metropolitan Government laid out numerous requirements for evaluating the contracts as EZ HOUSE was not just the first zero-energy housing complex but also the first administered and leased by a district government. The complex took four years to develop due to myriad challenges: administrative processes, contract evaluations, price bidding, energy simulations, approvals by different committees and the need to adapt regulatory frameworks to the innovations, among others.

The team initially built a prototype home to test its performance for a year and evaluate the experience of residents. Various high-efficiency materials and technologies were monitored and adapted for the final construction of the complex. Dozens of new technologies were applied to different building components, fifteen of which were used for the first time in the country, such as a geothermal system for heating, cooling and hot water pipes and specially designed windows and doors to prevent energy and heat loss. As a result, the residential complex generates over 407,503 kWh/year of electricity and 229,278 kWh/year of heat. The surplus electricity is transmitted to public services through a micro-network system. The buildings have 1,300 solar panels integrated into the design of the facades and each unit was built using energy-saving technology, including triple-glazed windows, aluminum shutters and high-quality insulation. The concrete walls are twice as thick as those of normal buildings to enable the apartments to maintain a temperature of 20° C during the winter without heating.

The total construction cost amounted to USD 27.4 million (KRW 31,430 million), only 1.7% of which was

spent on imported materials. Eighty percent of the inhabitants of the 122 homes are newlyweds and 10% are senior citizens. According to the Ministry of Land, Infrastructure and Transport, EZ HOUSE will allow residents to save up to USD 900 per year on energy bills as the building generates enough resources for cooling, ventilation and lighting.

We can now imagine residential buildings becoming power plants within cities and helping to significantly reduce the living costs of their inhabitants. The hope is that EZ HOUSE will far surpass its zero-energy goal. The monitoring results show that it will actually produce an annual surplus of energy. Public sector innovation is a continuous process of testing, refining, repeating, adopting and replicating, which requires a sustained commitment and an active partnership with the private sector. All the EZ HOUSE data and results will be shared with the public to improve construction standards. The Ministry of Land, Infrastructure and Transport will also prepare zero-energy residential building design guidelines based on the EZHOUSE monitoring findings and share them with the private sector to support the industry and stimulate the market.

THE RURAL-URBAN FRINGE

Rural housing is different from urban housing; grasping its complexity is critical given that, in rural areas, housing not only responds to residential needs but is also the setting for productive activities. Today, the division between rural and urban areas disappears in regions that are socially, environmentally and economically interdependent. In order to better analyze housing on the rural-urban fringe, it is necessary to understand the local context, the activities that take place there, the surrounding economy and environment, as well as family relationships.

ASSISTED INTEGRAL IMPROVEMENT (MIA)

Housing for Rural Populations

MEXICO

Population: 127.5 million (2016)

GDP per capita: USD 8,201.31 (2016)

Rural population: 20.48% (2016)

TIME FRAME

Year project was approved: 2009

Year project began: 2009

Year project was completed: ongoing

ACTORS

Project management, implementation and design: MIA Group

FINANCING

Type: state subsidies and microloans

Estimated budget: each house costs around USD 5,000 and improvements around USD 1,200 per unit

IMPACT

Number of residential units or solution: around 30,000 houses. The states that have most benefited are Oaxaca, Veracruz, Tabasco and Puebla

Estimated population impacted: 150,000 people

A rural area for a MIA project
Ph. MIA Program.



The MIA model is an innovative solution that offers affordable quality housing for Mexico's rural population. MIA provides integral project management: it purchases the construction materials, takes charge of the building logistics, helps clients with financing and works with the federal, state and local governments to secure the subsidies. It also carries out technical inspections and ensures that land tenure is guaranteed by the local government.

Although Mexico has been characterized by continuous urbanization since the mid-20th century, around 20% of the population continues to live in localities with under 5,000 inhabitants and 22% in localities with under 2,500 inhabitants. In some states, such as Chiapas, communities with fewer than 2,500 inhabitants account for over half of the population. In 2015, there were around 3.1 million agricultural laborers in Mexico, of whom 90% have no legal contracts and 60% live in poverty with their families (around 1.7 million households). Although in recent decades the Mexican government has built a large amount of subsidized housing, at a rate of 750,000 homes per year since 2005, most of the beneficiaries live in big cities, while rural and peri-urban populations have received little in terms of housing assistance. Between 2006 and 2015, the Vivienda Rural (Rural Housing) program offered around 630,000 loans for rural housing beneficiaries, a number that covers just a small portion of the demand.

MIA takes charge of identifying rural and peri-urban communities in need of adequate housing solutions, builds the homes and helps the future owners through the financing process in partnership with the local government. This group has focused on communities in central and southern Mexico, where rural poverty is more highly concentrated than in other parts of the country. The company used additional criteria to identify its target communities, such as the diversification of income streams, weather conditions and the institutional capacity of local governments.

To gain entry into the communities, MIA hired social promoters: people trusted by the target community who spoke the local dialect and were able to initiate the collaboration with the company. The social promoters identify the leader of the community and talk about the possibility of building houses there. MIA then organizes a community meeting with potential home buyers and local authorities. At the meeting,



MIA beneficiary families.
Ph. MIA Program.



MIA beneficiary families.
Ph. MIA Program.

the financial model is explained, drawings and photos of prototype houses are shown and the interested parties are informed that in order to be accepted into the program, they must make a down payment equivalent to 5% of the housing cost. Those interested are evaluated according to their eligibility for government subsidies and their financial capabilities. The legal status of the property is also analyzed and, if necessary, the local authorities are asked to issue a record certifying the person's right to the land on which they wish to build the house.

MIA offered three types of housing solutions. The "traditional" model is a complete house built in approximately 30 days for an average price of USD 5,000. The "incremental" version, the most popular solution, is built in four stages (ceiling, floor, walls and finishing) depending on the family's financial resources. Finally, there is the "exterior" type, with an average price of USD 1,200, whereby MIA builds just the foundations, the walls and the roof. The company provides all the construction materials from four large suppliers and negotiates prices for bulk purchases. It then transports the materials to the communities and offers two construction options: the owners can either build the house themselves or else pay more for workers to build the home. At present, the company has a portfolio of over 100 subcontractors (known as "MIA partners") and small construction companies that supply manpower. Whichever of the two options the buyer chooses, MIA offers technical advice and building supervision.

In order to be economically viable, MIA needs at least 25 client families per community. The business model depends on government subsidies: the federal government pays between 50% and 60% of the cost, while the state or municipal governments pay between 10% and 15%. The owner must pay 5% in cash in advance; this down payment is made through a financial intermediary such as Habitat for Humanity. The remaining balance is financed with a

microloan from a private institution or a philanthropic organization such as Habitat for Humanity or Grameen Bank Mexico. The owners take out these loans for a period of three to seven years, at an interest rate that varies between 7% and 35%. The loan default rate among MIA owners is less than 3%. After verification by the company, the owners normally make their deposit using mobile money transfers. Habitat informs MIA of receipt of payment and MIA delivers a portion of the construction materials and sends consultants to the site. When one-third of the house has been built, the federal government pays MIA 30% of the total subsidy it will provide and, upon completion, disburses the remaining 70%.

The MIA model is an innovative solution, offering affordable quality housing for Mexico's rural population. MIA identifies communities in need of an adequate housing solution, builds the homes and helps the future owners through the financing process, in cooperation with the local government. MIA's success is based on the fact that it offers complete project management: it purchases the construction materials, takes charge of the building logistics, helps its clients with financing and works with the federal, state and local governments to secure the subsidies. It also carries out technical inspections and ensures that land tenure is guaranteed by the local government. MIA's greatest asset is its ability to manage the coordinated actions of the public sector, the private companies involved in the multi-stage construction, the third sector and cooperative banks, and communities in remote rural areas that have historically been relegated by housing policies.

COMMUNITY

Community housing strengthens ties between residents and also benefits from the social capital that the community generates. In this type of housing, the entire community is responsible for habitat production and management, not just the family unit. This creates a social synergy that allows a community to achieve more ambitious goals than an individual family could on its own. Community management proposes shared common goods that not only reduce expenses but also guarantee a project's sustainability.

COMMUNITY MORTGAGE PROGRAMS

The Role of Community “Mobilizers”

PHILIPPINES

Population: 103.3 million (2016)

GDP per capita: USD 2951.07 (2016)

Urban population: 45.3%

TIME FRAME

Year project was approved: 1989

Year project was completed: ongoing

Year project was completed: ongoing

ACTORS

Project management: National Home Mortgage Finance Corporation

Project implementation: Social Housing Finance Corporation (SHFC)

Project design: Community Mortgage Program

FINANCING

Type: national budget

Estimated budget: USD 111 billion in loans for 1989-2014

IMPACT

Number of residential units or solution: 2,403 housing and infrastructure projects

Estimated population impacted: 270,160 families

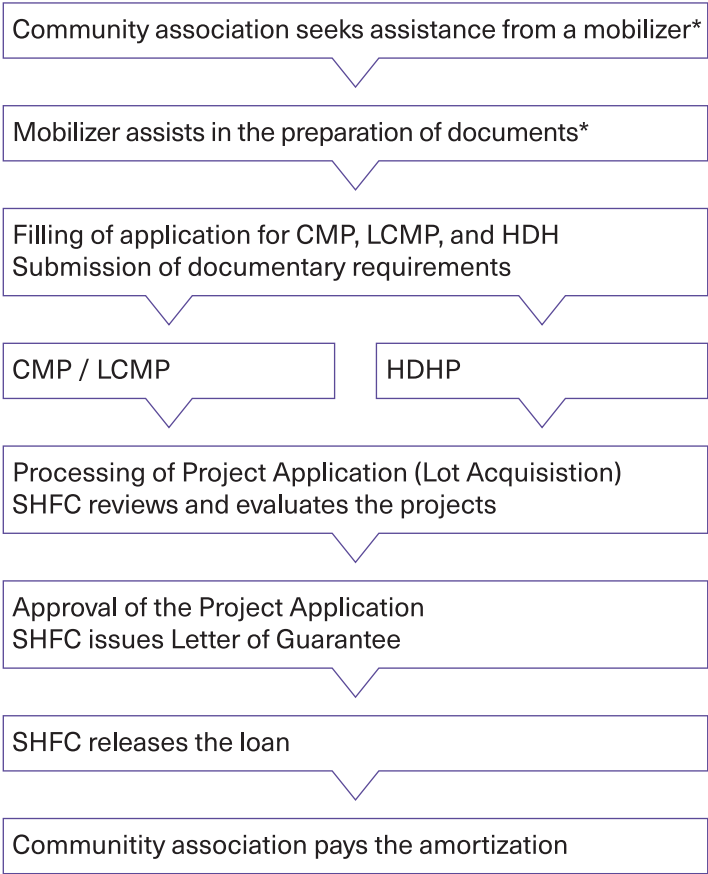
CMP Project. Ph. People's Process Shelter - Volume 1 - Communities UNHABITAT.



In 1988, the Philippine government launched a community mortgage program through the National Home Finance Corporation. The Community Mortgage Program (CMP) allows communities to request a group loan for land purchases using the same land as collateral for the loan. Any member or representative of a community organization can approach a CMP mobilizer, who assists the community in its own internal negotiations and in its dialogue with the government. The purpose of the mobilizer is to help communities obtain loan approval and build community housing.

According to estimates from the Family Income and Expenditure Survey (FIES), informal settlements in the Philippines grew 7.2% annually between 1991 and 2012. The Metropolitan Manila Development Authority estimated that in 2010, informal settlements were home to 2.8 million residents, that is, 556,526 families in the city's metropolitan area. Of this total, 104,000 families occupy areas identified by the Department of the Interior and local government as dangerous zones, such as railroad tracks, garbage dumps and the shores of channels, rivers and streams. The traditional financial system is mainly designed for sectors with formal salaries and for individual borrowers. These loans are not accessible for families working in the informal economy who are not members of the Government Service Insurance System.

In 1998, the Philippines government launched a community mortgage program through the National Home Finance Corporation (NHFC) to help poor urban households acquire the titles to the land they occupy and develop their homes and communities. The Community Mortgage Program (CMP) allows the organized communities to request a group loan for land purchases using the same land as collateral for the loan. The community can also apply for site development loans and for home building or improvement loans. The program especially helps communities living in at-risk areas that voluntarily choose to relocate. Access to the CMP funds is designed to support each stage of housing development, from land purchase to site development and home improvements. The



CMP flowchart. Source: Marife M. Ballesteros, Tatum P. Ramos and Jasmine E. Magtibay.

* For the HDHP, SHFC-accredited Civil Society Organizations and/or LGUs assist CAs.

Process Flow of the CMP, LCMP, and HDHP



CMP sets a limit on the loan amount per family and per stage for each community. The maximum loan amount is PHP 100,000 (USD 1,864.58). If the sales price exceeds this amount, the community must pay the remaining capital.

The NHFC sets an annual target for the number of CMP beneficiaries. Any member or representative of a community organization can approach a CMP mobilizer.

Mobilizers play a key role in guiding communities and the list of beneficiaries depends on them, since they determine which communities are prepared to take responsibility for a group loan. In addition, they work with a community to increase its loan eligibility through social cohesion and its ability to raise capital, evaluate purchase agreements and confirm that there are no liens on the property. The community may prepare itself by increasing the financial resources of members through community savings groups and other funding sources. The mobilizers are expected to help the communities in the CMP process, creating a profile for each community, its members, and the project site. They should also provide communities with information about how the CMP works and teach them about how to read titles and subdivision plans.

In 2018, there were 82 CMP mobilizers, including local government units, NGOs and national government agencies. In terms of the government agencies, only the National Housing Authority is active in mobilizing communities for this program. The NGOs have the highest percentage of completed projects (54% of the total); the local government units are responsible for 33% and government agencies, 14%. However, the national government agencies have been more active in individualizing property titles for different commu-

nity members, with titles assigned to individuals in 41% of its projects.

The SHFC pays a fee to mobilizers for each project they complete. The post-take fee is an incentive for the mobilizer to provide community development services after the loan has been approved and support the community in the medium term. Although there are not enough incentives for the mobilizers to undertake additional capacity building activities after the project delivery, it is unlikely they will abandon the community since their fee is not paid until the loan is approved.

After nearly 30 years of operation, the CMP has increased access to home acquisition or construction for poor communities. Although this policy is geared to the financial advancement of communities working in the informal economy, the families with prioritized access to the program are not necessarily the poorest communities. Due to the rising cost of land in the city and the maximum limits on household loan amounts, it is increasingly more difficult for the poor to be part of the program. The CMP mobilizers play a key role by understanding the social and economic complexities of the community and the formal public policy requirements and by helping communities get loan approval for the building of community housing.

GREEN

Green housing incorporates sustainability criteria into design and construction, thereby reducing its environmental impact. This new method of planning is based on creating sustainable designs aimed at both environmental conservation and social and economic development. It looks to optimize the use of natural resources and building systems in order to minimize the environmental impact of these constructions on the surroundings and on residents themselves.

HIPOTECA VERDE AND ECOCASA

Incorporating Eco-technology through Accessible Credit

MEXICO

Population: 127.5 million (2016)

GDP per capita: USD 8,201.31 (2016)

Rural population: 20.48% (2016)

TIME FRAME

Year project was approved: 2007

Year project was completed: ongoing

ACTORS:

Project management: Sociedad Hipotecaria Federal (SHF)

Project implementation: INFONAVIT

FINANCING

Type: subsidized loans

Estimated budget: The German Development Bank (KfW) has contributed USD 105.5 million in funding; the Clean Technology Fund provided USD 49.4 million in financing for housing developers and USD 2.1 million in non-refundable financial contributions; the IDB provided USD 50 million from its ordinary capital fund for the acquisition of EcoCasas; the European Union granted USD 9.3 million for non-refundable financing for passive houses; and the German Energy and Climate Change Department contributed USD 13.3 million to implement Nationally Appropriate Mitigation Actions (NAMA) on housing.

IMPACT

Number of residential units or solution: 56,307
certified EcoCasa Mexico housing units (47,302 housing units funded, 84%), 75 developers, 201 projects, a 1,801,824-ton reduction in CO2 emissions over the life span of the housing units
Estimated population impacted: 219,597 Ecocasa beneficiaries



Houses financed with Hipoteca Verde.
Ph. ECOCASA.

The Hipoteca Verde (Green Mortgage) program was created in 2007 by the National Housing Fund for Workers (INFONAVIT) with the aim of improving the quality of life of its borrowers by reducing household spending. The program grants a credit that supplements the mortgage and permits a family to acquire a home that is equipped with efficient technologies to reduce water and energy consumption. In addition to fostering family savings and minimizing environmental impact, the program encourages technological innovation.

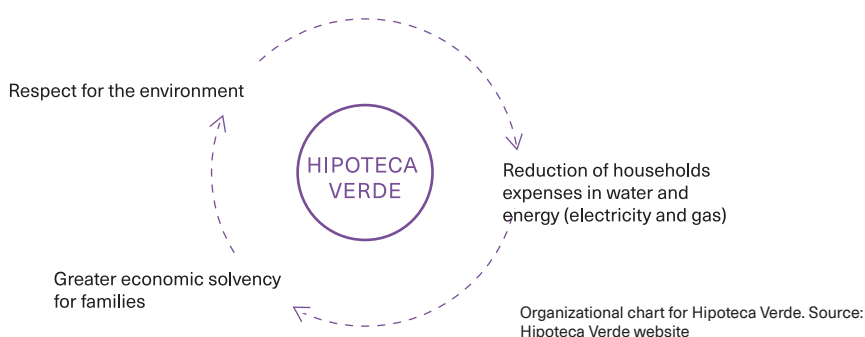
Following the signing of the Paris Agreements, Mexico set a goal to cut its CO2 emissions by 50% and thus limit the global temperature rise expected for 2050. According to the National Housing Commission, the construction sector is a good place to begin these efforts, as it is responsible for more than 50% of greenhouse gas emissions; these stem from the manufacture of construction materials, their transport, the building construction processes and the use of buildings once they are finished. Housing constitutes approximately 17% of total energy consumption in Mexico. A rising population and a growing demand for quality housing have, in turn, created a demand for approximately 600,000 new units per year. Furthermore, due to the growth of the Mexican population, it is estimated that seven million homes will be built by 2050, emitting 25 million tons of greenhouse gases. In 2012, the CONAVI developed the first Nationally Appropriate Mitigation Actions (NAMA) for the development of new

housing. The focus has been low-cost options for poor households, as a significant proportion of new construction will target that sector.

Hipoteca Verde is a housing finance program developed by the National Housing Fund for Workers (INFONAVIT) to encourage the use of energy-efficient systems and technologies in low-income households. INFONAVIT provides low-interest loans to its customers, 60% of whom are low-income workers. The program is aimed at improving the environment, promoting the incorporation of sustainability criteria in the construction of homes, mitigating climate change and ensuring energy and water savings, which makes homes more affordable. Families purchasing homes with INFONAVIT receive additional funds by way of a “green” mortgage—an additional credit of up to USD 1,250 on top of the mortgage itself—to cover the cost of additional eco-technologies. The initiative encourages developers to build



Houses financed with Hipoteca Verde.
Ph. ECOCASA.



homes using energy-saving materials and technologies, while the low-rate mortgages allow families to save enough on their utility bills to offset the increase in their monthly mortgage payments. Estimates from the Hipoteca Verde program show savings of up to 50% in electricity and gas consumption, and a reduction in annual water waste of approximately 5,000 liters per housing unit. These efficiencies translate into monthly economic savings of between MXN 100 (USD 5) and MXN 400 (USD 20), depending on the location of the housing unit.

The program finances approximately 22 eco-technologies, which include energy-saving light bulbs, thermal insulation of the roofing and walls, reflective coatings, solar water heating, ecological toilets and showers, water-saving devices, insulated pipes, flow-control valves for potable water pipes, water purification filters, a purified water supply, and waste separation containers, among other items.

The ECOCASA program is based on the concept of “overall house performance.” It does not promote the use of specific materials or eco-technologies, but instead leaves it up to the developer to choose the most suitable options for the housing prototype and bioclimatic zones where the development is located. In this way, the program supports both innovation and technological advances. ECOCASA seeks to drive a transformation of the housing market in Mexico by incorporating measures that reduce greenhouse gas emissions by at least 20% over conventional housing, and by granting concessional loans for the construction of energy-efficient housing.

The program has also granted USD 2 million in technical cooperation resources aimed at:

a) supporting the development and implementation of procedures for simulations, rating, inspections and monitoring of the thermal performance, water usage, accessibility (location) and life cycle of the construction materials of the housing;

b) strengthening skills in the housing industry and housing finance institutions by way of technical studies and training opportunities;

c) disseminating knowledge of low-carbon housing among the general public, the construction industry, universities and government institutions at the national and local level; and

d) developing public policies for low-carbon housing. At the end of June 2017, the program had financed a total of 30,935 housing units.

This initiative aims to encourage developers to build homes using simple energy-saving materials and technologies. The project raises environmental awareness among the general public, ensures a healthy living environment and improves accessibility to housing for low-income households (although it extends to households of all income levels). Estimates from the Hipoteca Verde program show the initiative saves up to 50% in electricity and gas consumption, in addition to annual water savings of approximately 5,000 liters per housing unit. Efficiency translates into substantial economic savings for every family. Thus, in addition to promoting family savings and lower environmental impact housing, the project also contributes to promoting other areas—such as technological innovation—by serving as a platform for the development and implementation of new technologies for the efficient household use of water and energy.

SCALABLE

“Scalable housing” refers to a strategy for expanding residential units or housing stock. Scalability may refer to the size of the dwelling; for instance, a small unit where home additions can be made on a scheduled basis, or a dwelling that can be subdivided internally. The term can also allude to incremental compliance with housing standards, in accordance with each town’s applicable building and urbanization codes.

THE ASIAN COALITION FOR COMMUNITY ACTION PROGRAM

Correlating Micro-Experiences in Order to Scale up Community Projects

SOUTHEAST ASIA

Population: 656,310,792

Urban population: 49.2%

TIME FRAME

Year project was approved: 2009

ACTORS

Project management, implementation and design:

Asian Coalition for Housing Rights (ACHR)

FINANCING

Type: community savings, state subsidies and donations

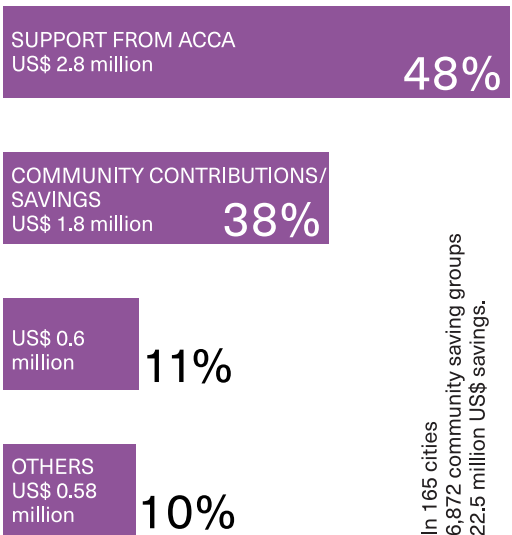
Estimated budget: seed capital of USD 58,000 per community

IMPACT

Units or solution: 146 housing projects and 2,021 small projects for neighborhood upgrading

Estimated population impacted: 49,356 families

ACCA financial breakdown.
Source: Asian Coalition for Community Action Program.

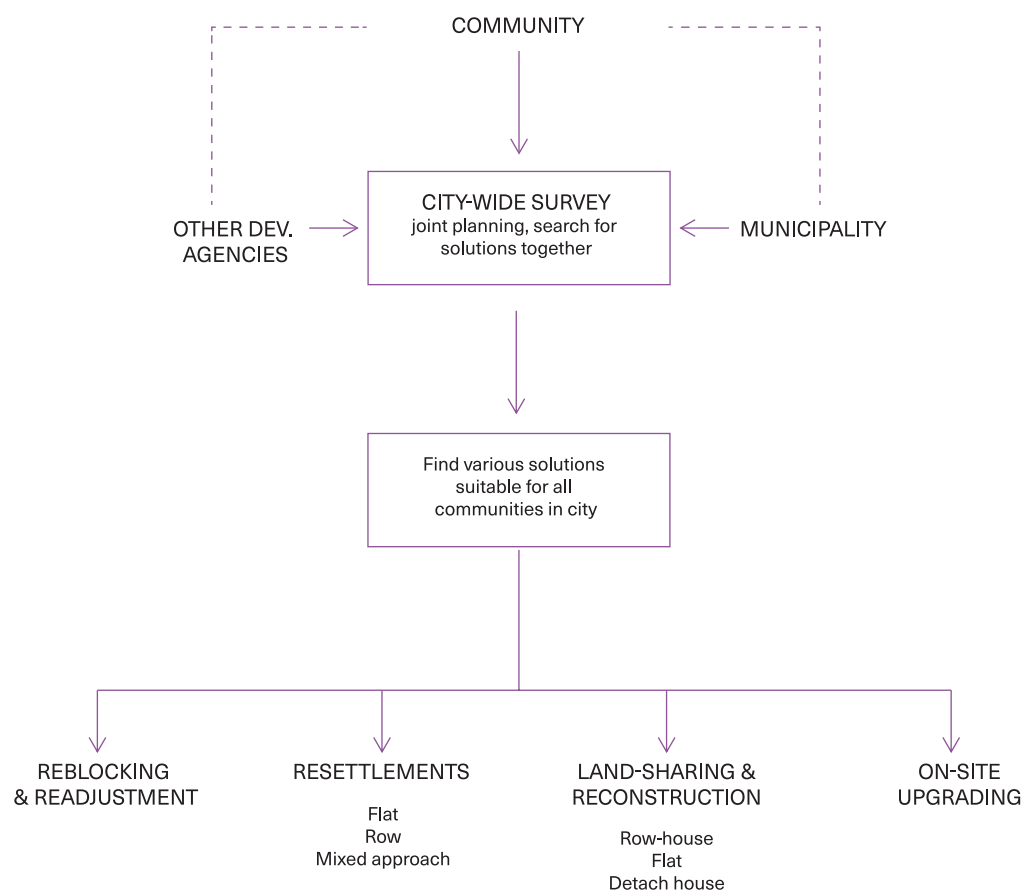


The Asian Coalition for Housing Rights has established the Asian Coalition for Community Action Program (ACCA), an initiative that supports the replication of good community-led urbanization practices in 215 cities in 19 countries. Its main functions are to support, establish and strengthen collaboration mechanisms in order to build networks and facilitate learning and cooperation. To date, ACCA has supported 146 housing projects that have benefited 49,536 families, as well as small-scale upgrading projects that have allowed 342,399 families to develop practical, community-led solutions in collaboration with their governments.

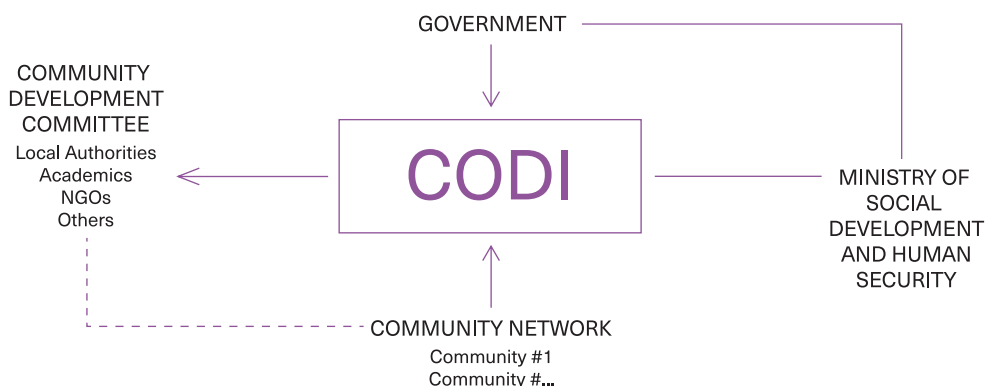
The Asian Coalition for Housing Rights (ACHR) is a network of community organizations working on issues related to urban poverty, informal settlements and housing. It supports the establishment and development of grassroots organizations for the urban poor. Generally speaking, these are organized into community savings groups. The ACHR offers technical support to these organizations, providing architects and urban planners to carry out surveying, develop maps and draw up comprehensive plans for upgrades or relocations. In general, communities combine their savings with development funds that allow them to take advantage of public financing provided by local and national governments, or even funding from international donors for large-scale development projects. By connecting residents of these informal settlements to their cities, country and region, the ACHR provides an opportunity for the

urban poor to influence land and housing policies.

The Asian Coalition for Community Action Program (ACCA) is an Asian Coalition for Housing Rights initiative that supports the replication of good community-led urbanization practices. This ambitious plan has operated as a sort of regional experiment in 19 countries and 215 cities. Its main functions are to support, establish and strengthen collaboration mechanisms that build networks and facilitate the learning and cooperation that will continue long after the ACCA projects are finished. It also builds relationships with other networks, such as CAN, the Community Architects Network. To date, 146 housing projects have been implemented with ACCA's support, benefiting 49,356 poor urban families. Small projects for upgrades—such as walkways, drains, toilets, water supplies, community centers and



Urban upgrading: Communities and different sectors involved in city development to find housing solutions.
Source: Asian Coalition for Community Action Program.



ACCA organizational chart.
Source: Asian Coalition for Community Action Program.

solid waste and composting systems—have been implemented in 2,021 poor communities, allowing 342,399 families to develop practical, community-led solutions to the problems they currently face which, in turn, leads to greater collaboration with their local governments.

In all of the countries where it operates, ACCA projects are implemented by groups already working on issues related to poverty and housing, or by key groups that come together to work on a project. Most of these groups—which include grassroots community organizations, NGOs, architects and development institutions—are already connected and have worked together within the ACHR network. ACCA projects act as catalysts: the core program activities—representing 58% of the budget—are focused on small-scale upgrades and large housing projects, which try to function as a blueprint in each city. Local groups develop the plans for these projects, which are then presented to the regional ACCA committee for review and approval. The ACCA structure is comprised of the following bodies:

- A regional ACCA/ACHR committee, which coordinates the affiliated institutes at the regional level, and reviews and approves the projects proposed by local members. The 15 members of the committee meet every two to three months. This regional body is key for learning, sharing, assessing and supporting the cities involved in the program, as well as organizing exchange visits and forums, and connecting with international organizations.
- Sub-regional support systems, which are made up of groups from neighboring countries. These groups assist each other on a regular basis and to an increasingly higher degree (particularly in Indochina and South Asia). Generally speaking, they communicate by way of national committees that connect community groups, government officials and NGOs.

- City development committees, which are present in most of the cities, and a working group that provides a platform for community networks, municipal governments, civic groups, NGOs and academics to plan, examine land issues and support change in the cities has been established. These committees represent a new partnership and a new kind of governance that is being built through concrete development activities.

- Citywide community networks and coalitions, which are the key mechanisms for connecting poor communities to the city to work together, support one another, pool their strengths, learn from each other's initiatives, survey and map settlements, strengthen their community finance systems, formulate their plans for upgrades, collectively negotiate for land and other resources and changes, and to plan joint activities in collaboration with other groups.

The ACCA is an example of how large quantities of housing can be provided without resorting to a repetitive, one-size-fits-all solution. The Asian Coalition for Community Action Program (ACCA) is an Asian Coalition for Housing Rights initiative that supports the replication of good community-led urbanization practices. This ambitious plan has operated as a sort of regional experiment in 19 countries and 215 cities. It has been made possible thanks to a sophisticated organizational structure that includes regional and national committees and the various urban actors that have participated in an ongoing and proactive manner.

GUARANTEED

Guaranteed housing provides legal and financial security for low-income households, particularly those whose members are employed in the informal economy or live in slums. It includes safeguards for assets and housing rights, and is applicable to legal systems of secure tenure, home mortgage policy or collateral systems and fair financial risks.

FOGARIM

Housing Guarantees for Populations Working in the Informal Sector

MOROCCO

Population: 35.28 million (2016)

GDP per capita: USD 2832.43 (2016)

Urban population: 30%

TIME FRAME

Year project was approved: 2004

Year project was completed: ongoing

ACTORS

Project management, implementation and design:
the Ministry of Housing launched Morocco's
National Urban Strategy

Project implementation: FOGARIM (Guarantee
Fund for Populations with Irregular and/or Modest
Income)

FINANCING

Type: interest rate subsidies on personal loans
intended for home acquisition

Estimated budget: initial capital of USD 60 million
from the Solidarity Fund and an additional loan
amount of USD 1.9 billion (2015) at an average of
USD 15,749 per loan

IMPACT

Estimated no. of beneficiaries: 123,990
beneficiaries as of 2015

The Guarantee Fund for Populations with Irregular and/or Modest Income (FOGARIM) program was created in 2004 by the Moroccan government. The program is subsidized by taxes on the construction industry, in order to facilitate access to loans for low-income citizens and workers from the informal sector. When a client defaults on his or her monthly payment, the mortgage bank can draw from the guarantee fund and eventually foreclose on the property. The fund pays 70% of the debt while the bank begins the legal process to recover the entirety of the debt. By reducing losses and transferring a large portion of these to the government, FOGARIM has reduced the risks for banks.

In 2003, the Moroccan Ministry of Housing launched the National Urban Strategy to encourage the production of affordable housing through tax exemptions, public-private partnerships, zoning changes and a solidarity fund that would subsidize urban improvements and housing production. The 2010 social housing program has been very successful among real estate developers, as it significantly reduces taxes for those who build at least 500 housing units valued at USD 25,000 over a five-year period. The program has produced more than 500,000 units since 2010 and has had a huge impact on the market. The government has also encouraged home financing through interest rate subsidies. If the value of a housing unit is less than USD 20,000, the government covers 3.5 points of the interest rate. If the value of the housing is between USD 20,000 and USD 35,000, the government pays two points

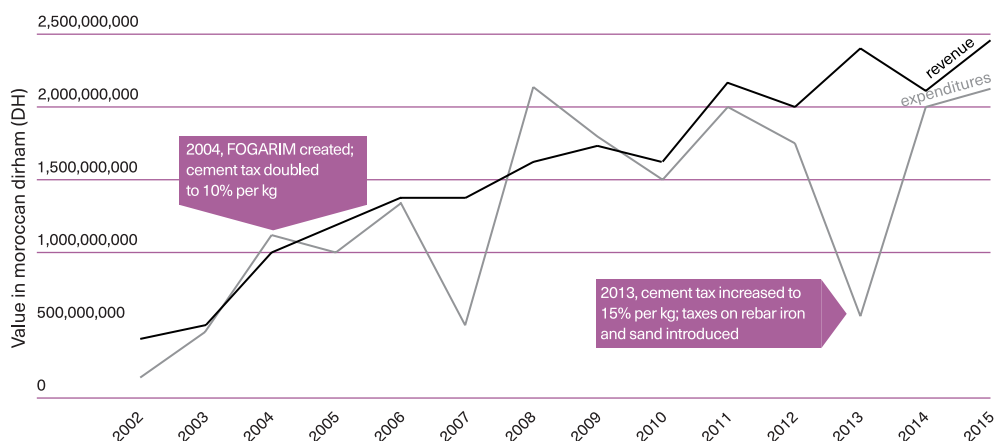
of the interest rate, for a maximum loan duration of 25 years. While these programs have helped reduce the costs of home loans and improved accessibility to housing, those working in the informal sector—a population that constitutes more than a third of the country's total labor force—continue to be excluded.

The Moroccan government created the FOGARIM program in October 2004. It aims to facilitate access to loans for low-income Moroccan households and those working in the informal sector. FOGARIM guarantees home financing loans, whether these are used to purchase housing, acquire land, or for construction.

The FOGARIM fund received seed capital of USD 60 million from the Solidarity Fund for Housing and Urban Integration (FSHIU) in 2014. At that time, the

DAMANE ASSAKE FUND			
FOGARIM		FOGALOGÉ	FOGALEF
FOGARIM-VSB	other FOGARIM		
<p>FOGARIM is the guarantee for low and/or irregular income households.</p> <p>FOGARIM has given access to housing bank loans to populations who had no access to such loans before.</p> <p>Only citizens who do not own housing can benefit from FOGARIM loans.</p> <p>Duration of FOGARIM loans is not limited by CCG but banks rarely give more than 25 years (it also depends on the age of the borrower).</p>		<p>FOGALOGÉ is the guarantee to housing loans to Moroccan middle-class professionals living in Morocco or abroad.</p> <p>FOGALOGÉ loans have 50% Government guarantee.</p> <p>While loan amounts are no capped, the undertaking of the guarantee cannot exceed US\$40,000.</p>	<p>FOGALEF started in 2003, shortly before FOGARIM.</p> <p>FOGALEF is subsidized (by the Mohamed VI foundation, 2 to 4 percentage points) and provides 100% guaranteed loans to teachers of the public sector.</p> <p>The Government subsidizes part of the interest rate.</p>
FOGARIM for "cities without slums households"; loans are 80% guaranteed and monthly payments must not exceed 1000 dirhams.	Housing value does not exceed US\$25,000. Loans are 70% guaranteed. Monthly installments must not exceed US\$175.	100% financing is possible with FOGALOGÉ loans.	FOGALEF differs from the others as it is also a subsidy and can be used for variable interest loans.

Housing funds subsidized by the Moroccan government.
Source: Center for Affordable Housing Finance in Africa (CAHF).



Balance of the Housing Solidarity Fund (FSH) and of Solidarity Fund for Housing and Urban Integration (FSHIU), 2002-2015.
Source: Lam, A., & Feather, C. (2016).

government also raised taxes on cement to 15%, instituted risk premiums on mortgage loans and introduced additional taxes on iron and sand in order to diversify and mobilize state resources.

All banks in Morocco can provide FOGARIM loans, but between 2013 and 2014, 95% of FOGARIM loans were granted by just three banks. It is the banks that grant the loans to customers; there is no direct relationship between the end customers and the government. The bank verifies the information it receives and decides the loan amount, interest rate and duration, as well as whether the application is approved or denied. In order to take advantage of the guarantee, the bank must respect all of the FOGARIM criteria. In other words, the loan must be fixed-interest with a maximum monthly payment of USD 175, the value of the home cannot exceed USD 25,000, and the client must form part of the target population. Every loan guarantee application is sent to the state entity for a final decision.

When a FOGARIM client defaults on his or her monthly payment, the mortgage bank can draw from the guarantee fund and foreclose on the property after nine months. The fund will pay 70% of the client's debt to the bank and the bank may commence the legal process to recover the entirety of the debt, including the part that has been paid for by the fund. As it is a guarantee rather than a subsidy, the FOGARIM program requires a smaller budget per client. It has therefore reached a larger number of beneficiaries, 123,990 in total, and a total loan amount of US\$1.9 billion (2015) at an average of USD 15,749 per bene-

ficiary. As a result, FOGARIM has been able to assist approximately 20% of the housing loan market and has increased the inclusion of those with modest and irregular incomes, including women, who now have access to financing for affordable housing.

The FOGARIM initiative undeniably changed the outlook of housing finance in Morocco. Banks opened their doors to a wider clientele, improving access to housing finance and granting more affordable housing loans to poorer sectors of the population. Although it is not a subsidy, the guarantee indirectly reduces interest rates by lowering the risk for banks. Its impact on the housing market has led to many other housing policies that, in turn, have driven similar changes on the market. Collectively, this has made housing more affordable for all middle- and lower-income groups. Nevertheless, in order to function correctly, certain conditions must be assured, such as a strong land tenure regime, the enforceability of foreclosures and a robust banking system. Empirical evidence shows that the FOGARIM initiative has been much more effective than the state subsidy program, as it has reached a much larger population, including workers with irregular and/or informal incomes, and it has cost the government less per beneficiary than a subsidy.

SOCIALLY MIXED

Mixed housing refers to dwellings, neighborhoods or complexes that are formed by combining two or more qualities to create a more complex whole. It might combine different social classes, age groups, racial or ethnic groups in a community or housing prototype, or different types of housing with diverse uses that go beyond the residential, including spaces for work, commerce, recreation and education.

PRIORITY AND ELIGIBILITY POLICIES

Promoting Social Integration through Housing

SINGAPORE

Population: 5.607 million (2016)

GDP per capita: USD 52,960.71 (2016)

Urban population: 100%

TIME FRAME

Year project was approved: 1989 and 2012

Year project was executed: ongoing

Year project was completed: ongoing

ACTORS

Project management and implementation:

Housing and Development Board (HDB)

FINANCING

Type: access to state-subsidized loans

Estimated budget: The National Treasury set aside USD 1.8 billion for the program, or 2.4% of the national budget.

IMPACT

Number of residential units or solution: 1 million apartments

Estimated population impacted: 80% of Singapore's resident population

Singapore Eligibility Programs.
Ph. Samuel He.

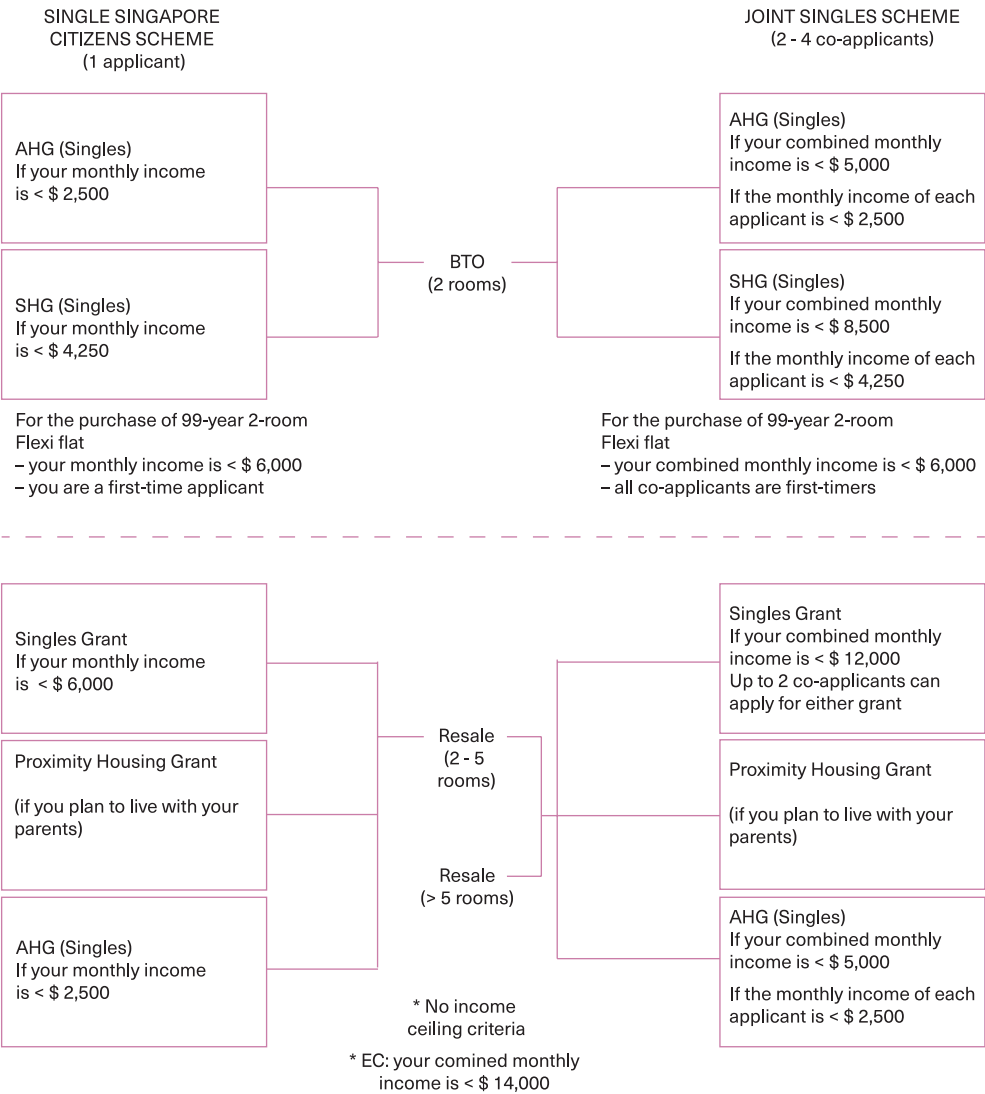


In Singapore, the priority schemes that form part of public housing eligibility programs ensure representation of all minority groups. The goal is not only a mixed-income housing program, but one with ethnic and cultural representation. Implemented in 1989, the integration policy was later extended to include priority eligibility measures that consider a wide range of issues. These measures, in fact, could serve as a reference model in other countries.

Most of Singapore's residential developments are public and state-managed. With more than a million apartments distributed across 23 cities and three states, more than 80% of the population of Singapore resides in public housing complexes and approximately 90% own their homes. The Housing and Development Board (HDB), which was established in 1960, administers public housing. Each public housing block has been conceived as a vertical community, with common areas integrated into the design to promote social interaction. Singapore's "void decks" are open, uninhabited spaces on the ground floor of these buildings typically used for community activities.

In 2015 and 2016, the National Treasury set aside USD 1.8 billion—2.4% of the national budget—for housing, enough to cover the HDB's annual deficit.

In Singapore, priority schemes are in place to improve the chances of first-time applicants and those with more urgent housing needs to successfully bid in a public housing sales launch. The priority schemes include the Parenthood Priority Scheme (PPS), Multi-Generation Priority Scheme (MGPS), Married Child Priority Scheme (MCPS), Third Child Priority Scheme (TCPS), Assistance Scheme for Second-Timers (Divorced/ Widowed Parents) (ASSIST), Tenants' Priority



Housing schemes for singles. Source: ECitizen



Public spaces in Singapore's social housing. Ph. Ariffin Jamar Straits Times.

Scheme (TPS) and Senior Priority Scheme (SPS). The Multi-Generational Housing Scheme encourages intergenerational co-living and prioritizes the allocation of public housing to extended families. These schemes also apply to different generations living close to one another. Housing grants are available for married first-time applicants purchasing an apartment for sale on the secondary market, located within one mile of their parents' home.

Every scheme has its own logic. For example, the Multi-Generation Priority Scheme, introduced in March 2012, assigns priority to parents and their married children who present a joint application to purchase pre-selected apartments within the same housing complex. Parents can apply for a two-bedroom "Flexi" (an apartment with flexible lease options) or a three-bedroom apartment, while their married child can apply for a two-bedroom Flexi or a larger apartment in the same complex. Since its implementation in September 2013, "3-generation apartments," known as 3Gens, have been designed and marketed for larger families wishing to live under one roof. In order to meet the specific housing needs of an aging population, the Studio Apartments scheme was launched in 1998, offering an alternative living option for adults over 55. With the two-bedroom Flexi plan, older citizens have the flexibility to choose the duration of the rental contract for their apartment according to their age, needs and preferences. Until they reach the age of 95, they can select leases from between 15 and 45 years of duration, in five-year increments. The Senior Priority Scheme (SPS) serves elderly residents who wish to grow older in a family environment. The SPS reserves half of the quota for elderly applicants seeking apartments close to their current residence or to their married child.

The public housing ethnic integration policy was implemented on March 1, 1989 to promote racial

integration and harmony in HDB properties. One of Singapore's most well-known and controversial racial integration policies, it sets a cap on the number of members of each ethnic group that can reside in each HDB residential estate. The policy has, in large part, accomplished its objective, as every neighborhood is a microcosm of the larger Singaporean society. Despite its successes, the policy has received a good deal of criticism for having put certain ethnicities at a disadvantage, for instance, or failing to take into account mixed-race marriages and residents.

If the aim is to respond faithfully to the population's housing needs, Singapore's priority schemes demonstrate that eligibility systems need to take into account factors that are much more complex and sophisticated than simple economic indicators. Singapore's Eligibility Schemes ensure a representative mix of the different minority groups of its society in every public housing complex. The programs therefore guarantee housing is not only mixed-income but also diverse in terms of the cultural and ethnic backgrounds of the residents. Flexible systems that allow apartments or houses to be grouped for use by multi-generational families could resolve the shortages and overcrowding that continue to plague state-subsidized housing developments in Latin America.

TEMPORARY

Temporary housing provides interim housing solutions for groups or individuals. It addresses a wide range of needs, such as housing for those who have lost their homes to natural disasters or political or economic events, as well as temporary accommodations for those residing in an area due to health, education or work-related circumstances.

CITIQU STUDENTS MILL JUNCTION

A Temporary Student Housing Solution

JOHANNESBURG, SOUTH AFRICA

Population: 55.91 million (2016)

GDP per capita: USD 5,273.59 (2016)

Urban population: 65.3% (2017)

TIME FRAME

Year project began: 2012-2013

Year project was completed: 2013

ACTORS

Project management: Citiq Students

FINANCING

Estimated budget: ZAR 40 million

IMPACT

Number of residential units or solution: 375 individual apartments

Estimated population impacted: Approximately 375 students

Citiq apartments. Ph. Citiq developers.



Responding to the housing needs of people at different stages of their life is a challenge. To address Johannesburg's student accommodation shortage, Citiq, a real estate developer, has converted abandoned grain silos located in the city center into affordable accommodation. The Mill Junction development comprises 375 individual apartments for use as temporary university student accommodation, along with libraries, common areas and computer rooms. The use of non-traditional building techniques reduced not only the project costs but energy and water consumption as well.

The city of Johannesburg, South Africa has a large number of university and academic institutions. Many students come from other South African cities and remote rural areas, or from other countries in Africa, to pursue their studies in the capital city. Students residing in Johannesburg, however, face a student housing shortage that the universities have been unable to resolve. South Africa's universities, most of which are public institutions, cannot meet basic housing needs with their own university residences due to high student enrollment. The lack of student residences causes insecurity, increases stu-

dent debt and creates obstacles that keep students from continuing their studies, as they are unable to pay overpriced rents. In 2005, the student housing crisis created an investment opportunity for real estate developers, who found a way to reduce the housing deficit by converting a group of abandoned silos in the city center into residences. Citiq Students is an initiative of Jika Properties, a company founded in 2005 that focuses on acquiring residential properties in rundown neighborhoods of Johannesburg that can be regenerated and provide new, attractive and safe student residences.



Citiq apartments. Ph. Citiq developers.



Citiq apartments. Ph. Citiq developers.

A diverse offering of housing options not only addresses different income levels, but also responds to the challenge of meeting people's changing housing requirements over the course of their lives. To address Johannesburg's student accommodation shortage, Citiq, a real estate developer, has converted abandoned grain silos located in the city center into affordable accommodation. Mill Junction comprises 375 individual temporary housing apartments for 400 university students. The project consisted of converting old silos into a ten-story residence of single or double rooms, as well as four additional buildings made from containers that are used for study rooms, libraries, common areas and computer rooms.

According to official figures, about half of all undergraduate students drop out of university before finishing their degree. This high dropout rate is attributed to a lack of academic support, family pressure and inadequate assistance. The Citiq project aims to cover all of a student's basic needs and create a friendly environment so students can dedicate themselves to studying and university life. This includes free wi-fi; rooms for studying, relaxation and socializing; community kitchens; and bathrooms on each floor. There is also a gym, areas for table tennis and recreational spaces.

This project has managed to successfully reconvert abandoned silos in the city center into student housing located at a very convenient distance from the universities. In addition, it contributes to urban regeneration, and has injected student life and vibrancy into a rundown area. Converting the old abandoned silos and using non-traditional construction techniques—such as cargo containers—reduced project costs and permitted an increase in the budget allocation for materials that help reduce energy consumption. These include double-glazed windows, motion-sensor-activated energy-efficient lighting,

and insulated piping and heat pumps for hot water production. By focusing on efficient architecture, the project has achieved 50% reductions in power and water consumption compared to a conventional building, which helps to lower the rates paid by students. Silo conversions have grown in popularity around the world, including another South African project, the Biscuit Mill, in Cape Town. Silos that were previously used to store grains or even nuclear missiles have been used for apartment buildings, hotels, student residences and houses. Due to their affordable cost and the flexibility they provide, containers are also being reused as holiday homes, cafés, restaurants, schools, offices and even skyscrapers.

The Citiq Students project is an example of an effective strategy for transforming neglected areas of a city by converting old structures—in this case, abandoned silos and reused containers—along with cheap, reusable and flexible materials to build temporary student housing. The potential value of the project is heightened by its location and the sustainable design characteristics of the building. Despite offering many basic services and a modern and attractive design, the apartments offer affordable rents for students. Citiq Students has focused on an age group that does not usually have homes that meet their precise needs, making this project unique and, at the same time, a model that can be replicated. This temporary housing provides a place for study and university life.

SHARED

Shared housing refers to two different concepts. On the one hand, it can refer to sharing a property: for instance, occupying separate bedrooms and sharing the common spaces of a home, such as the kitchen, bathroom, etc. It can also refer to private projects where small units are rented and there are shared common areas—such as work spaces, living rooms, kitchens—and centralized services, such as Internet access. On the other hand, shared ownership can refer to the gradual purchase of a home, beginning with a down payment that covers a percentage of its cost followed by period installments.

SHARING CITY SEOUL

Intergenerational Connections for Affordable Housing

SOUTH KOREA

Population: 51.25 million (2016)

GDP per capita: USD 27,538.81 (2016)

Urban population: 82.59 % (2016)

TIME FRAME

Year project was approved: 2012

Year project was completed: ongoing

Year project was completed: ongoing

ACTORS

Project management: Sharing City Seoul

Project implementation: Sharing City Seoul

Project design: Sharing City Seoul

The Sharing City Program in Seoul, South Korea, includes an intergenerational housing policy that responds to typical problems faced by the elderly, such as loneliness and isolation. The program uses a mobile phone application to match young adults looking for temporary rooms with seniors who are living in their original family homes and have empty rooms to offer. This project shows potential alternative uses for information technologies.

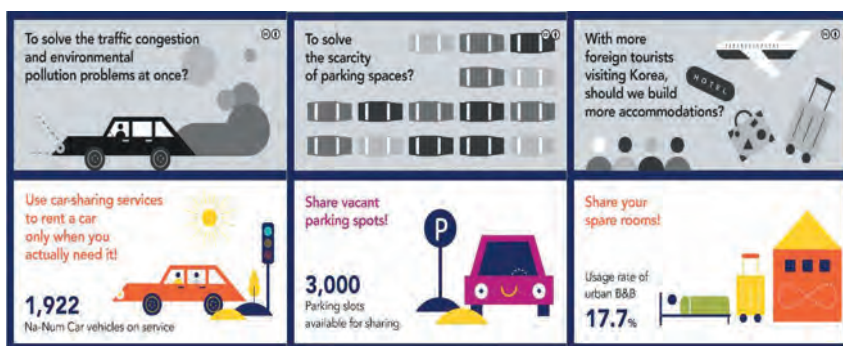
Seoul, which has a population of 10 million living within 233.7 sq. mi., has launched an innovative program that demonstrates the benefits of sharing goods and services. In recent years, Seoul has invested in developing its digital infrastructure and today it is highly developed, with widespread public wi-fi and smartphone penetration at 60%. Seoul now plans to become a global leader in the sharing economy. For example, Seoul currently has a unique environment in which 60% of its inhabitants live in apartment buildings. The Sharing City initiative proposes that the common spaces or services of those buildings be shared with non-residents, to create libra-

ries, social areas and gardens. There are already 32 community libraries in private apartment buildings. While this is a small number for a mega-city, these community libraries have the potential to become social centers for many vertical communities in Seoul.

The Sharing City Seoul Project was launched in September 2012, alongside a plan to bring about sharing projects that take into account how citizens live. It set out to lay the groundwork of sharing and inform the public. Seoul sees the Sharing City Seoul Project as a social innovation measure designed to create new economic opportunities, restore trustworthy



Results of the Sharing City Seoul program.
Source: Sharing City Seoul Annual Report 2015.



Results of the Sharing City Seoul program.
Source: Sharing City Seoul Annual Report 2015.

relationships and reduce waste in order to resolve the economic, social and environmental problems associated with the city. While existing city policies focus on the construction of primary infrastructure, such as roads, parking areas, schools, and libraries, the city's future policies will be directed at building secondary infrastructures. Seoul will also implement other policies that will respect and promote private-sector capabilities, as well as policies that will require the public sector to share public resources with citizens. To lay the groundwork for promoting the sharing of resources, and to encourage organizations and enterprises to share, Seoul announced and enacted its sharing promotion rules on December 31, 2012. The rules outline the principle of sharing public resources, designate the organizations and enterprises that will do so, provide administrative and financial support, and set the guidelines for the formation of the sharing promotion committee.

The Sharing City Program includes an intergenerational housing policy that seeks not only to expand eligibility for housing, but also works to address typical problems faced by the elderly, such as loneliness and isolation. The program uses a mobile phone application to match young adults looking for temporary housing in Seoul—usually university students—with seniors who are living in their original family homes and have empty rooms to offer.

Intergenerational living projects have already been implemented in Cleveland, Ohio, and in Finland and the Netherlands. Seniors offer rooms for millennials who are happy to volunteer their time in exchange for cheaper rent. Universities have also begun to experiment with programs that match students with senior residents. New York University has piloted a project that will match 10 graduate students with “empty nesters.” Other applications with similar objectives exist, such as Nest, a digital matching platform that connects people with disabilities with

state-subsidized housing providers. Nest is a quick and easy way for providers of Specialist Disability Accommodation (SDA) and Supported Independent Living (SIL) in Australia to find and select eligible people to live in their vacant rooms.

The Sharing City program not only aims to expand access to temporary housing, but also solve other issues, such as loneliness and isolation among the elderly.

This case also illustrates the potential role of information technology in developing alternative models to guarantee access to housing. The big question is whether millennials and homeowners are ready to live in such close proximity.

INCREMENTAL

Incremental housing is usually associated with settlement development and formalization policies that keep to a schedule and establish a step-by-step agenda to complete a project. The incremental method is beneficial from the point of view of public investment because once the community has agreed on an agenda, it is easier to deliver results through small stages of successive investments and thus earn the trust necessary for radical transformations. From the community's perspective, incremental interventions are less traumatic as they avoid temporary displacements. While this approach is not necessarily less costly, it can be more financially viable, particularly for local governments.

MAHILA HOUSING TRUST

Developing a Sustainable Habitat for Women

AHMEDABAD, INDIA

Population: 5.5 million (Ahmedabad, 2011);

1.3 million (India, 2016)

GDP per capita: USD 1,709.39 (2016)

Urban population: 31.16%

TIME FRAME

Year project was approved: 1994

Year project was completed: ongoing

ACTORS

Project implementation and design: Mahila Housing SEWA Trust (MHT)

Project implementation: Mahila Housing SEWA Trust (MHT) and partners

FINANCING

Type: multiple funding sources, including donations, public-private partnership, and the mobilization of community savings groups

IMPACT

Number of residential units or solution: More than 5,000 property titles have been registered; 45,000 bathrooms built; access to potable water for 42,000 households; legal electric connections to 180,000 families; 5,000 are using cleaner fuels
Estimated population impacted: 50,000 families have benefited from slum upgrading and redevelopment.

Members of the Mahila Housing Trust.
Ph. MHT SEWA.



In 1994, the SEWA Bank (Self-Employed Women's Association Bank), an organization dedicated to the self-employed working women of India's informal settlements, partnered with the Foundation for Public Interest to create the Gujarat Mahila SEWA Trust. The purpose was to create a united front for government negotiations and lead the process of improving the habitat. To this end, they have created a housing tenure guarantee of between 10 and 15 years. By eliminating the risk of eviction, the initiative has fostered access to credit and home improvements, which results in the incremental regularization of informal settlements.

Ahmedabad is the capital city of Gujarat, India, a state with an urbanization rate of 37%. More than 439,843 people are in the lower income bracket and are extremely vulnerable to the effects of climate change. SEWA is an organization of poor, self-employed working women founded as a trade union in 1972. It was the product of three growing movements, that of the workers, the cooperatives and the women's movement. More than 94% of Indian women in the workforce are employed in the unorganized sector. SEWA's core objective is to organize women workers so that they can have job security, income security, food security and social

security, including healthcare, childcare and housing. Today, SEWA has more than 1.4 million members and 19 sister organizations in nine states of India, each working independently. In 2012, 120,000 self-employed women were shareholders of the cooperative bank.

In 1994, the SEWA Bank joined with the Foundation for Public Interest (FPI) to create the Gujarat Mahila SEWA Trust (MHT). Headquartered in Ahmedabad, MHT is a SEWA sister organization run by women. Its purpose is to address issues related to the habitat of poor, self-employed women. MHT provides technical



Mahila Housing Trust. Ph. MHT SEWA.



Members of the Mahila Housing Trust.
Ph. MHT SEWA.

assistance and a wide range of support services, and work to influence urban policy in Ahmedabad. In this effort, it collaborates with financial institutions and private contractors engaged in housing development, municipal and state urban planning institutions, and communities that offer comprehensive home-based services and support actions on housing issues.

According to the MHT, the critical gap in credit availability for low-income households in India is between INR 100,000-800,000 (USD 1,814-14,512). The community-driven habitat access is achieved through six different programs, all organized from a women's advocacy perspective. The six programs are water and sanitation; housing and land rights; energy and climate resilience; microfinance; skill training and jobs; and participatory governance and planning.

MHT has developed a system of transitional tenure, which is a secure 10 to 15-year non-eviction guarantee for women living in informal settlements and their families. Transitional tenure applies when the SEWA Bank or another private bank decides to grant a home improvement loan. MHT's transitional tenure challenged the understanding of tenure insecurity held by mainstream financial institutions. Though desirable, legal property ownership is an unrealistic prospect for millions of economically active households that require decent housing. For most of them, informal tenure is the only option. MHT has been exploring the mechanisms and parameters that influence the levels of tenure security (or insecurity) for an entire settlement. Families can obtain secure tenure if they have been living peacefully for more than 10 years on land that is not subject to dispute with a landowner or other community actors, provided the home does not run counter to the land uses or future projects of the Ahmedabad Urban Plan. MHT believes that the benefits of investing in dwellings outweigh the risks of eviction, making the loan institutionally viable and the investments worthwhile in the eyes of the loan applicant. As a result, MHT has been

able to disburse loans for home repairs and additions in informal neighborhoods and resettlement areas.

SEWA's experiments with housing finance show that financial inclusion of informal sector workers can be increased by reviewing how financing institutions measure and regulate the risk of their potential borrowers. In a city where a large portion of the population is informally employed, SEWA has shown that financial aid for the most vulnerable sectors is neither unsustainable nor unfeasible, and that such beliefs are the result of institutional inertia in public and private banking. Replicability will probably prove extremely context-specific, emerging at the intersection of legal and regulatory frameworks and original organizational experimentations rather than one-size-fits-all solutions. Nevertheless, the SEWA experience shows that in order to demystify the perceived risks of working with low-income groups, flexible, responsible, versatile and competent institutions are needed, ones that truly understand the personal finances of the people they seek to benefit.

SOCIAL

The social function of land is linked to the way it is used, accessed and distributed between sectors of society, institutions and public and private services in towns and cities. The creation of social land—land that is both affordable and accessible—is a fundamental component of social housing and secures equal access to public goods.

COOPERATIVES IN KENYA

Housing for Affordable Land Access

KENYA

Population: 48.46 million (2016)

GDP per capita: USD 1,455.36 (2016)

Urban population: 27%

TIME FRAME

Year project was approved: The National Cooperative Housing Union (NACHU) started operations in 1987

Year project was completed: ongoing

ACTORS

Project management: National Cooperative Housing Union (NACHU)

Project implementation: 800 housing cooperatives affiliated with NACHU

Project design: Kenya national government

FINANCING

Type: Savings and credit cooperative for low and modest-income communities

Estimated budget: USD 9.4 million in loans in 2016. Member deposits were reported at USD 5.2 million in 2016.

IMPACT

Estimated population impacted: 12,312 active members participate in housing savings and loan programs

5. Savings and credit cooperatives (SACCO) are non-profit financial cooperatives that provide short or middle-term non-mortgage loans for incremental construction. Housing cooperatives (represented by NACHU) sell land to their members and sometimes act as urban developers. They contact the sellers or undertake the search for a large plot of land, make a down payment and complete the purchase within ninety days. This way, they provide affordable land for social housing, parceling, upgrading, titling and distributing land among their members.

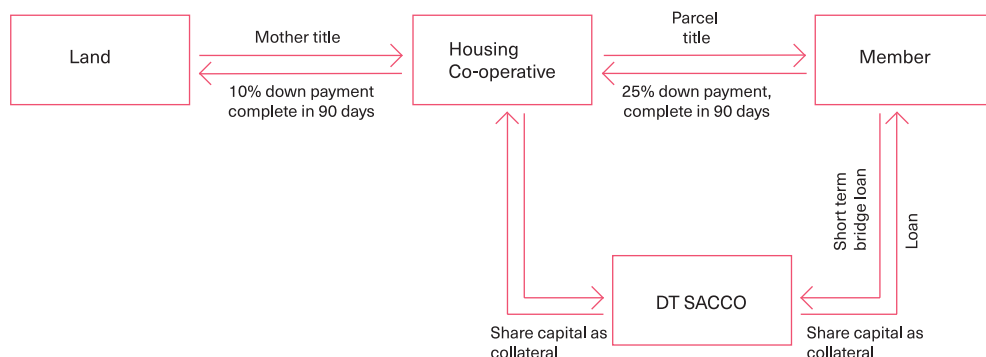
The savings and credit cooperatives (SACCO), non-profits owned by their members and governed by a board of directors chosen by them, compensate for the market's failures to meet the needs of the Kenyan population. The World Bank estimates that 90% of Kenya's financial system is managed through SACCOs. At the national level, SACCOs employ 240,000 people and contribute 45% of the gross domestic product. As of December 2016, there were 175 licensed and regulated SACCOs with almost 3.5 million members and total assets of USD 3.8 billion. In 2017, their membership rose by approximately 9%

and total assets grew by around 13% in comparison to the previous year (World Bank 2017).

SACCOs rarely extend their services to formal mortgage products owing to the financial situation in Kenya. They cannot usually tie up capital at low interest rates for long periods of time, meaning that a standard mortgage product is not economical for their target beneficiaries. Consequently, most of their members finance their homes with loans for short or medium-term projects ranging from four to six years. These loans work well for incremental construction, a

Microfinance	Training and Mobilization	Technical Services	Lobbying and Advocacy Activities
Facilitate shelter for 1000 households	Increase the # of active cooperatives	Establish housing resource center	Increase capital base for microfinance
Maximize coop savings and credit potential	Increase members in savings programs	Pilot test low income housing designs	Lobby for capital from bank, donors, govt.
Increase small business loans	Hold courses in financial management	Develop demo projects & environmental regs	Sponsor forums on land allocation & land titling
Increase infrastructure loans: water, sewer, electric, road access	Certify trainers in financial and credit management	Initiate non-member property management services	Sponsor forums on infrastructure

Summary of NACHU service plan (2007-2009). Source: Center for Affordable Housing Finance in Africa (CAHF).



SACCO Supported Housing flowchart. Source: Center for Affordable Housing Finance in Africa (CAHF).

common feature of the housing landscape in Kenya.

While SACCOs grant loans to finance housing, the housing cooperatives sell land to their members and sometimes act as developers. The National Union of Housing Cooperatives (NACHU) has 200,000 members organized into more than 800 housing cooperatives. NACHU acts as a provider of non-profit financial and housing services and as a coordinating organization that represents housing cooperatives throughout the country. It also develops housing and commercial real estate projects to supplement its income. In the last four years, NACHU has managed to complete 14 affordable housing developments comprising 1,573 units with an average price of USD 9,200 per unit. NACHU provides access to financing to both housing cooperatives and individual members. In 2016, 545 housing cooperatives of the 934 registered affiliates were participating in NACHU housing savings and loan programs, representing 12,312 active members. Eighty-four percent were in the low-income bracket and 16% earned modest incomes (Cooperative Housing International, 2017). The non-profit reported USD 9.4 million in outstanding loans to cooperatives on its 2016 financial statements. The savings mobilization NACHU has achieved is remarkable; member deposits were reported at USD 5.2 million in 2016 and over half of the savers are women.

The housing cooperative is either contacted by someone looking to sell a large plot of land for a housing development project, or else it conducts a search to find suitable land itself. Sometimes, a SACCO puts a seller in touch with the organization. The housing cooperative makes a down payment of approximately 10% and agrees to complete the purchase within 90 days. It puts up the necessary funds for the deposit by seeking loans from its SACCO partners or private banks. The legal rights to the land are then secured and plots are sold among its members, who must deposit approximately 25% of the land price and agree

to pay the balance within 90 days. Most members finance the balance by obtaining a loan from a SACCO or from a bank recommended by the housing cooperative, which holds the master title and will not transfer the parcel title until it has been paid in full. In cases where the housing cooperatives also build the homes, the member must deposit 10% and has three to six months to settle the balance, either with a mortgage or in cash.

By acquiring large tracts of land as opposed to individual parcels, the housing cooperatives achieve cost reductions that are passed on to their members, thereby making homes more affordable. As an agent that represents many end users, they can also gain more traction with the government in terms of providing basic infrastructure services such as water, sewage and electricity. Furthermore, they sort out administrative titling procedures: they have the technical knowledge to manage the parceling processes and can pay the administrative costs that they then transfer to the members in installments. In this way, the housing cooperatives produce affordable land, since they are responsible for parceling, upgrading, titling and distributing land among their members.

SECURE

Secure housing increases the personal safety of residents faced with violence or the threat of displacement. It covers a range of dimensions associated with security such as assets and housing rights, legal issues related to secure tenure, the housing policy system or housing guarantees, building safety and a safe environment.

NATIONAL SUSTAINABLE LAND INSTITUTE (INSUS)

Prevention of the Spontaneous Emergence of Irregular Human Settlements

MEXICO

Population: 127.5 million (2016)

GDP per capita: USD 8,201.31 (2016)

Rural population: 20.48% (2016)

TIME FRAME

Year project was approved: 2007

Year project began: 2007

Year project was completed: ongoing

FINANCING

Type: According to the subsidy and financing scheme chosen, the beneficiary makes a 20% down payment to receive the title.

Estimated budget: The program provided USD 30.5 million worth of land

IMPACT

Number of residential units or solution: The project succeeded in distributing over 100,000 deeds across the country in 2016 through a subsidy and financing scheme

Estimated population impacted: Approximately 400,000 people

Twenty-five percent of homes in Mexico have no property titles. The Program to Regulate Irregular Human Settlements (PASPRAH) targets households suffering from asset poverty and in possession of irregular lots that are situated in localities of 2,500 inhabitants or more. Since its creation, it has successfully streamlined the procedures required to formalize land ownership under the *ejido* (a state system for plots of land farmed communally) common land or federal system. These methods include decentralization, deconcentration and the simplification of administrative procedures.

The project goal was to provide low-income families with property, a pressing need in Mexico, where 25% of homes (approximately six million households) have no property titles. In 1973, the Commission for the Regularization of Land Tenure (CORETT) was set up as a decentralized agency of the federal public administration, with technical and social functions, legal status and private capital, to anticipate, deter and regulate irregular human settlements through the expropriation of *ejido* and communal land as well as private land. The institution's stated aim was to "regulate land tenure wherever there are irregular human settlements located on *ejido* and communal lands or federal property; and promote the acquisition and availability of land and territorial reserves

for urban development and housing, in coordination with other federal agencies and entities and state governments, with the participation of their municipalities and Mexico City, and in consultation with the social and private sectors, particularly farming communities."

CORETT became the National Sustainable Land Institute (INSUS) on December 16, 2016 by decree of President Enrique Peña Nieto. It is part of the Mexican government's social sector and coordinated by the Ministry of Agrarian, Territorial and Urban Development (SEDATU) within the framework of the national policy plan to combat poverty and organize human settlements in population centers.



A participant receiving her certificate.
Ph. INSUS website



Participants showing their certificates.
Ph. INSUS website

INSUS is responsible for implementing the Program to Support Residents without a Title and Regulate Irregular Human Settlements (PASPRAH). This is a support instrument for households that have been unable to complete the procedures required for regularization that would provide them with secure tenure of their lots. Its purpose is to promote orderly urban development.

PASPRAH targets families living in poverty who are in possession of irregular lots, situated in localities of 2,500 inhabitants or more, as well as in municipal seats. The amount of support granted by the program corresponds to the cost of regularization, up to a maximum of USD 530; when the total cost of regularization is less than or equal to this amount, the program covers it in full. The National Housing Commission (CONAVI) subsidizes 40% of the cost of regularization, while CORETT finances 40% of the total, and the beneficiary pays just 20%.

The agency responsible for implementation identifies and draws up a list of the areas where the policy is to be applied. Interested residents submit an application through the Single Socioeconomic Information Questionnaire (CUI). The implementing agency validates the information and data provided by the beneficiary on the CUI, which is captured in the PASPRAH Integrated Information System, a computer tool that assesses whether the family is living in disadvantaged conditions. The agency also certifies to the Urban Development, Land and Housing Department (DGDUSV) that the areas where actions are to be carried out fulfill the requirements set out in the program's guidelines.

For the purpose of identifying the project's priority areas, each is evaluated based on its location in the urban growth boundary (UGB); its participation in an urban development plan or program; its suitability for upgrading; the percentage of the population living in poverty; the Risk Atlas, and a risk analysis or map indicating whether the area can feasibly be occupied by human settlements. An analysis also determines whether the settlement occupies over 50% of the area; has access to public utilities (potable water, electricity and sewage); is accessible by public transport; is outfitted with basic equipment (for schools, health or provisions); and is located within the limits of a population center.

The role of the National Sustainable Land Institute (INSUS) is fundamental for preventing the spontaneous emergence of irregular human settlements through cooperation and dialogue between civil society and the state. Since its creation, it has successfully streamlined the procedures carried out during the land tenure regularization process under the *ejido* or communal system or at the federal level.

Its methods have centered on decentralization, de-concentration and the simplification of administrative procedures. By granting a federal subsidy aimed at regularizing land tenure in urban areas, it contributes to their upgrading and consolidation, since regularization helps create synergies in the provision of infrastructure and social services.

CENTRALLY
LOCATED

The concept of centrally located housing refers to the development of affordable housing in the existing urban fabric of cities, particularly in central areas where residents live in buildings that have been reconverted, renovated and repurposed for residential use. A central location offers residents advantages in terms of infrastructure and services, access to public transport and cultural offerings. Travel distances from these areas are short and residents have the chance to enjoy more flexible business hours and iconic city sites.

SOCIAL HOUSING INSTITUTIONS

Affordable Rental Housing as a Driver of Urban Regeneration

JOHANNESBURG, SOUTH AFRICA

Population: 55.91 million (2016)

GDP per capita: USD 5,273.59 (2016)

Urban population: 65.3% (2017)

TIME FRAME

Year project was approved: 1995 initial launch; 2010 policy reformulation

Year project was completed: ongoing

Year project was completed: ongoing

ACTORS

Project management: Social Housing Regulatory Authority (SHRA)

Project implementation and design: Johannesburg Housing Company

FINANCING

Type: seed capital with subsidies from the national government

Estimated budget: total assets R1.612 billion;

total investment properties R1.368 billion;

total revenue Rm 240.5

IMPACT

Number of housing units or solution: 4,293 rental housing units

Estimated population impacted: 19,478 people over age 21; debtors 0.004% of total rental turnover; average annual vacancies 2.23% of total rental housing covered by the program

Building recovery projects for social rent in Johannesburg.
Ph. JOSHCO



In South Africa, the Social Housing Regulatory Authority (SHRA) subsidizes up to 65% of the capital costs of housing projects earmarked in part for social rent. This model enabled the development of social housing institutions. One such organization, the Johannesburg Housing Company, builds well-managed affordable housing in the city center, attracting loans from commercial banks to an area that was previously rundown and devoid of investment.

In South Africa, a large proportion of tenants live in informal settlements: over 400,000 housing units have been built on unauthorized land that has poor access to basic services and is vulnerable to floods, fires and other environmental hazards. Shacks erected in the backyards of other dwellings increased by 55% between 2001 and 2011, to more than 700,000 units. There are two different subsidized rental housing programs in South Africa: the Community Residential Units (CRU) and the Social Housing Policy (SHP). Although the Social Housing Policy has existed since 1994, the creation of a regulatory authority (SHRA) in 2010 brought about significant developments. The Minister of Human Settlements has promised the delivery of 1.5 million new housing opportunities by 2019, including 750,000 units in upgraded informal settlements, the delivery of 563,000 subsidized housing units, 110,000 affordable housing units, 27,000 social housing units, 10,000 community residential

units and 35,000 affordable rental units.

Social housing projects are financed through a combination of government funds, debt and for-profit private capital (up to a maximum of 10% of total financing). Through the SHRA, the national government subsidizes up to 65% of the capital costs of housing projects, and allows subsidized units to be offered to tenants earning a certain monthly family income. Subsidized units must represent between 30% and 70% of all mixed projects.

There are three types of investment opportunities. The first is project financing for a non-profit institution or owner to undertake a project that includes social housing. The second is financing for a private developer to carry out a project involving social housing. The third is the purchase of a portfolio of projects developed by the National Housing Finance



Building recovery projects for social rent in Johannesburg.
Ph. JOSHCO



Building recovery projects for social rent in Johannesburg. Ph. JOSHCO

Corporation and Dutch International Guarantees for Housing Foundation. The social housing institutions (SHI) are non-profit delivery agents. To date, approximately 83 SHI have been set up and approximately 33,000 units have been delivered throughout the country. Although the number of these institutions has been increasing, the quantity of units developed by the SHI has not risen at the same rate, and most of the institutions have found themselves in financial difficulties. The most recent estimate is that just six of the 83 institutions are financially sound and another 25 are potentially viable.

In the case of Johannesburg, two SHIs have been very successful. One of them, the Johannesburg Housing Company (JHC), is a social housing company established in 1995 that has built a new affordable housing model with better building management and excellent customer service. It has developed over 4,293 rental housing units and thus provided homes for more than 19,478 people. Its work has helped to regenerate downtown Johannesburg, since many of the buildings it manages are not new but rather renovated modern architecture buildings that were dilapidated or abandoned. JHC works with two components of the rental housing policy: the declaration of urban restructuring zones, where SHIs can apply for a Restructuring Capital Grant (RCG) that covers up to 64% of the project financing; and the Bad Building Program (now known as the Inner City Property Scheme, ICPS). The objective of this program is to identify buildings that are in a particular state of disrepair and those in which arrears in public utility and service charges exceed the value of the building. The Johannesburg Housing Company and the Cope Housing Association, and later Madulam-moho, were the first SHIs to develop social housing schemes in the city.

The initial funding the JHC received provided the capital base required to develop social housing in

the downtown area on a big enough scale to ensure the organization could continue operating. By late 2000, JHC had established a portfolio of nine renovated buildings and two new construction developments. JHC's cost management has always been based on the requirement that each building must cover all of its operating costs, including interest on operating income.

Traditional urban regeneration strategies are mainly focused on economic growth, with an emphasis on attracting sustained private investments and creating a functioning real estate market that results in an increase in property value.

In the case of Johannesburg, through building improvements, renovations and conversions, as well as new construction projects, JHC has increased the housing stock within the city by approximately 10% and has transformed what were once rundown buildings to provide decent rents and housing. However, challenges will continue for social rental housing in the future due to the decreasing availability of affordable land in the restructuring zones.

DISASTER- RESISTANT

Resistant housing protects against natural disasters (earthquakes, floods, hurricanes) and those instigated by humans (fire, flood). The building systems, design and site of a house play a central role in avoiding future housing issues.

GEORGETOWN HOUSING SUPPORT PROJECT

A Long-term Sustainable Strategy

GEORGETOWN, GUYANA

Population: 67,140 (Georgetown, 2016);

773,303 (Guyana, 2016)

GDP per capita: USD 4,456.55 (2016)

Urban population: 30%

TIME FRAME

Year project was approved: 2010 (Amazonian Hinterland); 2017 (Georgetown, Guyana)

ACTORS

Project management: The Guyanese Ministry of Communities, the Guyanese Central Housing and Planning Authority and the IDB team: Patricio Zambrano-Barragan, Ophelie Chevalier, Robin Rajack, Derise Williams, Edgar Lemus and Martin Quiroga

Project implementation: The Guyanese Central Housing and Planning Authority (CHPA)

Project design: Pilot project in Guyana, MIT team: Adèle Naudé Santos, Marie Law Adams and Giovanni Bellotti; and students Kyle Branchesi, Sarah Brown, Kadeem Khan, Qianhui Liang, Helena Rong, Nneka Sobers, Yair Titelboim and Yue Wu

FINANCING

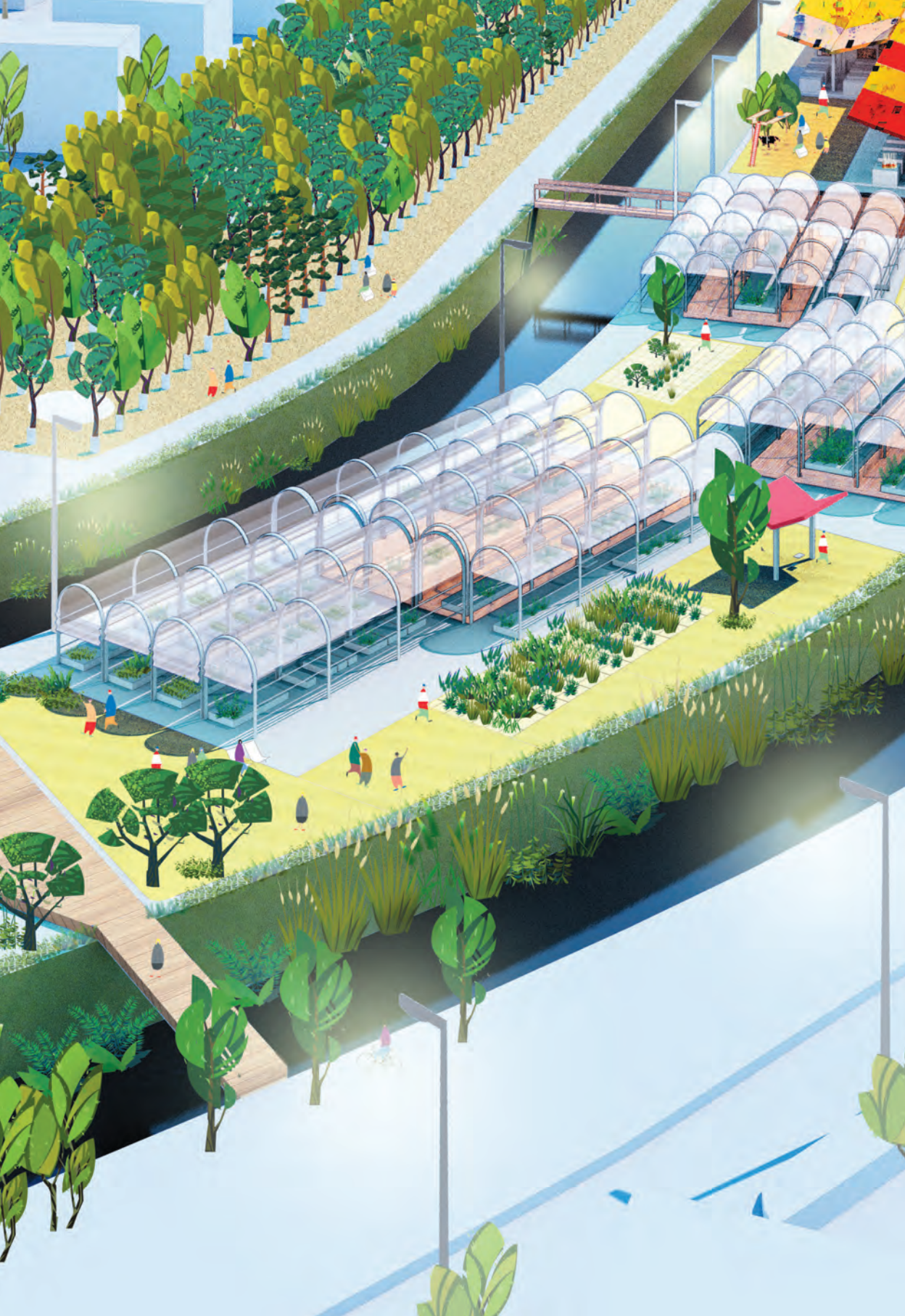
Type: IDB Loan

Pilot project in Georgetown, Guyana. Project designers: Adèle Naudé Santos, Marie Law Adams and Giovanni Bellotti. Students: Kyle Branchesi, Sarah Brown, Kadeem Khan, Qianhui Liang, Helena Rong, Nneka Sobers, Yair Titelboim, Yue Wu.



Over the last decade, the government of Guyana has adopted an incremental housing approach. The Inter-American Development Bank (IDB) and the Massachusetts Institute of Technology (MIT) organized a workshop to address the challenges of providing urban housing that strengthens communities. Security, sanitary conditions and resilience were key elements for housing support, along with the sustainable management of Georgetown's irrigation canals and resistance to flooding, storms and rising temperatures.





The city of Georgetown, Guyana, is defined by its relationship with water: it was built along the coast and is bordered on its western edge by the Demerara River, which flows from the Amazon. Today, the city and its outskirts are home to approximately 311,000 residents, or 40% of Guyana's total population. Colonial-era sugar plantations were built along the fertile coastal plain and have left behind a network of irrigation and drainage canals that disrupt the urban fabric. The old plantation lands are now home to informal settlements with a low population density. The irrigation system for agriculture was designed to support a vastly different context than that of the semi-urban residential developments found in the area today. Built three feet below sea level, Georgetown has a system of pumps and floodgates to keep flooding in check. However, only some of this equipment is currently in working condition and the canals are suffering from a lack of maintenance. In 2005 and 2015, the city was hit by catastrophic flooding due to heavy rainfall, and the risk of flooding is expected to rise in the future due to greater storm frequencies and rising sea levels. As a result, Guyana's urbanization initiatives face two predominant housing challenges. In Georgetown and the major coastal cities, formal housing is not affordable for most, overpopulation is prevalent and houses lack proper sanitation and are built without masonry or other structural reinforcements.

In the last decade, the Guyanese Central Housing and Planning Authority (CHPA) has adopted an incremental housing approach to help very low-income households improve their existing housing in both formal and informal settlements, and it has guaranteed formal ownership titles and basic infrastructure. The CHPA has taken incremental housing and adapted it to the specific conditions found in the coastal and interior regions. In urban communities, due to affordability issues and lands difficult to access and poorly maintained, CHPA has provided home improvement subsidies for infrastructure upgrades and formal ownership initiatives. In the hinterland, or rural interior region, the CHPA has pioneered a sustainable and inclusive incremental housing approach: it not only supports community-built housing, but also depends on community-led housing design and the use of local labor and materials.

At the end of 2017, the IDB approved a loan to assist the CHPA's initiatives for neighborhood upgrades and home improvements in Georgetown. The IDB invited faculty and students from MIT, led by Adèle Santos, to spend four weeks working with their team. Students from the University of Guyana Urban Planning graduate program were also invited to participate. The purpose of the workshop was to develop innovative design and planning strategies that could be executed and replicated in other parts of Guyana.



Pilot project in Georgetown, Guyana.



Pilot project in Georgetown, Guyana.

The team investigated each layer of the existing infrastructure separately, and also examined its role in the larger infrastructure system. For example, since garbage trucks were unable to drive along the unpaved roads, centralized waste collection was impossible. This led to households burning their waste, worsening the already poor air quality. Garbage was also dumped in the canals. The MIT team took advantage of a state plan to improve waste management and proposed the addition of a recycling plant and an educational facility to be located in the eastern expansion area, along with a waste collection system that uses cycle rickshaws. Lastly, the team identified underutilized reserve areas within the Sofia neighborhood and saw that poorly maintained areas between private plots are prone to squatter settlements, which results in community safety problems and health risks. MIT conducted fieldwork measurements of the primary canals and identified available reserve lands that could be repurposed for productive public uses and other areas that could facilitate mobility for locals.

The infrastructure was redesigned as a hierarchical, layered system that looks to solve basic infrastructural needs, such as cleaning the canals, improving accessibility and roadway safety and, in the future, increasing canal capacity. The first step of this public project involved street lighting, paved pathways and east-west connecting bridges. This was followed by the implementation of a water retention system throughout the reserves, at the confluence of the primary and secondary branches of the canals, so they can be used as open areas or plant nurseries during the dry season and for flood alleviation during heavy rains or storms. Once the key infrastructure needs have been addressed, the next step is to optimize and expand the quality and productive capacity of the landscape by introducing shared community spaces, such as markets, gardens, community centers and playgrounds. Markets and community gar-

dens will be developed as “plugin” modular units to generate incomes and create more job opportunities for area residents, which in turn will resolve issues related to the food supply and shortages, consolidate small public spaces and encourage the creation of a self-sufficient, productive community.

The MIT and IDB workshop in Georgetown, Guyana, addressed the urban challenges of providing housing that strengthens the community and, at the same time, provides safe, sanitary and resistant shelter by focusing on upgrades to existing infrastructure and the sustainable management of the city’s irrigation canals. It explored public infrastructure, open spaces and community development issues related to housing in the Sophia neighborhood, located approximately three miles east of downtown Georgetown. Built on what was once farmland divided by a network of irrigation canals, housing in Sophia is often poor quality and prone to severe flooding, without adequate infrastructure. The proposals that emerged from the workshop incorporated strategies for incremental construction, improved sanitation and resistance through the development of new housing typologies and public spaces, and building infrastructure that can withstand floods, storm surges and high temperatures.

SELF-FINANCED

Self-financed housing refers to projects that are able to finance their investment using their own resources. In general, these models depend on the value of the land and its sale as part of the investment flow. In cases of cross-financing, the idea is to sell a number of plots for commercial, production or housing purposes at market prices in order to finance the construction of affordable housing.

NAGARI NIVARA PARISHAD HOUSING

Cross-subsidizing for Affordable Housing Construction

INDIA

Population: 1.324 billion (2016)

GDP per capita: USD 1,709.39 (2016)

Urban population: 31.16%

TIME FRAME

Year project was approved: 1981

Year project began: 1992

Year project was completed: 2009

ACTORS

Project management, implementation and design:

Nagari Nivara Parishad

FINANCING

Type: community savings, state subsidies, cross subsidies from the sale of land

Estimated budget: USD 43,840,500

IMPACT

Number of residential units or solution: 6,152 homes in residential buildings and 62 homes and 109 stores in commercial residential buildings.

Nagari, Ph. RCHI MITI.



The case of Nagari Nivara Parishad shows how a group of developers can subsidize affordable housing. This NGO organized the community, set up a fund to pay the government for the subsidized land and secured a loan to begin development by mortgaging some of the residential plots. Following the construction and sale of the first units, they invested the returns into the project to help develop the remaining homes. The venture relied on sales management and demonstrated the potential of self-financed housing.

The 2011 National Census estimates that 65 million people in India live in slums. The Indian Ministry of Housing estimates a housing shortage of 18.78 million homes and acknowledges that 99% of the economically weaker and lower income groups are unable to afford housing. The real estate sector is a major component of the economy; it is estimated to have contributed 6.3% of GDP in 2013 and employs approximately 7.6 million people. However, rapid urbanization, poverty and strict standards have led to a scarcity of land for low-income residential development, pushing large sectors of the population out toward the urban peripheries.

This project came about as a result of a public protest by 4,000 Mumbai residents in 1981. The majority were low-income workers who were demanding a land grant to build affordable housing. Once the government had granted them the land, Nagari Nivara Parishad (NNP) organized the community to set up a fund to pay the government the cost of the subsidized land. To achieve this, it encouraged the members of the community to open individual accounts with the New India Co-op Bank Ltd, where they deposited

approximately UDD 14 to cover the cost of the land. It also raised a loan for the initial project development by mortgaging part of the residential land and selling other commercial plots.

The land allocated to NNP lacked basic infrastructure, such as roads, drains, water supply, electricity, etc. It contained high, rocky hills, ravines and deep quarries that hindered the construction of homes. Due to the lack of basic infrastructure facilities such as sewage and water connections, NNP was forced to take on the huge financial burden of constructing three septic tanks and a large water reservoir at the lowest elevation of the site. In 2003, the municipality was able to connect the area to the municipal sewage system and the temporary infrastructure was dismantled.

The project was planned, managed and developed entirely by NNP in consultation with community members and professional planning and design consultants. It was developed in four phases. In 1992, after obtaining the land, NNP went ahead with the housing project implementation, building and



Nagari. Ph. RCHI/MITI.



Nagari. Ph. RCHI MIT1.

handing over possession of 6,152 housing units in residential buildings, 62 single-family homes and 109 stores, which were sold to provide funds for the NNP to continue developing the remaining social housing units. The development of this venture depended on successfully managing the sale of commercial land. The 5,088 two-bedroom condominiums were completed and delivered to members in phases from April 1999 through May 2005; 1,064 apartments were delivered from March 2004 to March 2006. The last 109 stores and offices in the commercial buildings were delivered by May 2008. To date, 108 residential societies and five mixed-use societies (commercial zone, zone 4) have been set up and secure tenure documents, known as occupancy deeds, have been issued. Meanwhile, the communal areas are maintained and managed by the NNP trust, which charges residents a fee for maintenance.

In strong housing markets, for-profit or non-profit developers can use the proceeds from the sale or rental of market-price housing to subsidize the costs of affordable housing. For example, some developers have used the proceeds from market-price condominium units to subsidize condominiums or rentable units for working families within the same development. The NNP case demonstrates how developers can subsidize affordable housing with the proceeds from market-price transactions. The NGO organized the community, set up a fund to pay the government

for the subsidized land and secured a loan to begin development by mortgaging some of the residential plots. The development of the venture as a whole relied on the savvy management of commercial land sales and demonstrated the potential of self-financed housing even among low-income populations.

REGULARIZED

Land tenure regularization is a necessary step toward achieving the highest level of housing security and legitimacy. This not only includes possession of the deed or legal document but also refers to the comprehensive improvement of existing homes and the provision of public services such as potable water, gas and electricity.

TT NEIGHBORHOOD UPGRADING PROGRAM

Housing Infrastructure Upgrading and Regularization

TRINIDAD AND TOBAGO

Population: 1.36 million (2016)

GDP per capita: USD 15,377.10 (2016)

Urban population: 8.35%

TIME FRAME

Year project was approved: 2010

Year project began: 2010-2017

Year project was completed: 2017

ACTORS

Project management: IDB

Internal team: Robin Rajack (leader), Gregory Dunbar, Leonor Corriols Diaz, Priya Ramsumair-John, Maria Elena Castro-Muñoz and Geoffrey Abdulah

Project implementation: Trinidad and Tobago's Ministry of Housing and Urban Development, including the Land Settlement Agency

FINANCING

Type: IDB loan and national funds

Estimated budget: Loan of USD 40 million; matching funds of USD 7 million

IMPACT

Estimated population impacted: In total, over 7,000 households benefited from the program. Approximately 3,300 families benefited from the squatter regularization. Nearly 3,000 families were supported through the home improvement grants, and nearly 1,000 families built their dwellings using home construction grants in Trinidad and Tobago.

The Program Monitoring and Coordination Unit of Trinidad and Tobago's Ministry of Housing and Urban Development implements the Neighborhood Upgrading Program (NUP), a loan program established between the Inter-American Development Bank (IDB) and the national government. Its goal is to improve the living and housing conditions of low and middle-income residents of squatter settlements through infrastructure reforms based on three components: regularization and upgrading, housing subsidies, and sectoral and institutional strengthening.

Trinidad and Tobago has an estimated housing deficit of over 100,000 units. The country has also experienced problems with squatting on state land, with up to 19% of the population living in such conditions. Successive governments have responded with a number of programs to regularize informal settlements and grant occupants tenure security. In terms of meeting new housing needs, there have been two partnership programs with the private sector to build housing for low-income households. As part of a joint venture, the Housing Development Corporation (HDC) enters into agreements with medium and large contractors to build new houses and communities. In addition, the Infill Lots program involves small contractors building houses on vacant lots within existing developments owned by the HDC. The results of both programs have been mixed and the first scheme did not achieve its original aim of completing 10,000 units per year.

The Ministry of Housing and Urban Development's Program Monitoring and Coordination Unit (PMCU) implements the Neighborhood Upgrading Program (NUP), a USD 50 million loan program agreement between the Inter-American Development Bank (IDB) and the government of the Republic of Trinidad and Tobago.

The goal of the NUP has been to optimize the living and housing conditions of low and middle-income households living in squatter settlements through infrastructure reforms, by providing home improvement grants and facilitating the incremental construction or purchase of affordable quality housing. This program also promotes the equitable development of healthy and sustainable communities in Trinidad and Tobago. The NUP includes three components. The first is the regularization and upgrading of squatter settlements, a component that provides infrastructure upgrades for squatter communities and land tenure regularization for tenants. This work is carried out by the Land Settlement Agency (LSA), which, under the State Lands (Regularization of Tenure) Act of 1998, is authorized to regularize illegal occupation at 254 scheduled sites in Trinidad and Tobago. The second component is housing grants, with the PMCU providing matching grants to eligible low-income beneficiaries for home improvements, housing construction or purchases. The third and final component, sectoral and institutional strengthening, helps build the policy-making and implementation capacity of the Ministry of Housing and Urban Development and its agencies. This includes the acquisition of hardware and software, the automation of program reports and participation in regional/international forums on best practices in housing and urban development.

To be eligible for the grant, beneficiaries must earn a monthly household income that does not exceed USD 1,050; be citizens and residents of Trinidad and

Tobago; be able to contribute enough to complete the repairs/construction or purchase; provide proof of ownership or permission from the owner to repair/purchase or build on the property; and not have previously benefited from any housing grant offered by the Ministry or its agencies. The program offers applicants financial assistance of USD 5,200 or USD 8,200 to build or purchase a home valued at no more than USD 29,700 in Trinidad and USD 32,650 in Tobago. The cost of the land is not included. Applicants earning a monthly family income of up to USD 600 are eligible for a grant of USD 7,400, and those with a monthly family income between USD 600 and USD 1,050 qualify for USD 5,200. The PMCU has developed 10 housing designs that can be built for under USD 33,550.

All applicants are entered into the Ministry's database and beneficiaries are chosen in a random selection process. Those selected are contacted and interviewed to confirm the information provided on their application. A technical officer from the state office monitors the works to be undertaken to guarantee strict compliance with the signed agreement and authorizes the disbursement of funds in tranches. Although the formal evaluation is still ongoing, the IDB considers the NUP a success. The program reached thousands of families with urgent housing needs, many of whom were living in poverty. It was implemented so as to ensure that it respected social and environmental perspectives in the target communities. The unit costs were reasonable when compared to the usual state expenditures on similar housing initiatives, and implementation was completed as scheduled in 2017.

This program can be replicated throughout Trinidad and Tobago as the procedures and the capacity to undertake similar works has been developed and there is an urgent need for such interventions. In the case of regularization for squatter settlements, the entity responsible for implementation is the Land Settlement Agency, a permanent arm of the state. The Ministry has also developed the in-house capacity to implement the housing subsidy program independently of the NUP. The challenge for expanding this project will be financing. The IDB is willing to continue as a financial and technical partner in this type of work, and it has now supported three consecutive loans for housing and other projects in the country.

COMPONENT	DETAIL
Regularization of illegal settlements on state land	<p>Construction and paving of roads, construction of drains and water retention facilities; drinking water supply and hydrants; regularization of electricity supply.</p> <p>Measures to regularize the land tenure of the occupants on the sites through an innovative and incremental legal approach.</p>
Subsidies for home improvements	<p>Subsidies (typically TT \$ 20,000) for home improvement projects managed by the owner, such as roof and floor repairs, interior bathroom facilities, subdivisions to improve privacy, etc.</p> <p>Normally, the owners would contribute with their savings and assets to complete the project. The coverage was in Trinidad.</p>
Subsidies for the construction of housing	<p>Subsidies (typically TT \$ 50,000) for the construction of a new home managed by the owner.</p> <p>Normally, the owners would contribute with their savings, liquid capital, and private loan to make up the difference. The coverage was in Trinidad and Tobago.</p>
Sectorial and institutional strengthening.	<p>Improvements in the training and information system of the Ministry of Housing and Urban Development (MHUD) as well as the Land Arrangement Agency (LSA). Purchases of equipment for the work of MHUD and LSA.</p>

Description of the TT program components.
Source: IDB team headed by Robin Rajack.

SUSTAINABLE

The aim of sustainable housing is to reduce the environmental impact and increase the well-being of residents. This concept refers to practices employed throughout the life cycle of buildings (design, construction and operation) that effectively minimize the sector's climate footprint, resource consumption and the loss of biodiversity.

VINTE AND PROCSA

A Sustainable Construction Industry

MEXICO

Population: 127.5 million (2016)

GDP per capita: USD 8,201.31 (2016)

Rural population: 20.48% (2016)

TIME FRAME

Year project was approved: In 2017, a new brand was launched for private sector operations to signal this new direction

ACTORS

Project management: IDB Invest

FINANCING

Type: Private sector with IDB Invest loans (senior loan)

Estimated budget: From 2013 to 2018 the IDB granted USD 60.25 million in loans for the urban planning and housing sectors

IMPACT

Number of residential units or solution: PROCSA and VINTE have built over 50,000 homes

Estimated population impacted: approximately 200,000 people

A Vinte real estate development. Ph. Vinte.



The affordable housing developers VINTE and PROCSA demonstrate how the private sector can improve both sustainability and corporate responsibility in the construction industry. The environmental advocacy of these companies focuses on both process and product, and includes the planning, upgrading, construction and sale of housing developments in Mexico. PROCSA promotes environmental protection on the construction site itself and VINTE develops sustainable housing.

IDB Invest is the private sector branch of the Inter-American Development Bank (IDB) Group, which finances sustainable projects and companies to achieve financial results that maximize the region's economic, social and environmental development. With a current portfolio of USD 11.6 billion under management and 330 clients in 21 countries, IDB Invest is opening up new frontiers to provide financial solutions and consulting services that meet the changing demands of its clients and markets. IDB Invest is expanding its portfolio by increasing its focus on infrastructure and corporate sectors, including energy, transportation, water and sanitation, social infrastructure, agribusiness, manufacturing, telecommunications and sustainable tourism, while continuing to serve its financial market customers. IDB Invest is also expanding its local presence to strengthen its customer service and ensure quality portfolio management. It is opening centers in Panama, Trinidad and Tobago, Colombia and

Argentina and aims to place personnel in the 26 borrower countries in the Latin America and the Caribbean region.

PROCSA is a group of companies whose main activity is the development, design, construction and sale of low and middle-income social housing in Mexico. Since its founding 53 years ago, PROCSA has provided housing solutions for over 15,000 families. The company takes charge of the entire process of building a housing complex, including land selection, project documents, permits, construction, sale and the final delivery to the customer, making it a comprehensive package of quality services.

In recent years, PROCSA has taken a proactive stance on environmental protection within the private construction sector in Mexico, focused not only on the final housing product itself, but on the on-site construction process as well. For example, a water-



PROCSA projects. Ph. PROCSA.



PROCSA projects. Ph. PROCSA.

proof space is provided for the maintenance of machinery and equipment to prevent oil and/or grease leaks into the subsoil. Different waste materials are stored individually in closed containers that prevent spills and are collected by companies specializing in such materials. The building site is lit by lamps with photocells and energy-saving bulbs. The water-based paint and pastes used in the construction are lead- and solvent-free. Separate containers are provided for organic and inorganic garbage. To prevent noise pollution and air pollution from smoke and fumes, vehicle maintenance is required of all transport contractors, whose documents must be in order, with all corresponding vehicle checks and services.

VINTE is a real estate developer whose subsidiaries are engaged in developing, promoting, designing, building and selling low and middle-income housing, with a presence in four Mexican states (the state of Mexico, Querétaro, Hidalgo and Quintana Roo) and plans to branch out into Puebla and Morelos in the near future. Vinte has been developing sustainable housing for over fifteen years based on an inclusive business model that promotes community life and incorporates an environmental protection approach to encourage the most efficient use of natural resources. The company also focuses on shared value creation, which promotes a vision of long-term sustainability. Over the course of its existence, Vinte has developed over 33,000 homes in five states of Mexico, mainly in the center of the country, and has achieved a high level of customer loyalty and extensive brand recognition in the areas where it operates.

The company recently came up with one of the most promising household saving proposals: Hybrid/Zero Gas House (Casa Híbrida/Cero Gas) is the first stage of an innovation investment program focused on achieving productive homes. The Hy-

brid/Zero Gas House is designed to eliminate the use of this fuel and produce the energy required to meet basic needs such as cooking and bathing. The pilot versions of this 560 sq. ft. home for four costing an average of approximately USD 25,600 demonstrated substantial benefits, such as average estimated monthly saving of 5% of the total family income, depending on their day-to-day habits, as well as a reduction of half a ton of greenhouse gas per house per year.

The cases of the affordable housing developers VINTE and PROCSA demonstrate how the private sector can improve both sustainability and corporate responsibility in the construction industry. The environmental advocacy of these companies focuses on both process and product, and include the planning, upgrading, construction and sale of housing developments in Mexico. PROCSA aims to use the IDB Invest loans to convert industrial zones for residential purposes, while VINTE plans to continue developing models of the Hybrid House to reach all sectors of the population in 2019.

INTEGRAL

Integral housing refers to projects and programs that involve homes but also view other uses as fundamental to the habitat. In this way, integral projects always rely on a master plan that defines and designs commercial, productive and recreational uses of housing while addressing the need for public space. In general, the positive impact of integral housing projects extends beyond the beneficiaries to others living in the project's proximity.

PARQUE NOVO SANTO AMARO V

An Integral Master Plan as the Cornerstone of Social Housing

SÃO PAULO, BRAZIL

Population: 12.11 million (São Paulo, 2017);

207.7 million (Brazil, 2016)

GDP per capita: USD 9821.4 (2017)

Urban population: 86% (2017)

TIME FRAME

Year project was approved: 2009

Year project began: 2010

Year project was completed: 2012

ACTORS

Project management: City of São Paulo

Project implementation: Mananciais Consortium:

Construbase + Engeform

Project design: Vigliecca & Associados

(Architects: Hector Vigliecca, Luciene Quel, Neli Shimizu, Ronald Fiedler)

FINANCING

Type: Investment subsidies, federal government financing

Estimated budget: USD 7.2 million

IMPACT

Number of residential units or solution: 200 new housing units, urban and infrastructure upgrading, linear park

Estimated population impacted: 1,945 people

An aerial view of Parque Novo Santo Amaro V.
Ph. Courtesy of Vigliecca & Associados.



The purpose of the Parque Novo Santo Amaro V master plan was to relocate 200 families at risk of natural disasters. The design was adapted to the existing urban fabric and to a reforestation plan along the reservoir. In order to avoid gentrification and internal displacements, the project was built in the area where the beneficiary families were already living while considering adequate water and environmental management.





This project was carried out in Santo Amaro, one of the informal settlements on the south side of São Paulo. This public transportation options are poor in the neighborhood, and a trip downtown can take two hours. In addition, educational, recreational and social infrastructure is scarce and Santo Amaro's distance from the city center affects the productivity and prosperity of the community. The total intervention covers 13 acres located in a special social interest area (ZEIS 1) that is also an environmental protection area due to the nearby Guarapiranga reservoir.

Introduced in 2001, the ZEIS category applies to four types of areas: slums that require physical upgrades, slums located in environmentally sensitive areas, undeveloped peripheral areas, and abandoned neighborhoods in the city center. The new São Paulo master plan adds 13 square miles of new ZIES for the development of social interest housing and earmarks

a fifth type of area characterized by a low population density and adequate access to public services.

The municipal government of São Paulo commenced the project, which was overseen by the Housing Department. The main aim was to relocate 200 families at risk of natural disasters because they were squatting along the banks of the Guarapiranga reservoir, at the bottom of the valley. One of the main goals of the project was to avoid gentrification and internal displacements. Therefore, the project was built in the area where the beneficiary families were already living, but plans took water and environmental management into account.

The government of the state of São Paulo partnered with the municipal government to expropriate the homes of 200 families. The families were relocated in subsidized rentals nearby while their new homes were under construction. When the project was com-



Homes. Ph. Courtesy of Vigilecca & Associados.



Project and surroundings.
Ph. Courtesy of Vigilecca & Associados.

plete, families were each assigned one residential unit. However, given that the land belongs to the city, the families do not own their apartments and must pay a monthly occupancy permit under the initial financial scheme. This allows them to inhabit the residential unit until the commencement of the land titling process, which will allow residents to buy their home with a state subsidy. The total cost of the project in 2009 was approximately USD 6 million, with a cost per unit of around USD 30,000.

Instead of imposing a new reality on the neighborhood, the project makes conscientious interventions in the urban landscape and values its existing resources. The green areas that had disappeared during the informal settlement were recovered through a linear park that functions as the cornerstone of the project. All along the park, the community areas—like the children's park, skating rink, soccer fields and school—encourage residents to walk around and increase their identification with the neighborhood. In order to get to school, children used to have to cross a contaminated stream where the sewers emptied. As part of the project, the stream was diverted underground and then covered by a street. In addition, water mirrors were created to preserve residents' connection to the environment. Today, the area receives its water from various recovered sources.

The buildings are between five and seven stories tall and the 200 residential units have different layouts. There are two-story apartments with two or three bedrooms and options for people with physical disabilities. The layout is designed not to deter pedestrians as some non-residents also use its walkways.

The goal of the project was to promote decent living conditions and prosperity for this vulnerable community on the periphery of São Paulo. By providing a formal housing infrastructure and a whole set of services, the project facilitates daily life for residents

and allows families to develop a sense of belonging. On the other hand, by relocating families at risk of being affected by natural disasters, the project avoided community displacement and fragmentation. In addition, it successfully integrated the building design with the surrounding landscape and resolved structural issues like the course of the water and water management. It also incorporated high-quality plentiful public spaces open not only to residents but to the entire neighborhood. Given the vulnerable conditions of informal communities in Latin America, social housing projects should always be accompanied by a social program that accompanies the community's development and appropriation, providing tools and knowledge for managing and caring for their habitat.

LOCALIZED

Localization is a variable related to the advantages of the areas within cities with a high density of workplaces, social services like healthcare and education, and shopping areas. In general, when done well, localization guarantees fast, safe access to these areas. As a result, public transportation services, roads, and the size of the urban or rural fabric are all critical factors to the multifaceted success of localization.

LA PLAYA APARTMENTS

A Multi-scale Consortium for the Construction of Centralized Housing

MEDELLIN, COLOMBIA

Population: 2.46 million (Medellin, 2015);
49.06 million (Colombia, 2017)
GDP per capita: USD 6301 (2017)
Urban population: 77% (2017)

TIME FRAME

Year project was approved: 2003
Year project was completed: 2004

ACTORS

Project management: Conconcreto handled the project management, CI Loreto was in charge of the construction and Ana Elvira Vélez and Juan B. Echeverri were the architects
Project implementation: Conconcreto (project management), CI Loreto (construction)
Project design: Ana Elvira Vélez, Juan Bernardo Echeverri and Carlos Andrés Peérez

FINANCING

Type: Loan
Estimated budget: The budget in 2002 was approximately USD 2.6 million and that year, each unit sold for approximately USD 9,500. Today, each unit would cost USD 22,175.

IMPACT

Number of residential units or solution: 254 apartment units
Estimated population impacted: 1,016 people (calculating an average family size of four)

Aerial view of the project. Ph. Courtesy of Ana Elvira Vélez and Juan B. Echeverri.



A large construction firm partnered with a local construction company and an architecture studio to build La Playa Apartments, taking advantage of tax breaks provided under a national social housing policy to encourage private sector investment. The project boasts a centralized location and innovative home typology, among other features. It also illustrates how high-quality design can maximize the value of a residential unit.

More than 30% of the city of Medellín suffers from some type of social or environmental vulnerability. The urban districts in the north, central east and central west of the city are those with the lowest quality of life and human development and also those with the highest violent crime rates. The state provision of social housing does not come close to meeting existing demand. For this reason, private sector participation is critical to developing affordable housing. This social housing project is a private sector initiative developed by the construction firm Concreto, a leading company in public works such as highways, bridges and dams since 1961. In building La Playa Apartments, the company took advantage of the country's national social housing

policy, which encourages private sector investment in social housing in exchange for tax breaks. On the demand side, the Colombian social housing scheme provides a housing subsidy to eligible families; known as "family compensation funds," these are granted to households whose income is less than four times the monthly minimum wage.

Built in 2004, La Playa is a residential building project at the site of the old textile factory Coltejer in downtown Medellín. The challenge was to design the 254 residential units, each measuring 560 sq. ft., on a limited budget. Although a private company had designed the project, it needed to comply with all national regulations on social housing. Therefore,



Balconies. Ph. Courtesy of Ana Elvira Vélez and Juan B. Echeverri.



Sidewalk and public space. Ph. Courtesy of Ana Elvira Vélez and Juan B. Echeverri.

the maximum cost of each residential unit was set at 135 times the monthly minimum wage (approximately USD 18,000 in 2002). Architects had two issues they needed to resolve: how could 254 families live together in a single housing block without it feeling overcrowded? Could the design be flexible enough to allow residents to have their own identity?

In response to these challenges, the design plan was based on three main ideas. The first was to make the floor area as large as possible and leave it partly unfinished. The basic residential unit was approximately 16 x 35 ft. with a simple layout. By offering unfinished units, the architects were able to maximize the floor area, giving each unit 560 sq. ft. plus a balcony measuring 22 sq. ft. It was then up to each resident to finish the apartments based on his or her needs and budget. The second principle was to reduce the fragmentation associated with density. The common areas of the buildings were designed in the form of rounded or pointed arches that divide the entryways into four residential units per floor. This creates a sense of a small community for residents. Third, the architects aimed to provide quality common areas to further develop the neighborhood. The project involved three buildings parallel to La Playa Avenue and Santa Helena Creek that form a pedestrian walkway which can be used as a recreational area or for neighbors to gather. Although the city is responsible for the upkeep of this area, residents have also taken on tasks like cleanup, gardening and a community watch. The balconies of the apartments that look out onto the walkway create constant visual contact with the public space and thus increase the safety of the complex.

As a result of these interventions, the project has addressed the issue of population density and community belonging for those families not accustomed to living in high rises. In addition, it strikes a balance between the characteristic density in any downtown

area, the sense of belonging to a neighborhood, and a high-quality, abundant public space. On the other hand, one of the main attributes of this project, the flexibility in the types of units offered, also helped reduce the cost per unit, making the housing more affordable for low-income sectors.

Although feedback meetings with the community were not part of the project, the design—which considered both flexibility and adaptability—allowed each family to make its own decisions about the interior design of their homes.

The project represented an innovation on social housing in Medellín in several ways. One of the most important was its location in the city's downtown area; usually, housing for low-income groups is located on the urban periphery. In addition, the project offered an innovation in terms of this type of housing, providing a flexible space and avoiding predefined family configurations with rigid spatial distribution. This development also illustrates how quality designs can make the most of the budget available for each residential unit. Finally, the project shows the role the private sector can play in creating affordable, centrally-located housing with quality architecture and construction. The success of La Playa Apartments was made possible by a multi-scale consortium formed by a large construction firm with solid financial and administrative capacity, a local builder well-versed in the city's dynamics, and an architecture studio committed to the production of social housing.

COORDINATED

EMPRESA DE DESARROLLO URBANO OF MEDELLIN

Comprehensive Quebrada Juan Bobo Neighborhood
Upgrading and Environmental Recovery Plan

MEDELLIN, COLOMBIA

Population: 2.46 million (Medellin, 2015);

49.06 million (Colombia, 2017)

GDP per capita: USD 6,301 (2017)

Urban population: 77% (2017)

TIME FRAME

Approval year: 2004

Start year: 2005

Completion year: 2007

ACTORS

Project management: Empresa de Desarrollo Urbano

Project implementation: Empresa de Desarrollo Urbano; municipal and DAPM departments; the Colombian Ministry of Environment, Housing and Territorial Development (MAVDT); Aburrá Valley Metropolitan Area (AMVA); and the public utilities firm Empresas Públicas de Medellín (EPM)

Project design: Empresa de Desarrollo Urbano

FINANCING

Type: Mixed sources of financing from different levels of government (national, departmental, regional and municipal)

Estimated budget: COP 49 billion

IMPACT

Number of residential units or solution: 85 houses improved and 29 replaced

Estimated population impacted: 1,260 inhabitants, plus all of the inhabitants of the ravine

Homes and recreational areas. Ph. Courtesy of Empresa de Desarrollo Urbano of Medellín.



The Comprehensive Quebrada Juan Bobo Neighborhood Upgrading and Environmental Recovery Plan addressed the natural risks associated with the proliferation of informal housing in the city of Medellín. The project relocated more than 1,260 inhabitants living in high-risk housing, restored environmental reserves and cleared the shores along the ravines. The project was successful due to a comprehensive approach that encouraged community participation, which ensured the solutions were compatible with local needs.

In recent years, Medellín has undertaken institutional, social and physical transformations to solve specific problems in defined areas. Actions aim to improve housing adequacy, restructure public spaces, provide community facilities and develop mobility systems. The Empresa de Desarrollo Urbano (EDU) of Medellín is a state-owned company with private capital and financial and administrative independence. Through its Integral Urban Projects (PUI) initiative, it has developed long-term intervention methodologies that serve as models for areas suffering from unplanned growth and housing deficits, low quality of life indexes, high murder rates, or a shortage of community facilities and public spaces.

The PUI comprises improvement programs that focus on the rezoning and endowment of peripheral areas that have been developed informally. Such areas are characterized by a lack of public spaces, low-quality mobility infrastructure, few community service facilities, and poor coverage of water supply networks and sewage systems. The PUI also seeks solutions to the habitability issues associated with living in high-risk areas and carries out the environmental restoration of ravines and protected areas.

The MIB Quebrada Juan Bobo project addressed the natural risks associated with the proliferation of informal housing along a ravine and the relocation of more than 1,260 inhabitants living in high-risk housing. It also involved the restoration of environmental reserves and the removal of structures along the ravine shore, where 80% of the houses suffered from structural and functional deficiencies. Of these houses, 35% were located on ravine slopes in areas with geotechnical restrictions and 94% were illegal.

MIB Quebrada Juan Bobo was a pilot project, the first of its kind to be developed and also the largest in terms of what it has achieved and the attention it has drawn. The interventions also influenced the decision to locate the Metrocable, part of Medellín's public transport system, in the area. Additionally, it provided opportunities to formulate strategic programs aimed at environmental restoration and the improvement and relocation of high-risk housing. Not only were the existing buildings on Quebrada Juan Bobo determined to be in critical condition in terms of their physical and functional safety, but a land and environmental survey also revealed environmental pollution and water contamination. The



Public spaces adapted to the terrain. Ph. Courtesy of Empresa de Desarrollo Urbano of Medellín.



Public spaces. Ph. Courtesy of Empresa de Desarrollo Urbano of Medellín.

sewer system was entirely informal; on average, each four-member dwelling measured approximately 312 sq. ft. There was no public, structured mobility plan; instead mobility options were mostly informal and posed high risks to inhabitants, who were also exposed to the danger of landslides where 90% of the sliding debris could be comprised of sewage water.

This project delivered 85 home improvements and 29 replacements of highly deteriorated homes that were built on the same plot in order to conserve existing urban structures and help the families become home owners. The MIB Quebrada Juan Bobo initiative encouraged a partnership between the national, departmental and municipal governments to grant new housing subsidies and housing improvements. Based on the number of applications it received and seeing the real demand that existed, Colombia's Ministry of Environment, Housing and Territorial Development (MAVDT) launched a subsidy pool; the municipality of Medellín assigned a value per unit of USD 3,000 and raised funds through a trust.

The Juan Bobo management and intervention model required institutional and organizational coordination among multiple entities, programs and projects. Actors were in constant dialogue with local civic organizations and the project's technical managers. The idea behind the Juan Bobo project strategy, which encouraged community participation, was that direct beneficiaries should play an active role in decision-making, self-analysis and reflection. Community participation included actions aimed at raising the awareness and responsibility of the inhabitants by engaging them in housing programs. The project began by recognizing the existing community and fostering synergy with the state in order to build consensus.

The success of the MIB Quebrada Juan Bobo project lies in its successful coordination of multiple actors,

which enabled it to have a greater impact. It also encouraged community participation to ensure solutions were compatible with local needs and, at the same time, fostered a sense of belonging. EDU and the Medellín Social Interest Housing Fund (FOVI-MED) coordinated economic, financial and technical resources for the infrastructure and public space upgrades with more than 12 local government entities and programs, including the Aburrá Valley Metropolitan Area, the Municipal Potable Water and Basic Sanitation Program, the Department of Public Works, Empresas Públicas de Medellín, the Department of Health, the Institute of Sports and Recreation (INDER), the Administrative Planning Department, the Department of Finance, the Medellín Government Department, and the Social Welfare Department. Besides providing manpower for cleaning, worksite maintenance and home improvements, communities also contributed human resources for negotiations, newly formed committees and the management of community projects.

COOPERATIVE

QUINTA DEL BATLLE

Development for Social Inclusion

MONTEVIDEO, URUGUAY

Population: 1,319,108 (Montevideo, 2016);

3,444,000 (Uruguay, 2016)

GDP per capita: USD 15,220.57 (2016)

Urban population: 95%

TIME FRAME

Year project was approved: 1992

Year project began: 1997

Year project was completed: 1999

ACTORS

Project management: The Uruguayan Ministry of Housing, Land Organization and the Environment

Project implementation: The Uruguayan Federation of Mutual Aid Cooperatives (FUCVAM)

Project design: The following housing cooperatives: Cooperativa de Vivienda Leandro Gómez, Cooperativa de Viviendas de los Trabajadores, Cooperativa de Vivienda Horizontes Nuevos II, Cooperativa de Viviendas Hogar 1

FINANCING

Type: Mutual aid contributions and state subsidy

IMPACT

Number of residential units or solution: 206

housing units managed by four cooperatives

Estimated population impacted: 2,000 families, including those who benefited from the infrastructures and social services

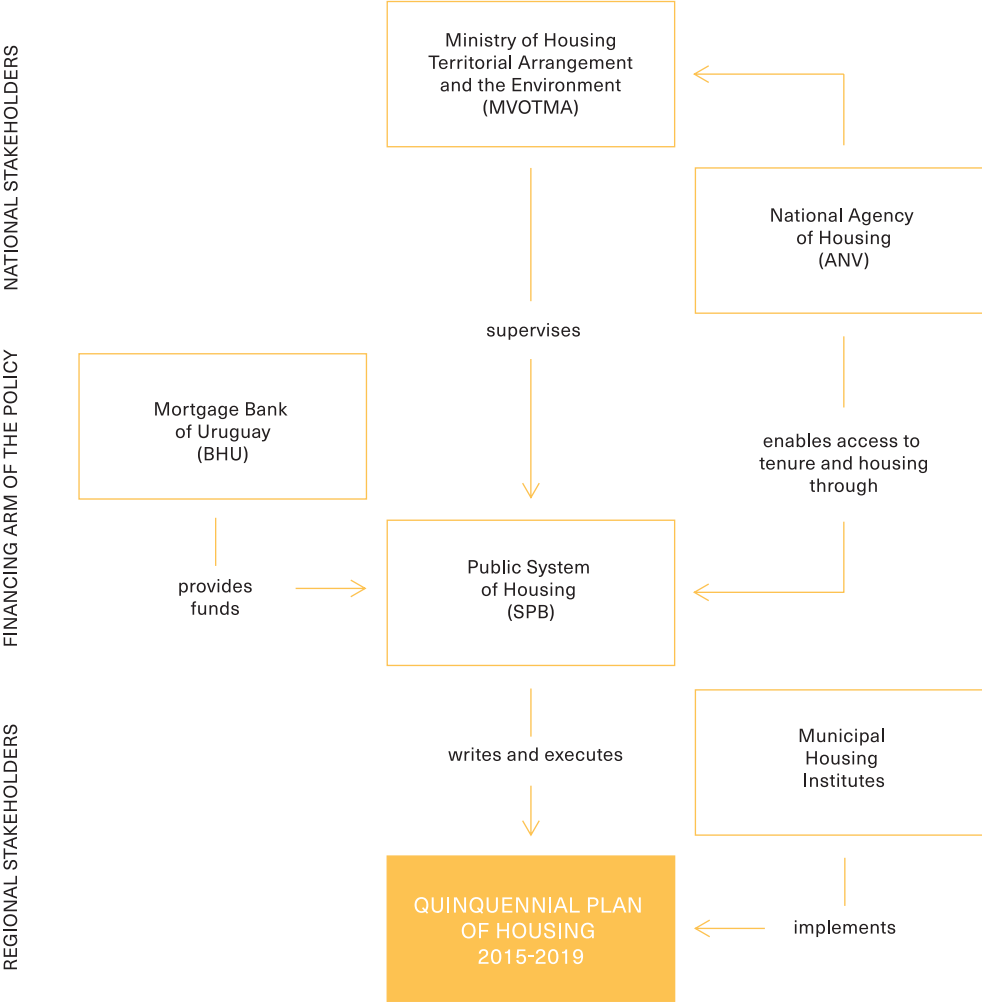
Members of a FUCVAM cooperative. Ph. FUCVAM.



The Uruguayan Federation of Mutual Aid Cooperatives (FUCVAM) developed a structured housing project on land provided by the Montevideo municipal government. In keeping with their cooperative housing model, members shared land tenure and decision-making responsibilities until receiving the titles to their individual properties. Collective legal representation, mutual aid and self-management results in better quality housing at the same cost as public housing.

Founded in 1970, the Uruguayan Federation of Mutual Aid Cooperatives is a trade-union organization founded by Uruguayan workers seeking access to affordable housing. Self-management by the cop members and future home residents creates a

model of belonging and empowerment that is not only reflected in the quality of the homes but also in the upkeep of buildings over time. It is the future residents who oversee the construction and make management decisions, with support from the te-



Housing policy flowchart and FUCVAM Uruguay. Ph. FUCVAM.

chnical assistance institutes. FUCVAM is currently the oldest and largest social movement dedicated to housing issues and social development in Uruguay. It has 500 member cooperatives that represent some 25,000 families. Through a combination of state and community interventions, the housing cooperatives have obtained urban infrastructure, educational institutions, cultural infrastructure, healthcare programs and access to affordable food. Since 2001, FUCVAM has participated in numerous training events in more than 15 Latin American countries.

Originally owned by Uruguayan President José Batlle y Ordoñez, Quinta del Batlle was a farm located on what was once the outskirts of Montevideo. Before the cooperatives became involved, the site and the surrounding areas had no urban infrastructure and its residents did not have homes: they were squatters inhabiting derelict buildings or slums in areas not designated for building. The Montevideo city government ceded the land to the cooperatives as part of an urban housing development plan structured around FUCVAM, which provided technical assistance from pre-construction until the phase following occupancy. Through a coordinated intervention by four cooperatives and FUCVAM's efforts, ten housing blocks were built with infrastructure including public water provision, sanitation, power and phone lines. The Quinta de Batlle project also provided social infrastructure and services for the area and experimented with low-cost modular building systems. As a result, besides the 206 families of cooperative members who received homes, the development benefited more than 2,000 households in the surrounding areas.

Multisectoral collaboration made the project possible. The four housing cooperatives jointly oversaw the entire process, managing resources, proposing urbanization programs and contributing manpower, design and organizing personnel. In keeping with the cooperative housing model, members shared land tenure and decision-making responsibilities until receiving the titles to their individual properties. Since a lottery system was used to determine which residential unit families would receive after construction was completed, each unit received the same effort and attention by coop members. The design and production of prefabricated construction materials like cement blocks and ceramic tiles were also handled by members at the construction site.

The technical assistance institutes drafted the construction project jointly with the cooperatives, filed for the mortgage and supervised the works, and provided general consulting services throughout the construction process. The cost of these services was up to 7% of the project total.

The Montevideo municipal government provided the land as well as the urban infrastructure necessary for the housing and social services. In addition, the Uruguayan Ministry of Housing, Land Organization and the Environment financed the project, providing loans to each cooperative that covered 80% of the program's cost. Besides financing the construction of the homes, this loan allowed the cooperatives to pay for the land, the cost of which could not exceed 15% of the total project expenditure, by law. Nineteen percent of the 25-year loan was subsidized and the remaining balance was paid off in installments at 2% annual interest. The financing provided by the Housing Ministry came from the National Housing and Urbanization Fund, which is funded by 2% of the wages of the country's economically-active population. Banco Hipotecario del Uruguay was the custodian bank for the financing the Ministry provided and it approved disbursements based on building works certificates that attested to the progress made in construction.

FUCVAM was involved in all stages alongside the cooperatives and served as the main negotiator with government bodies. The federation also provided consulting on administrative and legal aspects, trained coop members for project management and facilitated horizontal relations with other cooperatives.

FUCVAM and Quinta del Batlle show that when social organizations with legal representation become an institutionalized part of housing production, mutual aid and self-management can produce housing that is notably better quality than public housing built at the same cost. Each group was able to access loans, subsidies, the chance to participate in the project design and financing that covers 80% of the costs—benefits they would not have accessed individually. This model also allowed the future residents to be involved in the design and construction of their homes. From the point of view of the redistribution of public resources, the cooperatives are able to adapt to different payment methods while providing security to members as well as transparent decision-making and project management.

INCREMENTAL

ELEMENTAL

Incremental Building for Social Housing

CHILE

Population: 18.05 million (2017)

GDP per capita: USD 15,346 (2017)

Urban population: 90% (2017)

TIME FRAME

Year project was approved: first project was in 2003

Year project was completed: ongoing

ACTORS

Project management and implementation: Chilean

Ministry of Housing and Urban Development

Project design: Alejandro Aravena, Elemental

FINANCING

Type: subsidy

Estimated budget: USD 7,500, USD 25,000 or USD 40,000 per home, depending on the type of subsidy

IMPACT

Number of residential units or solution: 14 social housing projects with more than 2,000 houses delivered

Estimated population impacted: Approximately 8,000 people

Las Anaguas, Monterrey, Mexico.
Ph. Estudio Elemental



A room, a kitchen, a bathroom and a roof: the rest is up to the home's residents. Incremental housing has proven a practical method to encourage community participation, besides allowing governments to provide centrally-located housing to a great number of residents. The innovation of the Elemental project lies in proposing "half a good home," where owners can add additions and adapt living spaces to their needs.





In the 1990s, savvy housing policies allowed Chile to successfully reduce the housing deficit to half of what it had been in the mid-1980s. During this period, institutions like the World Bank, the Inter-American Development Bank and USAID encouraged other developing countries to adopt the Chilean housing model. However, the homes built during this period lost their value and deteriorated over time not only in Chile but also in other countries with similar policies. Between 1998 and 2001, the average size of social housing units went from 388 to 430 sq. ft. A total of 202,026 homes were funded by the Chilean Housing Ministry during those years. However, according to a report by Ana Sugranyes and Alfredo Rodríguez, overcrowding continued to be an issue in social housing despite the increased size of the floor

plans. Besides the small size of the homes built as a result of these policies, limited financing also led to the construction of social housing on cheap lands on urban peripheries—far from job opportunities, education, healthcare and recreation.

According to Alejandro Aravena, over the last few decades Chile has developed an efficient, laudable public housing policy that has achieved systematic reductions of the housing deficit. However, it has done little to address the poor quality of social housing. In 2001, for example, the state offered a direct subsidy of USD 7,200. With this subsidy, families were expected to buy the land and pay for both necessary infrastructure and home construction. On a competitive real estate market, this meant in the



The Elemental project.
Ph. Estudio Elemental



Quinta Monroy, Chile.
Ph. Estudio Elemental



best-case scenario they were able to build homes measuring between 323 and 430 sq. ft.

In the mid-aughts, Elemental made an important contribution when it proposed a change in the paradigm of how to address the housing deficit in developing countries. The solution was based on the idea of incremental housing, which is not the same as a small, finished home that can later be expanded. Additions, after all, are common in social housing.

Two concepts are key to understanding the incremental housing Elemental proposes. The first has to do with the size. Instead of considering the 430 square feet initially constructed as a finished social housing unit, Elemental approaches this as half a house, but one of higher quality. This “compartment” is designed and equipped to serve as the basic unit for subsequent additions and improvements by owners, outfitted to sustain expansion within a range defined by the architects. Because the housing deficit is tied to a lack of resources, the finishings of the homes are generally quite low quality. This is resolved by building just half a home and leaving the work of the finishings and “customization” of the home to the families that will live there, based on their personal preferences.

At the same time, in terms of the home's value, the project aims to avoid the almost intrinsic effect of social housing: its drop in value once residents move in. Elemental aims to put the value of social housing on par with the rest of the houses in the city. The residential unit is conceived of as real estate—that is, as accruing value over time. Therefore, the idea is to treat the home as a social investment, not an expense.

To achieve these objectives and rethink the concept of social housing, Elemental proposed four design parameters that define incremental housing. The first is to achieve low population density on lots in a good location within the city. Creating shared areas

for the community between the residential unit and the public space belonging to the city is the second parameter. The third is to apply the standards of a middle-class home to the basic residential unit and the fourth, to find a suitable and strategic location for core services with an eye to potential growth. These four elements can be found in all of Elemental's incremental housing projects, which include Quinta Monroy in Iquique, Villa Verde in Constitución, and Lo Barnechea in Santiago (Chile) and its Monterrey project in Mexico.

Elemental's innovation rests on the concept that the empty or unbuilt space—or as the architects refer to it, “half of a good home”—is where the value of social housing lies. A room, a kitchen, a bathroom and a roof: the rest is up to the home's residents. In this free, unbuilt space, owners are able to make their own decisions on expanding their homes and adapting them to their personal needs. When home additions begin, neighbors are involved in decision-making. This strengthens community relations and helps integrate low-income households to the urban fabric.

Incremental housing has proven a practical method to encourage community participation in government-sponsored programs, besides providing housing to a great number of inhabitants when resources are limited.

HEALTHY

SOS CHILDREN'S VILLAGE

A Healthy Habitat for Extremely Vulnerable Populations

TADJOURA, DJIBOUTI

Population: 45,000 (Tadjoura, 2015);

942,333 (Djibouti, 2016)

GDP per capita: USD 1,862.17 (2015)

Urban population: 77.43% (2016)

TIME FRAME

Year project was approved: 2012

Year project began: 2012-2014

Year project was completed: 2014

ACTORS

Project management: SOS Kinderdorf

Project implementation: Dji Fu

Project design: Urko Sánchez Architects

FINANCING

Type: SOS Kinderdorf – NGO

Estimated budget: USD 1.85 million

IMPACT

Number of residential units or solution: 15 homes

Estimated population impacted: 75 children

Interiors of public spaces.
Ph. Urko Sánchez Architects.



The SOS Children's Village, designed by Urko Sánchez Architects, is an example of how the design of homes and public spaces plays an important role in ensuring safe and healthy habitats, even in unfavorable climates and social conditions. Here, the narrow streets open up onto safe play areas for children, thanks to a design that optimizes the distance between houses so that each open space becomes an integral part of the house. Developing healthy housing is a key objective of children's rights.





Most of Djibouti's population lives in cities, such as Tadjoura, which is a small port city of approximately 15,000 located on the Red Sea coast. The majority of inhabitants are farmers who experience drought and food shortages, issues that have had a major impact on the lives of many families. Food insecurity is one of the greatest challenges the population faces on a daily basis. As part of its program to strengthen families, SOS Kinderdorf, an international NGO, selected Tadjoura as the location for its first SOS Village, which consists of 15 homes for

children. More than 48% of rural inhabitants lack access to potable water. Some are forced to travel more than 18 miles daily to collect drinking water. Many children, and girls in particular, drop out of school due to the need to fetch water for their homes. SOS focuses on improving children's access to health, education and nutritional services.

The SOS Children's Village in Tadjoura, designed by Urko Sánchez Architects, is a compound of 15 houses for children and is supported by SOS



Interiors of public spaces. Ph. Urko Sánchez Architects.



Terraces. Ph. Urko Sánchez Architects.

Kinderdorf, an NGO dedicated to children's rights. The architects first carried out a detailed study that resulted in the integration of a medina typology, the community's nomadic traditions, and references to the typical housing of local communities. Urko Sánchez Architects took on the challenge of designing and building a high-quality product on a low budget.

This medina designed for children drew on the community and its traditions, incorporating sustainability measures for ventilation and comfortable indoor temperatures, as well as elements that increase safety and self-sufficiency. The community's relationship to public space was taken into consideration in the design of the compound, as many activities take place there. The project designers ensured that every house has its own outdoor space with enough privacy to make it a central part of daily life in the household. As is the case in traditional medinas, all of the houses look inwards: the compound is a walled, intimate community that is secure and well-adapted to its social and environmental context.

Due to the extreme climate, the architects made detailed investigations to determine the optimal method of providing passive and efficient natural ventilation. The narrow streets of the medina provide shade, as does the strategic orientation of the alleys. Other techniques that improve air flow include "ventilation corridors" and the interspersing of large and small openings in the walls of the houses. Where air circulation proved impossible, tall ventilation shafts called "wind catcher towers" were built: these redirect wind into the interior rooms, providing a refreshing breeze. The layout of the houses was also extensively analyzed and follows the same medina design so as to provide the greatest amount of shading and cross-ventilation; in some instances, houses overlap; the terrace of

one becomes the roof of another. Open areas also create ideal spaces for children to play.

As this medina has been created for children, the narrow streets open up at different points into courtyards of various sizes that can be used for recreational activities. Besides building a sense of community, which is an essential feature of all SOS Children's Villages, the courtyards provide safe environments for play, as the medina is a car-free zone. Despite the arid climate, the architects added plants in an effort to encourage residents to care for them. Over time, the trees in these communal green spaces will grow and provide additional shade, thus keeping outdoor areas cool. The project also takes advantage of the hot, sunny climate to produce electricity using a self-sufficient, solar power system.

SOS Kinderdorf's partnership with the architecture firm was essential to the success of the project. The firm worked to meet the needs of the NGO and created a design that respects both the conditions of the location and the interests of the children, who are the focus of the project's objectives. SOS Children's Village ultimately acts as a shell that protects the life within, and it can be adapted by the young residents and the adults who care for them. Today, it is both a social and architectural success that is frequently visited by area residents.

CULTURALLY RESPONSIVE

HOUSING FOR THE FISHERMEN OF TYRE

Building Cultural Landscapes through Affordable Housing

TYRE, LEBANON

Population: 60,000 (Tyre, 2002);

6.01 million (Lebanon, 2015)

GDP per capita: USD 17,986 (2016)

Urban population: 87%

Resident population in informal settlements: 4.5%

TIME FRAME

Year project was approved: 1998

Year project began: 1998

Year project was completed: 2008

ACTORS

Client: Al Baqaa Housing Cooperative and the Association for the Development of Rural Areas in Southern Lebanon (ADR)

Donors: The Greek Catholic Church of Tyre donated the land, and there were further donations from the Spanish Agency for International Cooperation and several private donors

Project design: Hashim Sarkis (architect); Ezra Block, Ryan Bollom, Cynthia Gunadi, Scott Hagen, David Hill, Ziad Jamaledine, Paul Kaloustian, Brian Mulder, Cheyenne Owens, Erkin Ozay, Anuraj Shah, Mete Sonmez (design team).

FINANCING

Type: Donations

Estimated budget: USD 1.6 million

IMPACT

Number of residential units or solution: 80 two-bedroom apartments

Estimated population impacted: 80 families

Aerial view. Ph. Hashim Sarkis Studio.



The fishermen's cooperative of Tyre, Lebanon, partnered with the architect Hashim Sarkis to develop a housing complex. The project accommodated an ambitious program on a very small budget, creating a housing complex that fosters a sense of community by balancing private and public space. Sarkis has merged architecture, landscape and urban planning, and the result is an exemplary complex that mitigates the chaotic conditions of its environment while respecting the social and cultural mores of the community it houses.



Public spaces for the community.
Ph. Hashim Sarkis Studio.



Housing buildings.
Ph. Hashim Sarkis Studio.

Tyre, an ancient coastal city south of Beirut, has long struggled to maintain viable infrastructure amid seemingly constant chaos and combat. Area fishermen have been particularly hard hit, as the longstanding conflict with Israel has prevented them from deep-sea fishing. In 1984, during the Lebanese Civil War, the ancient city was added to the UNESCO World Heritage List. However, with this designation, strict regulations were imposed on new constructions along the coastal region where the fishermen have traditionally lived. This, in turn, led to overcrowded and unsanitary conditions. In their search for a solution, the fishermen formed the Al Baqaa Housing Cooperative and convinced the Greek Orthodox Church to donate a parcel of land outside the historic city center. They then partnered with the architect Hashim Sarkis to develop the project.

Given the chaotic and unpredictable context and the location's distance from the residential neighborhoods of Tyre, the design of the housing complex incorporates an imposing building that runs along the site perimeter. More than simply serving as a border, however, this construction—a long, 22-foot-wide building that wraps around the site—also organizes the surrounding streets and lots, creating an internal road and central open space. The internal road is an extension of the street that provides access to the units and connects the two main entries. The central open space contains a community garden and a playground.

In order to avoid the feeling of a large urban housing block, the linear mass is divided into a series of buildings that are separated by openings used for pedestrian circulation. These create variations in the volumes of the buildings, with corners adapted to fit with the surroundings.

One of the main concerns of the fishermen was for all the units to be equal, particularly in terms of their access to views and private outdoor spaces. Therefore, the units had to be designed differently, depending on their location.

The project consists of 80 two-bedroom units, each with approximately 925 sq. ft. of interior space and about half that figure in private outdoor space. The units are organized in three types of housing blocks or clusters. The first type consists of simple one-story flats (simplexes) arranged around a communal scissor stair. The second block consists of four duplexes, each with an open ground floor dedicated to shared home space and a second floor for the bedrooms. These duplexes are located around the central open space. All of the ground floors have views and cross ventilation, and the indoor living spaces extend into private outdoor spaces (gardens and porches for the lower units and balconies and roof decks for the

upper units). The third type of block is a combination of duplexes and simplexes and can be found at the corners of the central open space.

This open-air space is a characteristic feature of the project. The buildings are positioned around the perimeter of the site, in a rectilinear spiral that begins with a tight entryway that turns to open onto a large central space. This space offers a paved area with a shared water tank and a planted garden. Instead of framing the different parts of the project with planted trees, these are used to mark the entrance paths between the buildings. This creates an effect where the landscape spills over into the gaps between buildings and emphasizes the connection between the central open space and the external streets.

In a decade-long collaboration with the cooperative, Sarkis developed a vibrant, modern housing system that not only accommodates the ambitious program and the limited budget of the fishermen, but also furthers a rich sense of community by balancing private and public space, in keeping with the fishermen's traditional lifestyle. By combining architecture, landscaping and urban planning, the Sarkis collaborative approach to design results in a residential complex that exemplifies the power of architecture to offset surrounding conditions of conflict while respecting the social and cultural mores of the community.



Facades.
Ph. Hashim Sarkis Studio.

PRODUCTIVE

Productive housing can refer to two concepts. On the one hand, to the integration of livelihood-related activities in the living space, where the residential unit is not used purely for domestic purposes, but also contributes to the local economy. On the other hand, it describes houses or housing complexes that employ the future residents during the construction process so as to improve their technical skills, their employability and the economic livelihoods of their families.

UMUSAMBI HOUSE

Housing Typologies for a New and Productive
Rural Rwanda

OUTSKIRTS OF KIGALI, RWANDA.

Population: 603,049 (Kigali, 2002);

11.92 million (Rwanda, 2016)

GDP per capita: USD 702.84 (2016)

Urban population: 30.7% (2017)

TIME FRAME

Year project began: 2017

Year project was completed: 2018

ACTORS

Project management: Rwandan Housing Authority
and Norman B. Leventhal Center for Advanced
Urbanism of the Massachusetts Institute of
Technology

Project implementation: MIT students, Rwandan
Housing Authority, SKAT Rwanda and Strawtec

Project design: Prof. Rafi Segal and his students:
Andrew Brose, Monica Hutton, Mary Lynch-Lloyd,
Ching Ying Ngan, Taeseip Shin, Maya Shopova,
Danniely Staback and Daya Zhang

FINANCING

Type: Rwandan Housing Authority, MISTI, TATA,
Norman B. Leventhal Center for Advanced
Urbanism of the Massachusetts Institute of
Technology, MIT TATA Center, MIT-Africa, SKAT
Rwanda and Strawtec

Estimated budget: USD 16,000 per housing
unit. The homes built by the Rwandan Housing
Authority are valued between USD 10,000 and
USD 18,000

IMPACT

Number of residential units or solution: The
project produced a prototype and it is expected
that 30 housing complexes of 300-400 homes
each will be developed

Estimated population impacted: With one family in
each unit, it is expected to benefit around 10,000
families

Rear facade. Ph. Ben Segal



Led by Professor Rafi Segal, students from the Massachusetts Institute of Technology (MIT) worked in collaboration with the Rwandan Housing Authority and SKAT Consulting to produce Umusambi House, their response to the national government's call for proposals to deliver a house with a cow or another means of subsistence for producers. This case study shows how a land organization system facilitates the introduction of infrastructure and services for community development, and it highlights the important relationship between housing policy goals and the architecture.

Only 26% of Rwanda's total population resides in urban areas, though the country has the highest population density of all Africa. Managing this dense yet geographically dispersed population presents a significant challenge to developing affordable housing in the country. As of 2013, the government of Rwanda implemented the Integrated Development Project (IDP) Model Villages. These new *imidugudu* (villages) provide housing and a cow or other non-monetary subsistence mechanism (such as chickens, tools or seeds) to the farmers and ranchers who are dispersed across the hills of the country. It also es-

tablishes a land organization system that facilitates the introduction of critical infrastructure and social services for the socioeconomic development of these rural areas. Despite an innovative proposal, the houses supplied by the Rwandan Housing Authority simply replicated generic urban typologies with unsophisticated and costly construction systems; they did not respond to the social and economic needs of the residents, whose ways of life and changing demographics were not reflected in those design typologies.



The construction process. Ph. Ben Segal



Frontfacade. Ph. Ben Segal

In July 2017, with support from the MIT TATA Center for Technology and Design, MIT–Africa and the Norman B. Leventhal Center for Advanced Urbanism, students from MIT’s School of Architecture and Planning travelled to Rwanda. Led by Professor Rafi Segal, the students participated in an intensive workshop with the local Mageragere community, including local builders and professional experts, to undertake the development of construction technologies. Together, the group designed and built a new prototype house that aims to improve low-cost housing design in rural areas and create houses that adequately respond to the social needs and livelihoods of families. They also proposed a village model for rural planning, and developed a construction model that includes training and employing local communities and supporting the development of the brick-building industry in Rwanda.

The MIT team proposed new housing typologies and a master village plan to increase the density of traditional rural settlements. The prototype house combines traditional elements from the region with flexible living spaces and a kitchen and bathroom located in semi-outdoor spaces. By incorporating the outdoor areas, the house takes advantage of the entire plot, provides for family growth and allows livelihood-related activities to be incorporated. The new Umusambi House prototype also includes single-slope roofs for more efficient rainwater harvesting, partially-covered shaded areas in keeping with the local lifestyle and wall systems that promote natural ventilation. The prototype house was also designed as a two-household model, which allows for greater efficiency in the construction of structural components and the use of materials.

The team also focused on developing an advanced brick-building technique and training local villagers in brick production. Students and young masons

worked on site in collaboration with SKAT Consulting, which supports local economic programs to develop construction materials in Africa. Together, they hatched a culturally appropriate and economically viable design using efficient and sustainable materials for large-scale housing construction. Following a continuous design-build workflow, masons and students built mockups of breeze walls and reinforced concrete columns, as well as a kitchen chimney. The higher-quality bricks created greater construction stability and made for more efficient use of mortar, which was mixed by hand on site to build the prototype. Compressed strawboard panels were used for maximum flexibility and a shorter construction time, allowing the family to determine the size and number of rooms in the house. The result is that the design of the new units supports the production of climate-sensitive building materials and non-agricultural employment.

The experience of this project provides two lessons that can contribute to the development of adequate housing. First, it highlights the need to tie housing policy to a strategy for livelihoods, particularly when families are being relocated. Second, it shows the strong relationship between the goals of housing policy and the architectural design that results from that policy. The strategy of the Rwandan Housing Authority to provide both housing and a means of subsistence was only able to achieve success once the design of the housing responded to the specific social needs and livelihoods of families, in a hands-on process that involved both the community and local experts.

HIGH-DENSITY

Density can refer to both population and the built-up environment. When used in reference to population, it denotes the number of inhabitants in a given area: a neighborhood, block, locality or housing complex. The second meaning refers to the urban form: the compactness, height, and ratio of spaces used for residential purposes in buildings, social housing and the city as a whole. In both cases, density generally makes reference to the most efficient use of urban land, infrastructures and services.

SKYVILLE @ DAWSON

Creating High-Rise Communities

REPUBLIC OF SINGAPORE

Population: 5.612 million (2017)

GDP per capita: USD 52,960 (2016)

Urban population: 100% (2017)

TIME FRAME

Year project was approved: 2007

Year project began: 2010

Year project was completed: 2015

ACTORS

Project management: Singapore Housing & Development Board

Project implementation and design: WOHA Architects Pte. Ltd.

FINANCING

Type: governmental

Estimated budget: n/a

IMPACT

Number of residential units or solution: 960 units

Estimated population impacted: n/a

Vertical walkways.
Ph. WOHA Architects Pte. Ltd.



SkyVille @ Dawson is a public housing project containing 960 units, which demonstrates that “high density can be high amenity” and challenges the traditional form of modern skyscrapers. SkyVille takes advantage of Singapore’s temperate climate to create spaces within and between high-rise towers for community interaction: each home is part of a Sky Village of 80 units that share a terrace. Other communal areas include a public park, supermarket, cafeteria, commercial spaces, playgrounds and grass courts.



Public green spaces.
Ph. WOHA Architects Pte. Ltd.



SkyVille @ Dawson is a public housing project containing 960 units. It was completed in 2015 and developed by the Singapore Housing & Development Board (HDB). The HDB is the authority in charge of public housing in Singapore and reports directly to the Ministry of National Development. It was set up in 1960 to address the housing deficit facing the city-state during that period, when approximately 1.6 million people were living in slums and squatter settlements. With over one million apartments distributed across 24 towns and three estates, Singapore's HDB brand is unique. The units built by the

HDB are home to over 80% of the population living in Singapore, approximately 90% of whom own their own dwellings. This was made possible thanks to a home ownership plan presented in 1964 by the government to provide citizens with real estate and also boost the local economy. This particular plan, along with other schemes and subsidies introduced over the years, has made owning a property in Singapore highly affordable and attractive.

Community building is a central pillar of Singapore's public housing program. However, the typical



High-rise apartments.
Ph. WOHA Architects Pte. Ltd.



Aerial walkways.
Ph. WOHA Architects Pte. Ltd.

modern high-rise, with its cramped circulation area, is not conducive to social interaction. Community living, variety and sustainability are the themes of SkyVille @ Dawson.

The SkyVille @ Dawson project takes advantage of Singapore's temperate climate to create spaces within and between high-rise towers. Community interaction is promoted via one key innovation: the public, external, shared spaces woven throughout the entire complex from the ground to the roof. Each home is part of a Sky Village of 80 housing units that share a sheltered community terrace and naturally-ventilated garden. Each tower is composed of three blocks of four vertically-stacked Sky Villages, containing a total of 960 homes. The social and community spaces on the rooftop are a way of ensuring that, far from alienating, high-rise, high-density projects can make for lively, low-energy communities.

The apartments are column-free, beam-free flexible units, designed to suit different sized families, diverse lifestyles (for example, home office/loft-living) and future flexibility. Buyers were able to choose between three floor plans for each size unit.

The sky village concept increases a sense of community and identity within the complex as a whole and is designed to be a social space that enhances cohesion. Other common areas include an urban plaza located along a linear public park with a supermarket, a cafeteria, commercial spaces and play areas, fitness centers, courts and lawns designed along a 500 ft. bioswale. The community living areas at ground level provide seats overlooking a landscaped park, with huge trees and event halls for weddings and funerals. The rooftop park includes a 1300 ft. jogging track lit by pavilions equipped with a photovoltaic array.

This project offers two important lessons. First, it highlights the HDB's efforts to provide quality housing and create an optimal living environment for residents. This consolidated program has managed to bridge the housing deficit in complex urban environments where almost 100% of the population resides in towns and cities, and it guarantees social and racial unity among the diverse ethnic communities living in Singapore.

Second, the project demonstrates that high density does not have to coincide with alienation, rather it can offer residents great amenities. It provides three options for each type of unit, and the flexible designs take into account different family sizes, lifestyles and possible upcoming changes in households. The project adopts passive design strategies and makes full use of construction technologies for prefabricated components. All communal areas boast natural ventilation and daylight. The project incorporates over 3.7 acres of public gardens and achieves a green plot ratio of 110%.

EXPERIMENTAL

Experimental housing refers to a laboratory where people's experience and knowledge allows local and traditional systems to be explored together with the community. It aims to originate, catalogue and streamline processes, while taking into account the habitable area, its spatial versatility, its technological and linguistic consolidation and, finally, its functional and aesthetic purpose.

B31 HOUSING LABORATORY

Experiments on Existing Housing

BUENOS AIRES, ARGENTINA

Population: 13,591,863 (Buenos Aires);

43.85 million (Argentina, 2016)

GDP per capita: USD 12,449.22 (2016)

Urban population: 91.89 %

TIME FRAME

Year project was approved: 2018

Year project began: 2018

Year project was completed: ongoing

ACTORS

Project management: TC RG-T2983 (Support for the Development of Urban Innovation Laboratories in Latin American and Caribbean Cities); IDB (HUD/Cities LAB) and the Social and Urban Integration Department (SECISYU) of the Buenos Aires municipal government (Housing Improvement Program)

Internal team: Francisca Rojas (IDB/HUD), Luis Felipe Vera (IDB/HUD), Tamara Egger (IDB/HUD), Lucie Van der Meulen (SECISYU), Nicolás Balzarini (SECISYU)

Implementation: Gabinete de Arquitectura (Solano Benítez, Gloria Cabral)

Existing markets.



In Argentina, 28.6% of the population lives in substandard housing. In the city of Buenos Aires, the oldest and largest informal settlement, or villa, is Villa 31, where 80% of the complaints filed by residents relate to structures, sanitation, power connections and poor ventilation. The architecture studio Gabinete de Arquitectura worked with the authorities to develop building solutions to improve housing. The process takes an incremental and inclusive approach to housing that values the community's heritage and existing capacities.

In Argentina, 28.6% of the population¹ is affected by the qualitative housing deficit, which particularly impacts the first two-quintiles of income distribution. Villa 31 is the oldest and largest informal settlement in the city of Buenos Aires. It was established in the 1930s to house immigrants arriving in the city to work at the port and railroads. The settlement consists of 12,200 functional units—about 11,000 of which are houses—with approximately 43,000 people living on 114 acres of land. More than 40% of these households suffer from unmet basic needs, and a great deal of the housing does not meet minimum habitability standards. The municipal government estimates that 67% of Villa 31 households fall below the poverty line: their monthly income cannot cover the cost of the basic food basket. To meet international minimal habitability standards, individual private space should amount to 150 sq. ft. per person. However, in Villa 31, the average is just 75 sq. ft. per person. Furthermore, 22% of families in Villa 31 live in overcrowded conditions, compared to just 1.8% elsewhere in the city of Buenos Aires. About 80% of the complaints filed by Villa 31 residents relate

to habitability, including issues with sanitation and power connections, poor ventilation and a lack of safety in home access.

The AR-L1260 project (Urban Integration and Social and Educational Inclusion Program of the City of Buenos Aires) supplements the Comprehensive Urban Plan (PIU) set out by the Social and Urban Integration Department (SECISYU) of the Buenos Aires municipal government. It includes a comprehensive intervention in Villa 31 that will improve housing in 74 existing square blocks and provide public spaces, basic infrastructure and community facilities, as well as 1,000 homes and three new schools.

Installed in a housing unit located in Villa 31, the Housing Laboratory will function as an open space for innovation. It is a space to “do what we do not yet know how to do.” In keeping with a collaborative design and construction methodology, it will incorporate and develop local human capital, reuse discarded materials and test three housing prototypes that employ innovative building techniques.



Existing markets.

In the oldest and largest informal settlement in Buenos Aires, the profound divide between the lofty aspiration of current policies and the actual state of affairs appears insurmountable. The apparent insistence on self-exclusion among residents also evidences the urgent need for a fresh outlook on the opportunities and resources that could serve to bridge the divide. The AR-L1260 Project includes a housing improvement component that is of an appropriate scale and complexity to design, develop pilot projects and evaluate new, collaborative building strategies to advance incremental improvements and the sustainability of self-built housing. The facades and interiors of homes will be renovated and there will be several opportunities to explore improvement mechanisms that contribute to climate change adaptations and mitigations, and to the development of a circular economy. Two items of particular interest are the reuse of demolition materials in the upgrades and improvements, and the use of the local manpower and skilled tradespeople in the neighborhood.

To accompany the process, a Housing Laboratory is being installed in the neighborhood to encourage the community to participate in improving housing. The lab will serve to identify opportunities for innovative building solutions, develop and implement pilot projects, evaluate the results and disseminate the lessons learned.

The first task at the Housing Laboratory will be to study several Villa 31 cases that will shed light on the structural deficiencies of the existing homes and help identify possible structural reinforcement solutions that can preserve and improve the built heritage of the neighborhood. Based on this initial analysis, innovative building strategies will be proposed as a way to promote incremental, small-scale sustainable housing improvements that emphasize the reuse of materials. Strategies will focus on reaching a baseline for acceptable structural safety standards using innovative intervention techniques that prioritize the preservation and recovery of structures while improving habitability, ventilation, lighting and energy efficiency.

Through a series of workshops and experiments, three prototypes that make use of innovative construction techniques will be developed as solutions for structures in poor condition. Once developed, the prototypes will undergo a technical evaluation to identify strengths and opportunities for improvement. The analysis will focus on: the structural performance of the different techniques, the effectiveness of a collaborative incremental construction process, the reduction in environmental impact that can be achieved through the use of recycled materials, and, lastly, the costs of the processes.

Once the prototypes have passed the certification stage, they will be used for a concrete and demonstrative pilot. After test results are gathered and guidelines established, a handbook will be produced and distributed to the technical partners of the project to share the lessons learned and the techniques that were developed.

The Gabinete de Arquitectura, led by Solano Benítez and Gloria Cabral with the support of the IDB, has worked with the city of Buenos Aires to install a Housing Laboratory in Villa 31, one of the most emblematic informal settlements in Argentina, to discover innovative building solutions for home improvements. The laboratory focuses on developing solutions that reuse waste materials collected from the demolition of unrecoverable homes. The process not only looks to explore incremental and collaborative approaches to home improvements, but also values the built heritage and existing capacity of the community.

1— The number of homes that do not meet minimum standards in relation to some aspect of their construction, such as the building materials, wet core pods and/or connections to the power grid, water mains and sanitation.

LOCAL

Resilient housing can be achieved through the use of local construction techniques and materials, which also supports the development of communities, particularly in semi-urban and rural areas. Using local materials and labor boosts the economic value for the local economy, creating a multiplier effect that provides greater social welfare and a more efficient building supply chain. Additionally, it reduces greenhouse gas emissions and enhances cultural identification with the innovative elements of the architecture and program.

TEACHERS' HOUSING

Merging Local Techniques and Innovation

GANDO, BURKINA FASO

Population: 18.65 million (2016)

GDP per capita: USD 702.84 (2016)

Urban population: 30.68% (2016)

TIME FRAME

Year project was completed: 2014

ACTORS

Project management: Village Community of

Gando; Kéré Foundation e.V.

Project design: Kéré Architecture

FINANCING

Type: Kéré Foundation e.V. contributed the financing

Estimated budget: n/a

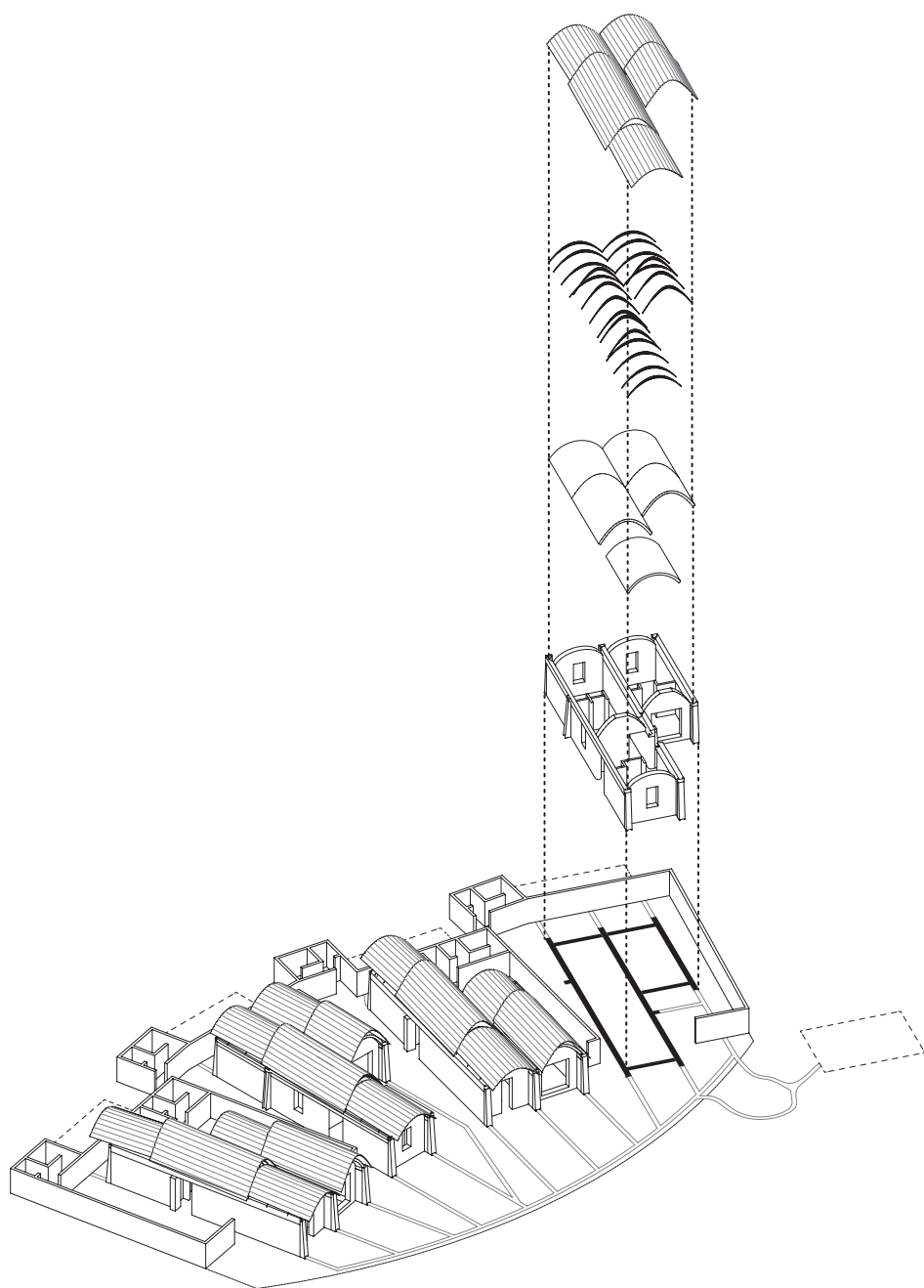
IMPACT

Number of residential units or solution: The villagers produced around 15,000 bricks, each measuring 15.75 x 8 x 4 inches, at a rate of between 600 and 1,000 bricks per day.



Social housing.
Ph. Kéré Architecture.

The teachers' housing in Gando, built by the Kéré Architecture studio, was designed to promote the use of earth as a sustainable and durable building material. Built as a series of adaptable modules, each of the homes is comparable in size to the traditional huts of the region. The use of local techniques and the enthusiastic involvement of the people of Gando were key to the success of the project. The villagers gained new skills and a sense of responsibility, awareness and newfound respect for the traditional and innovative aspects of the construction.



Perspective drawing of the construction system.
Ph. Kéré Architecture.



Gando is a town of 2,500 inhabitants located in the central-eastern region of Burkina Faso, which has a subsistence agriculture-based economy. Besides being one of the poorest countries of Africa, its school enrollment rates are the second lowest in the world, after Niger (UNICEF, 2004). Children are least likely to attend schools in rural areas like Gando, where attendance is barely 45%. When Kéré—the architect

behind the project—was a child in Gando, the village did not have a school. However, thanks to a scholarship in Germany, he was able to study in Berlin and earn a university degree. It was while studying architecture that he decided to build a school in his home village. He raised the funds with his German friends and the government of Burkina Faso to purchase bricks. As is typical in rural areas of Burkina



Local construction technology.
Ph. Kéré Architecture.



Social housing.
Ph. Kéré Architecture.

Faso, where people work together to build village homes, the men, women and children of Gando came together to build the school using traditional construction techniques. The school, which opened in 2001, was a success—so much of a success, in fact, that it was overwhelmed by the number of students, which rose to 350 children, three times its capacity. It also lacked housing for the teachers. And so, the Teachers' Housing Project was envisaged to address this challenge.

The houses were designed to attract teachers to this rural region, as well as to promote the use of earth as a sustainable and durable building material. The houses were conceived as a series of adaptable modules, each of a comparable size to the traditional circular huts of the region. Individual modules can be combined in different ways to form a larger composite whole. The simplicity of the design and minimal use of purchased materials means that the villagers can easily adapt them. The six houses built for teachers and their families are arranged in a wide arc to the south of the school complex. This curvilinear design is not only visually appealing, but also reminiscent of traditional Burkinabe settlements. The barrel vault roofs have been built using stabilized earthen bricks. The construction method, which was used for the first time in this region for the project, takes advantage of local resources, and is climate-efficient. To protect the building from ground moisture, the thick 15.75-inch adobe walls were built on site on a foundation of cement and granite stones. The villagers produced around 15,000 bricks, each measuring 15.75 x 8 x 4 inches, at a rate of between 600 and 1,000 bricks per day.

In each module, a tie beam that connects the walls bears the load of the roof, which is made of a layer of reinforced concrete that was poured on site into a formwork constructed of compressed stabilized earth blocks (CSEBs). The heights of the roofs vary

between three and five feet, leaving a sickle-shaped opening where they meet that serves to ventilate and light the interior space. Generous overhangs protect the walls from moisture. In Burkina Faso, the exterior walls of traditional houses are covered with a 1.5-inch-thick mixture of mud, vegetable juice and cow dung to protect against the elements. Unfortunately, these components are of little use in the rainy season and they attract termites, which can eventually lead to the destruction of the walls. In the Teachers' Housing Project, the traditional organic components of the mixture were replaced with bitumen. The final stage of the work consisted of tamping the clay soil to create a smooth, uniform surface. The enthusiastic participation of the people of Gando was key to the project's success. The villagers not only gained new skills, but also developed a sense of responsibility, awareness and newfound respect for the traditional and innovative aspects of construction.

The success of the project depended to a large extent on the commitment and active involvement of local inhabitants, as well as the use of low-cost local materials, such as earthen bricks, and the traditional construction techniques learned by the community. Traditionally, all members of a rural community work together to build and repair houses in rural Burkina Faso. While respecting this cultural tradition, the architectural project adopted and improved low-tech sustainable techniques over the course of its development. The villagers of Gando participated in the process and the result is buildings that are resilient, functional and durable.

FLEXIBLE

Flexible housing refers to residential units designed to adapt to changes, either in terms of the family composition or their functional needs. Generally speaking, flexible house design is seen in architectural decisions regarding homes, that is, in the private sphere. It can also refer to partial compliance with existing construction and urban planning directives, as well as flexibility with regard to financial issues, such as risk guarantees or adaptable requirements based on different socioeconomic needs.

PLUGIN HOUSE

A Building System to Revitalize Existing Urban Structures

BEIJING, CHINA

Population: 21.71 million (Beijing, 2017);

1.379 billion (China, 2016)

GDP per capita: USD 8,827 (2018)

Urban population: 58% (2017)

ACTORS

Project design: He Zhe, James Shen, Zang Feng

FINANCING

Budget: USD 13,000 per prototype

IMPACT

7 pilot projects

Expansion of existing home.
Ph. People's Architecture



In the Courtyard Plugin House project, People's Architecture Office applies a new proprietary construction method based on a system of prefabricated panels to build temporary living spaces within the narrow alleys of Beijing known as hutongs. Instead of tearing down existing infrastructure, derelict structures are reinvented through new additions. The modular system is lightweight and designed as a provisional solution to make the dilapidated buildings of the Chinese capital habitable again.



Expansion of existing home.
Ph. People's Architecture



Drywall construction process.
Ph. People's Architecture

Although China's urban population growth rate has been slowing for at least a decade, the urban housing crisis is far from being solved. Real estate is an engine of the Chinese economy, and according to some estimates, it accounts for up to 30% of the GDP. Maintaining these rising housing values is paramount to the country's economy. However, it has led to a growing housing bubble, particularly in cities such as Beijing.

Between June 2015 and the 2017, according to the 100 City Price Index published by SouFun Holdings Ltd., the real estate market saw the cost per square foot increase by 31%. In fact, the cost per square foot in Beijing is 38% higher than the average in the

United States, where per capita income is more than seven times higher than in China. This has put home ownership out of the reach of most Chinese. Many original residents and tens of thousands of migrants have also been driven out of cities such as Beijing as part of a government offensive against illegal housing.

Over the past few years, Beijing has suffered from intense gentrification and an overpriced housing market, which has had a direct impact on the urban fabric of the city center. The centuries-old hutong, or narrow alleys with characteristic courtyard homes, are rapidly disappearing as they are cleared for new housing in the urban center. As a result, the original



Plug-in prototypes finished with original environment.



Plug-in prototypes finished with original environment.

inhabitants are being forced out. Founded in Beijing in 2010, People's Architecture Office (PAO) proposes a social entrepreneurship model that focuses on preserving communities in the historic neighborhoods of the city center. When the government invited urban architects and planners to design new ways of upgrading these historic neighborhoods, PAO proposed maintaining the original structure of the old courtyard houses while building a completely new structure inside the old walls, thus avoiding the need for demolition.

The result was the Plugin House, a system of lightweight panels that snap and lock together to build provisional spaces within the existing urban structures of Beijing's historic districts. A Plugin House costs less than half of a conventional renovation, opening up the possibilities for the original owners to remain in the urban center. Additionally, a Plugin House provides equal or greater quality of life and energy efficiency than a new apartment tower.

The Plugin replaces parts of the old house and adds new functions, such as a kitchen and bathroom. Some neighborhoods do not have sewer systems, so public toilets are often the only option. However, the Plugin integrates an off-the-grid composting toilet system into the house.

A unique feature in one of the Plugin House projects is the living room ceiling, which extends upwards to create a space double the height of the room with skylights on either side. Sunlight streams in from above, flooding the previously dark interior with light. The small bathroom also has a skylight, but the sunlight coming in is filtered through a blue privacy screen. Even on gloomy days, the bathroom is covered in a blue tint. A roof deck provides an open-air space in the midst of the crowded urban surroundings.

PAO's patented prefabricated panels make the Plugin House very affordable. The system is waterproof and

can also be used outside of an existing structure. The prefabricated modules incorporate insulation along with interior and exterior finishing into a single molded panel. The panels snap and lock together with a built-in lock, making for a simple assembly that can be completed by a couple of individuals without any special training in just one day, using a single tool. Wiring and plumbing are integrated into the molded composite panels.

The Plugin is a means of upgrading existing housing through an innovative construction system that offers an affordable way to renovate old houses and allows the urban neighborhoods of Beijing's historic center to be preserved. Thanks to the accessible technology and design, citizens are no longer forced to sell their properties and move to the suburbs; they can now remain in the urban center and improve their homes. The architectural form of a Plugin House is defined not by the limitations imposed by regulations, but instead by the demands of residents and the immediate surroundings: no surface of the Plugin structure is allowed to block sunlight, obstruct circulation, or interfere with the views. Even while the structure is being built, the Plugin system allows for changes in the case that new demands emerge.

AFFORDABLE

The affordability of housing is determined by what inhabitants can pay and the final cost of units. Affordable housing is not necessarily cheaper but considers a range of issues, such as payment terms, access to credit, maintenance costs, resale possibilities and the unit's lifespan.

CEMENT BLOCK BANK

A Block Saving Scheme for Housing

THE GAMBIA

Population: 2.03 million (2016)

GDP per capita: USD 473.19 (2016)

Urban population: 67%

TIME FRAME

Year project was approved: 2013

Year project began: 2014

Year project was completed: ongoing

ACTORS

Project management, implementation and design:

Amiscus Horizon Limited.

FINANCING

Type: private company

Estimated budget: USD 10,000 - 15,000 per unit

IMPACT

Number of residential units or solution: 25,000

cement block accounts

Amiscus Horizon Limited demonstrates how the private sector can actively develop alternatives for affordable housing by lowering the costs of materials for clients who lack access to formal financing. The company offers an incremental scheme for the purchase of cement blocks and also provides technical and financial assistance to customers. It is essentially a “pay-as-you-go” model in which cement blocks are purchased monthly and stored for a fee. When the customer has purchased enough blocks for the project, the company takes care of transporting them—free of charge—to the building site.

According to the Gambian Ministry of Lands, in 2015 there was a shortage of approximately 50,000 housing units in the country. Most houses built by private developers are far beyond the reach of the middle and lower classes; a three-bedroom house (2,400 sq. ft.) sells for approximately USD 100,000. Moreover, the country's financial market is underdeveloped and, while there are mortgage companies, almost none serve the affordable housing market. In 2015, mortgage rates averaged 20% annual interest. Just

four large banks control 68.1% of the total assets of the construction industry and the penetration rate of banks in the country is low: 25% in urban centers and only 5% in rural areas (OAS, 2015). As a result, most Gambians self-build their homes incrementally, in line with their savings capacity. About 52% of houses are built with semi-permanent materials, and only 40% of houses are built with permanent materials. According to UN-Habitat, just 27% of inhabitants benefit from secure tenure.



Prototypes for saving scheme. Source: Amiscus Horizon Limited.

FENCING ESTIMATION								
Fencing details	15m x 20m	15m x 25m	20m x 20m	20m x 25m	20m x 30m	30m x 30m	40m x 40m	50m x 50m
Block requirements	1680 blocks	1940 blocks	1920 blocks	2160 blocks	2400 blocks	2880 blocks	3840 blocks	4800 blocks
NOTE: Please note that this estimation is based on a 8 course block wall, which is the average fencing size.								

Sample estimate of construction materials. Source: Amiscus Horizon Limited.

Amiscus Horizon Limited (AH), founded in 2013, is a company that provides solutions for the affordable housing market in The Gambia. Its vision is to address the current housing shortage by reducing the costs of building materials for customers who do not have access to formal financing. The company offers an incremental scheme for the purchase of cement blocks and also provides technical and financial assistance. It allows customers to build houses on a “pay-as-you-go” basis: cement blocks are purchased monthly and stored for a small fee. When the customer has accumulated the blocks they need to build their house, the company transports the material free of charge to the building site.

AH provides technical services to calculate the approximate number of blocks needed for a project and set up the savings model. For example, according to their estimates, a three-bedroom bungalow requires 3,975 blocks. With AH, customers can choose a package costing USD 27.50 per month in which they put away 71 blocks monthly, or a total of 857 blocks per year. Within four to five years, all of the blocks needed to build a house will have been “saved.” The Block Saving Scheme means that, instead of saving up a large sum to build a home, customers can work toward that goal through small monthly payments. After the blocks have been delivered, the company offers financing for construction and connects the customer with a mortgage partner.

During its first four months, AH operated as a wholesaler: it purchased the blocks from a factory on a monthly basis and received large discounts on its wholesale orders. However, due to high demand, the company soon began to produce the blocks internally. This allows the company to control and guarantee the quality of the product. Should blocks fail to meet the required standards, the customer will be reimbursed in cash for all blocks at market price. AH purchases cement in bulk at a discount rate in

order to protect against rising cement prices. Thus, it can provide bricks at lower prices than its market competitors. The savings scheme provides the company with a more accurate outlook of demand, thereby reducing its production costs. The formalized savings scheme protects customers against inflation on materials such as cement and sand.

Customers financing the construction of their homes can “withdraw” their blocks when necessary. Most customers are in the middle-income bracket and include teachers, nurses, police officers, mid-level public employees and young professionals. According to AH estimates, the cost of affordable housing should range between USD 10,000-15,000, excluding the cost of land. This is well below the current rate for affordable housing produced by leading real estate developers.

In The Gambia, Amiscus Horizon Limited demonstrates the active role the private sector—in this case, the construction industry—can play in developing alternatives for affordable housing. While challenges associated with affordability remain, stakeholders in the housing sector are increasingly relying on creative and pragmatic methods to address housing needs while maximizing business opportunities.

SELF-MANAGED

In countries such as Peru, Mexico and Haiti, it is estimated that more than 60% of the population lives in “self-built” housing. These are units that are designed, financed and built through the ongoing effort of families who do not have access to formal financing or titled land. “Self-management” refers to the actions and policies aimed at regulating the self-build process by providing financial and technical support, monitoring, legal advice and other mechanisms that contribute to standardizing, coordinating and facilitating the efforts of individuals.

FUPROVI

Self-management Models for the Development of Sustainable Communities

COSTA RICA

Population: 4.85 million (2016)

GDP per capita: USD 11,824.64 (2016)

Urban population: 81.2%

TIME FRAME

Year project was approved: 1987

Year project was completed: ongoing

Year project was completed: ongoing

ACTORS

Project management, implementation and design:

Fundación Promotora de Vivienda (FUPROVI)

FINANCING

Type: subsidy, donations and community savings

IMPACT

Number of residential units or solution: 15,000

homes and 132 housing projects, of which 10

involved emergency interventions

Estimated population impacted: 115,000 people have benefited and more than 39,000 people have been trained in community building processes

Fundación Promotora de Vivienda (Housing Promotion Foundation, or FUPROVI) is a non-governmental organization that offers a range of housing programs targeting low-income families. FUPROVI helps communities take advantage of national financing and government housing subsidies to acquire construction materials and also provides training and technical assistance during a project's development stage. The model is based on the belief that beneficiaries should actively contribute their time and energy to identifying and resolving their housing issues.

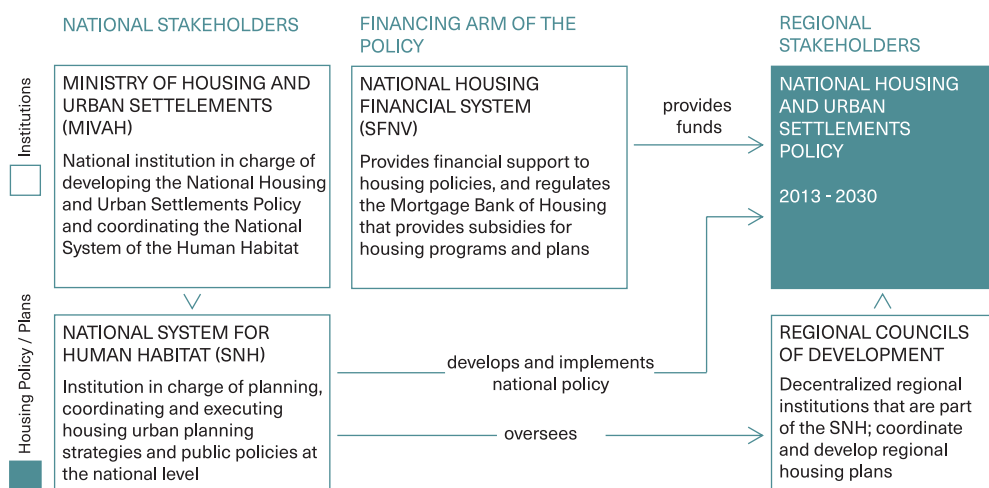
FUPROVI is a non-governmental organization that offers a variety of housing programs for low-income families, including community development, income generation and institution-building initiatives. The organization manages a portion of national housing subsidies by underwriting loans and also acts as a financial intermediary for the subsidy programs. FUPROVI provides technical assistance and serves as a facilitator during the construction of units. As a joint effort of the Costa Rican Government and the Swedish International Development Agency (SIDA), FUPROVI receives enough donations for a revolving fund that allows it to reinvest in new projects. The organization's projects encourage future proprietors, residents and communities to be involved in the planning, construction and distribution of housing and applies a methodology based on mutual assistance and joint efforts. FUPROVI grants loans for building new housing and improving existing homes, as well as for upgrades to basic neighborhood infrastructure—such as streets, sewers, power lines and water pipes—in addition to developing community programs.

The community of Nazareth is located on the Caribbean coast of Costa Rica, which suffers from frequent natural disasters due to both its location and ongoing deforestation in the area. The community was formed when the land where the project is now located was taken over by squatters. It consists of a 15-acre plot, formerly a private estate that families began to occupy informally starting in 1998. Eventually the land was divided among them into equal plots of approximately 970 square feet (19.5 x 50 ft.). Though, public utilities were intermittent at the time, houses did have access to electricity and water. In 2002, Nazareth began the land registration process with support from FUPROVI.

The project faced five major challenges: the low incomes of the residents and their lack of faith in the project; legal issues regarding the land; divisions within the group; the characteristics of the Caribbean region; and the fact that the project is located in a rural area. As part of its strategy, FUPROVI's Project Management Unit focused its efforts on resolving the legal status and tenure of the land that the fa-

POLICY OVERVIEW	
YEAR OF ADOPTION	2014
DESCRIPTION	The National Housing Policy aims to provide access to affordable housing in a quick and efficient manner to people living with insufficient resources
CONSTITUTIONAL RIGHT DEFENDED	The National Constitution of the Republic of Costa Rica, Article 65 (1949)
OBJECTIVES OF THE 2013-2030 NATIONAL HOUSING AND URBAN SETTLEMENTS POLICY	1. Create the National System for Human Habitat 2. Generate communities in an inclusive, participatory and safe environment through planning, design and the execution of intervention strategies to revitalize the social integration and cohesion of these settlements 3. Develop holistic human settlements that exist in harmony with the environment, as well as provide facilities, open/public spaces, service infrastructure and social amenities 4. Develop human settlements in a safe and sustainable manner 5. Improve the managing capacity of the National Federal System of Housing
AFFILIATED HOUSING PROGRAMS	- Accesible Housing Programs - Federal subsidy program, allocated according to recipients' income level - Collective Bonus Program - A collective subsidy to improve urban and social infrastructure for families living in precarious living conditions - "Reparación, Ampliación, Mejoras o Terminación" Program - Federal subsidies to improve or increase the number of rooms in a given house
HOW DOES THIS AFFORDABLE HOUSING POLICY WORK?	
STRUCTURE	The application of the policy occurs at a regional level in Costa Rica. The policy requires that the five regions of Costa Rica follow the policy's objectives while addressing their own housing and urban planning programs and plans.
URBAN PLANNING APPROACH	The policy addresses the need to fight against housing deficit and abandonment, and to ensure urban redevelopment through a new form of service provision that includes urban amenities, social infrastructure and the provision of public spaces. The settlement policy also highlights the concept and need for: compact cities, high quality construction, and urban design.
PARTNERSHIPS	Driven forward with two partners: the National System of Planning and the National System of Territorial Arrangement, who are charged with overseeing the country's twin goals of social and urban development.

FUPROVI Housing Policy Overview. Source: Manuela Uribe.



FUPROVI Housing Policy Overview. Source: Manuela Uribe.

milies occupied. Next, the organization worked to convince and unify the families so they would support the project and make it viable, both in social and organizational terms. A strategy was developed to mobilize the largest amount of institutional support possible and, at the same time, to select technologies and building systems that were environmentally and culturally appropriate while meeting the socio-economic needs of the Nazareth families. One requirement was that the families be involved in the building process.

Following a self-management model, the families were involved in the entire construction process, from digging ditches for sanitation pipes to building the houses. The use of a modular, prefabricated system facilitated the participation of the families at every stage of the construction. Furthermore, by building housing components on site, families were given the opportunity to learn new skills while contributing to their own living environments. The houses were built using wood and fiber cement that perform well in the regional climate. Construction workshops were also held to teach families how to frame walls and windows, as well as how to make wood furniture for the interiors. The houses were built on concrete stilts that lift them three feet off the ground in order to prevent flooding. Each unit has been designed to include a living and dining room, kitchen, bathroom and two or three bedrooms, depending on the size of the family. The families were able to choose between a two-bedroom 485 sq. ft. model and a three-bedroom 580 sq. ft. model. The architecture of the Nazareth project was inspired by the vernacular housing of the region and the design of the previous homes of the beneficiaries.

Families contributed 30 hours of work per week to help in the construction of the project. Certain members of the community were responsible for keeping a log of the hours worked per household. Once the project was completed, workshops were held to design the recreational and communal areas, along with information sessions regarding the maintenance and management of the project.

FUPROVI helps the community take advantage of national financing and government housing subsidies to acquire construction materials while also providing training and technical assistance. In Nazareth, the organization not only provided access to affordable loans for low-income families, it also offered consulting services, technical assistance and training throughout the cycle of the project: before, during and after its completion. FUPROVI provides a technical instructor, an architect and a social and administrative coordinator to supervise their projects. The Nazareth project included the creation of a construction technique that could be adapted to the regional climate and the cultural values of the Caribbean, as well as to the socio-economic conditions of the beneficiaries. The model is based on the belief that beneficiaries should actively contribute their time and energy to identify issues and come up with solutions for their homes.

SOLIDARITY

When used in relation to housing, solidarity refers to individuals or groups collaborating to provide urgent solutions for those in vulnerable situations, for instance, for those lacking the resources to build a home, or those who have lost their home. It encourages partnership, cooperation and self-management for the production, use or sale of housing or building supplies that are to be used in self-built homes.

PATRIMONIO HOY

Corporate Responsibility and Affordable Materials

MEXICO, COLOMBIA, DOMINICAN REPUBLIC,
NICARAGUA, COSTA RICA AND PANAMA
Regional population: 202 million people

TIME FRAME

Year project was approved: 2001
Year project was completed: ongoing

ACTORS:

Project management and implementation:
Patrimonio Hoy
Project design: CEMEX

FINANCING

Type: Private company
Estimated budget: More than USD 135 million in
micro-loans to clients

IMPACT:

Number of residential units or solution: 100 micro-
loan offices; 500,000 homes; more than 105,000
new additions measuring 100 sq. ft.
Estimated population impacted: 2.5 million people

A PH beneficiary.
Ph. Patrimonio Hoy –CEMEX website



Patrimonio Hoy (PH) was launched in Mexico and has since expanded to other Latin American markets. PH was designed to overcome the barriers faced by low-income families who want to improve their homes. By offering personalized financing solutions to its customers, PH is not only acting as an industry disruptor in the countries where it operates: it is transforming the saving and spending habits of demographic groups that were previously ignored and, in turn, benefiting local economies.

Mexico faces a growing housing deficit, with 34% of families living in homes with qualitative deficits. As in many other developing countries, low-income families in Mexico do not necessarily receive regular paychecks, government subsidies or allowances, nor do they have access to banks or loans. As a result, they have adopted savings methods differing from those used by middle- and high-income families. For these reasons, incremental self-built housing represents between 30% and 40% of the Mexican cement market. This type of building is complicated and comparatively expensive due to high market fragmentation, the limited purchasing power of those who rely on it and their lack of formal financing. Moreover, because self-builders lack bargaining power, are not very knowledgeable about construction and are unaware of storage possibilities, about 30% of the materials purchased by low-income families go unused, which often leads to construction delays or even project abandonment. It can thus take a typical family 20 to 25 years to build their home.

Cemex is one of the largest cement and construction supply companies in the world, with more than USD 15 billion in annual net sales. Headquartered in Mexico, the company has production facilities in more than 50 countries and more than 54,000 employees worldwide. Patrimonio Hoy (PH), a Cemex subsidiary, was launched in Mexico and has since expanded to other Latin American markets. The initiative was launched in 1998, after the company publicly acknowledged its lack of understanding of the self-build market. Cemex gathered research about the self-build model used by many low-income communities. A three-year investigation into market dynamics and construction techniques revealed that an estimated 2.2 million rooms are self-built each year, and that rooms take four to five years to build at a cost of USD 1,500 each. Thus, the PH initiative was launched in 2001 to target the self-builder segment, which is made up of low-income families earning an average of USD 4,000 to 8,000 annually, or two to five times the minimum annual wage. The program

BY IMPROVING LIFE CONDITIONS THROUGH HOUSING, PATRIMONIO HOY SUPPORTS A HEALTHIER DEVELOPMENT AND FAMILY INTEGRATION.

MICRO-CREDIT	CEMEX finances 80% of the cost of materials
	Commits groups of 3 people in solidarity
MATERIALS	Supplies the necessary materials
	Fixed prices during the project cycle
	Storage of materials
TECHNICAL SUPPORT	Housing project created according to the needs of each family
FAST AND SAFE	Reducing time and costs, incrementing quality and the functionality of housing
ACCESSIBLE	Weekly payments of US\$16.50, with service centers in their communities

PH programs. Source: Patrimonio Hoy – CEMEX website



PH beneficiaries.
Ph. Patrimonio Hoy - CEMEX website

was designed to help families overcome the barriers that prevent them from improving their homes; it has been extended over the years and today it serves more than 40,000 families annually.

It follows a basic micro-financing model known as the "solidarity group," wherein groups of three customers enroll together as members at their local Patrimonio Hoy office. The group must commit to a 70-week membership and transfer a small weekly amount to PH (USD 16.50 per person: USD 13.80 for materials and USD 2.70 for services), which is retained as credit against the future delivery of building materials. Cemex also receives a small membership fee from each weekly payment. The payments cover the purchase of construction materials, which are delivered in seven installments over the course of the membership. They are also used to cover the consulting fees of an engineer and an architect to supervise the project. The cost of materials is fixed for the duration of the building project, which protects customers from price fluctuations and macro-economic instabilities. Cemex also provides storage and vouchers for materials should customers find themselves in periods of financial difficulties or wish to delay construction. Regional managers and local office sales representatives are compensated based on member repayments and the fulfillment of the membership period agreed in the program.

To attract new customers or partners, PH has a network of local sales representatives. Each representative works with assistants and is supervised by a coordinator. The assistant sales representatives advertise PH's products at local markets or through door-to-door visits. When selecting coordinators, sales representatives and assistants, PH looks for people who are well-known and trusted in the community. Every new member receives a comprehensive housing package that includes on-site technical assistance to ensure the specific needs of each fami-

ly are met. An architect visits the families to evaluate the existing basic structure of their homes, discuss their construction plans and assess their financial situation. Based on this evaluation, the architect then develops and presents the construction plan, which includes both the design and the type and quantity of materials necessary to comply with safety, environmental and other required building standards.

Though PH supplies building materials to low- and medium-income households, this is not their main business. PH has formalized the method their clients use to finance housing improvements by offering a savings and loan mechanism. By offering personalized financing solutions to its customers, PH is not only acting as an industry disruptor in the countries where it operates, it is also transforming the saving and spending habits of demographic groups that were previously ignored and, in turn, benefiting local economies due to the increased sales volume at Cemex's local material retailers. Given that 55% of PH members hire local builders, the program also boosts local employment. Moreover, 29% of beneficiaries use their newly built spaces to develop their own businesses, leading to more dynamic local economies.

RECLAIMABLE

According to national census data from Latin America, reclaimable housing is related to the qualitative housing deficit. Reclaimable housing refers to homes that are currently substandard but could be improved through repairs, material changes, extensions or hookups to basic services. For our purposes, “reclaimable” refers to dwellings or housing complexes that are renovated, or buildings that had another purpose and were adapted for residential use.

PEDREGULHO HOUSING COMPLEX

A Physical and Social Restoration

RIO DE JANEIRO, BRAZIL

Population: 6.32 million (Rio de Janeiro, 2016);

207.7 million (Brazil, 2016)

GDP per capita: USD 8,649.95 (2016)

Urban population: 86.6%

TIME FRAMES

Year project was approved: 2004

Year project began: 2010

Year project was completed: 2015

ACTORS

Project management and implementation:

Companhia Estadual de Habitação do Rio de Janeiro

Project design: Pedregulho Neighbors

Association and Alfredo Britto

FINANCING

Type: Subsidy

IMPACT

Number of residential units or solution: 328

individual apartments

Estimated population impacted: 1,700 residents

View of a housing block. Ph. Britto, A. (2015). *Pedregulho: O Sonho
Pioneiro da Habitação Popular no Brasil*. Rio de Janeiro: Edições de
Janeiro.



Though it is a recognized Rio de Janeiro monument, the Pedregulho Housing Complex received no public investment and had fallen into a critical state of disrepair, both socially and physically, by 2002. That year, residents launched a campaign for its restoration. In 2010, the state-owned housing firm Companhia Estadual de Habitação do Rio de Janeiro began work under the direction of Alfredo Britto and with the collaboration of the community. This strategy of restoration strengthened relationships within the complex and generated a greater sense of belonging.

The Pedregulho Housing Complex was built between 1946 and 1948 in São Cristóvão, a neighborhood on the north side of Rio de Janeiro. The 522-unit housing complex was designed for low-income municipal employees and included a full range of facilities and social services. Affonso Eduardo Reidy's architectural design followed the urban principles set forth by the International Congress of Modern Architecture (CIAM) and complemented by the landscape design by world-renowned architect Burle Marx. Although it is one of the best-known public housing developments in modern Brazilian architecture, Pedregulho was not a confined case. In fact, it was part of a series of initiatives carried out by the Rio de Janeiro Department of People's Housing, inspired by the reconstruction of British

cities following the Second World War. Part of the housing project was inaugurated in 1950 and the new government took advantage of it to relocate residents from informal settlements. In the 1960s and 1970s, the complex began falling into decline due to the lack of maintenance, a disorderly occupation of the apartments, the progressive occupancy of communal areas and wear and tear. By the 1980s, Pedregulho was in a state of decrepitude.

Though it was registered as a Rio de Janeiro cultural monument in 1986, almost no investments were made in the Pedregulho Housing Complex until 2002, when the residents themselves began a campaign that led to initial renovation efforts. The Pedregulho Neighbors Association and Alfredo Britto, the



Terraces in Block A.
Photography: Britto, A. (2015). *Pedregulho: O Sonho Pioneiro da Habitação Popular no Brasil*. Rio de Janeiro: Edições de Janeiro.



Terraces in Block A.
Photography: Britto, A. (2016). *Pedregulho: O Sonho
Pioneiro da Habitação Popular no Brasil*. Rio de
Janeiro: Edições de Janeiro.

architect commissioned for the renovation, formed part of the restoration program committee. The first phase of the restoration, the 2004 Strategic Restoration Plan for the Pedregulho Housing Complex, introduced architectural plans for each building in the complex along with a strategy to address the main demands of the community. The plan presented an analysis of the primary building conservation issues and established the restoration criteria for the heritage-listed complex. The strategic guidelines included maintaining the character of the complex as expressed by the architectural and urban elements; upholding the original intentions of the project and recovering its functionality; preserving the consistency of the existing materials and characteristics of the complex, provided these are compatible with proposed uses and where the costs of restoration are feasible; and satisfying the demands and needs that arise from the new uses and demands of contemporary life, provided these do not undermine the general restoration criteria. These demands include parking, television antennas, outdoor clotheslines, housing complex security and garbage collection.

Restoration work did not begin until 2010, when the Companhia Estadual de Habitação allocated a budget for the project. Restoring Pedregulho presented challenges in terms of both restoration methods and criteria, as well as the social, financial and technical issues involved in renovations of a public housing project long overlooked by the public authorities. An additional challenge to this monumental undertaking was that the residents continued to live in the units during the renovation, accompanying the project at every step of the way and tolerating its inconveniences. In order to attract community involvement, job opportunities were offered to complex residents. The president and vice-president of the Pedregulho Neighbors Association were hired to work on the project and acted as mediators, balancing the technical demands of the work and the day-to-day

issues of the residents. A group of social workers was also employed to establish an ongoing dialogue with the residents and communicate the significance and value of the architectural complex.

The need to work on already constructed housing can arise in any existing neighborhood, particularly in housing complexes that have fallen into disrepair and increasingly suffer from qualitative deficits as the years pass. Such was the case of the historic Pedregulho Housing Complex, and the restoration and reclamation project aimed to restore this important cultural heritage building as a source of public pride, contributing to improving the quality of life of its residents without allowing the property to become a "museum." The involvement of the neighborhood association was essential to the success of the project and helped avoid unwanted gentrification and the displacement of the original residents. Lastly, the permanent maintenance committee for the complex—which attends to requests for repairs and ensures that new interventions are resolved appropriately—also keeps the residents actively involved and committed to the future of their homes.

DISRUPTIVE

Disruptive projects break with trends to provoke or trigger actions to achieve a desired objective. In terms of housing, disruptive projects can indicate a turning point in the real estate market, which may include changes in the social and cultural behavior of populations with respect to habitat production.

HOUSING AND HABITATS

Revitalizing Managua's Historic District

MANAGUA, NICARAGUA

Population: 973,087 (Managua);
6.15 million (Nicaragua, 2016)
GDP per capita: USD 2151.38 (2016)
Urban population: 59.4%

TIME FRAME

Year project was approved: 2016
Year project began: 2017
Year project was completed: November 2017

ACTORS

Project management: The General Planning
Department of the Managua Mayor's Office
(ALMA), IDB.
Project implementation: The General Planning
Department of the Managua Mayor's Office
(ALMA).

FINANCING

Type: Technical Cooperation from the IDB
Estimated budget: There are 55 projects in total,
including 26 priority projects with an estimated
budget of USD 188.14 million; 25 medium priority
projects with a USD 223.12 million budget; and,
finally, four projects valued at USD 6.59 million.

IMPACT

Number of residential units or solution: 1.5 million
inhabitants will benefit from the 55 projects.

Images from a future urban scenario. Image: General Planning
Department, Managua Mayor's Office (ALMA).



This disruptive project—a social housing development in the center of Managua, Nicaragua—occupies four acres of publicly owned land in a centrally-located, traditional neighborhood. It consists of 365 multifamily units, some of which are allocated to social housing, and a storefront space. The project is expected to trigger private investments in the area and, at the same time, serve to regulate the affordable housing market, spur the redensification of the urban center and reclaim this area as a safe space for inhabitants.

In order to overcome its housing deficit, Nicaragua must build 347,691 houses and perform infrastructure upgrades on an additional 609,609 units. According to municipality data, the city faces a housing shortage of 80,000 units and, though the Institute of Urban and Rural Housing (INVUR) is executing housing projects, these will not satisfy all the demand. According to the 2014 Census of Urban Pacific Settlements in Nicaragua, the Department of Managua has 204 settlements, 157 of which are in the capital itself, where 91.9% are found in risk areas. Managua is clearly a unique case, as the housing located in its historic district is the result of a complex transformation that followed the catastrophic 1972 earthquake. Informal settlements play a large factor in the urban center and, in terms of housing per hectare, it has low population and building densities. The 2012-2022 Revitalization Plan was developed as a road map for recovering downtown Managua's prominence for both the city and the nation. The goal is for this area to provide a high quality of life to

a socially diverse and integrated population that is proud of its heritage. Over the past eight years, the Managua Mayor's Office has invested in recreational and sports venues in the city center and promoted a tourism program based on cultural values. It is gradually reversing more than 40 years of urban decay, increasing perceived safety and improving its image.

The housing and habitat strategy that was applied to Managua's downtown area is a contemporary model for urban regeneration and an example of how to rehabilitate and transform existing and inhabited spaces. It recognizes the need to address existing structures, not only in terms of their historical value and heritage, but also in terms of their overall morphology and socioeconomic context. Thus, the revitalization of Managua's historic district follows a spatial model that, on the one hand, aims to improve safety, wellness and environmental conditions while avoiding the displacement of the resident population and, at the same time, integrating the most



Images from a future urban scenario. Image: General Planning Department, Managua Mayor's Office (ALMA).



Images from a future urban scenario. Image: General Planning Department, Managua Mayor's Office (ALMA).

vulnerable population; on the other hand, it looks to configure an urban scale that combines density with mixed-use structures, upgrades to the environment and improved accessibility and services, while respecting the urban core as the fundamental organizing element.

The municipality of Managua's design for an urban development model that makes efficient use of the land disrupts the traditional redensification model. It includes housing and improvements, and consolidates the urban habitat targeted by the Integral Plan for the Revitalization of the Historic District of Managua. It occupies four acres of publicly owned land in a centrally located, traditional neighborhood and consists of 365 multifamily units, some of which are allocated to social housing, as well as a shopping area.

The project—conceived as an emblematic disruptor—is a pilot for urban redensification based on sustainable urban-architectural development. It considers inclusive urban facilities, environmentally and user-friendly components, and incorporates multiple options for safe human mobility. The model introduces high-rise multifamily apartment buildings as an effective alternative for moderate urban redensification. Mixed land use (housing, commercial and services) is incorporated into the design, which also considers work-live spaces, offering pre-designed spaces for use as workshops, kitchens and more. As defined in the city's housing and habitat strategy, this disruptive project includes solutions for families of different income levels and incorporates innovative building materials and systems that comply with national construction standards. The project also employs eco-friendly technologies, such as passive ventilation, rainwater recycling and the use of native vegetation in communal spaces.

The project envisions short- and medium-term implementation plans and establishes a clear order of priorities and criteria for technical, social, envi-

ronmental, financial and institutional components. Central government policies for promoting social housing have also been drafted and will facilitate the access of low- and middle-income households to the project. In addition, by consulting with and inviting urbanization companies to participate in the development of the plan, the municipality generated interest in contributing to urban redensification and increasing the supply of housing that targets the low-to middle-income market. Likewise, public-private partnerships have been established to promote the development of these housing models.

This disruptive housing project in the center of Managua, Nicaragua, aims to reverse the decline of the urban core and reclaim spaces for social housing. The Municipality of Managua's design for an urban development model that makes efficient use of the land disrupts the traditional redensification model. It includes housing and improvements, and consolidates the urban habitat targeted by the Integral Plan for the Revitalization of the Historic District of Managua. This disruptive project includes solutions for families of different income levels and incorporates innovative building materials and systems that comply with national construction standards. The project is expected to trigger private investments in the area and, at the same time, serve to regulate the affordable housing market, spur redensification in the urban center and reclaim this area as a safe space for inhabitants.

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Over the course of the 20th century the world's population grew more than during any other period in history, increasing from around 1.5 billion people in 1900 to nearly seven billion people today. Given this exponential growth, it is essential to reflect on what we have done to house this growing population—or what residents have done to procure housing on their own. According to the numbers, we have been capable of building enough housing to compensate for the quantitative deficit; the biggest challenge we face today is to how to make qualitative changes to the existing housing stock. Population growth continues to be strong in the emerging economies of the Global South, and exploring the potential of housing to transform the urban fabric is critical to building better cities.

This project by the Housing and Urban Development Division of the IDB is an invitation to make strategic use of lessons learned, to imagine new solutions and possibilities, and to bring a renewed agenda to housing and urban development in the years to come.

