# 100RC HANDBOOK
# Planning for Resilient Urban Growth

## Tools for Proactively Managing Rapid Urban Growth

Prepared by NYU Marron Institute
in collaboration with 100 Resilient Cities

May 2018

NYU Marron Institute of Urban Management

PIONEERED BY THE ROCKEFELLER FOUNDATION
100 RESILIENT CITIES

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### About 100 Resilient Cities

100 Resilient Cities - Pioneered by the Rockefeller Foundation (100RC) is dedicated to helping cities around the world become more resilient to the physical, social and economic challenges that are a growing part of the 21st century. 100RC supports the adoption and incorporation of a view of resilience that includes not just the shocks – earthquakes, fires, floods, etc – but also the stresses that weaken the fabric of a city on a day to day or cyclical basis. Examples of these stresses include high unemployment; an overtaxed or inefficient public transportation system; endemic violence; or chronic food and water shortages. By addressing both the shocks and the stresses, a city becomes better able to respond to adverse events, and is overall better able to deliver basic functions in both good times and bad, to all populations.

Cities in the 100RC network are provided with the resources necessary to develop a roadmap to resilience along four main pathways:

1) Financial and logistical guidance for establishing an innovative new position in city government, a Chief Resilience Officer, who will lead the city's resilience efforts
2) Expert support for development of a robust Resilience Strategy
3) Access to solutions, service providers, and partners from the private, public and NGO sectors who can help them develop and implement their Resilience Strategies
4) Membership of a global network of member cities who can learn from and help each other.

Through these offerings, 100RC aims not only to help individual cities become more resilient, but to facilitate the creation of a global practice of resilience building.

### About NYU Marron Institute of Urban Management

The NYU Marron Institute of Urban Management conducts innovative applied research, working with cities to take on the critical challenges of urban growth. Cities are central to economic development and the entrepreneurial and technological advances that improve the human condition. But urbanization carries many challenges, including problems of sustainability, equity, and overburdened infrastructure and public services. NYU Marron is championing a new model of academic praxis to address these challenges and improve the opportunities available to the billions of urban residents around the world.

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# Introduction

## Planning for Urban Growth is Planning for Urban Resilience

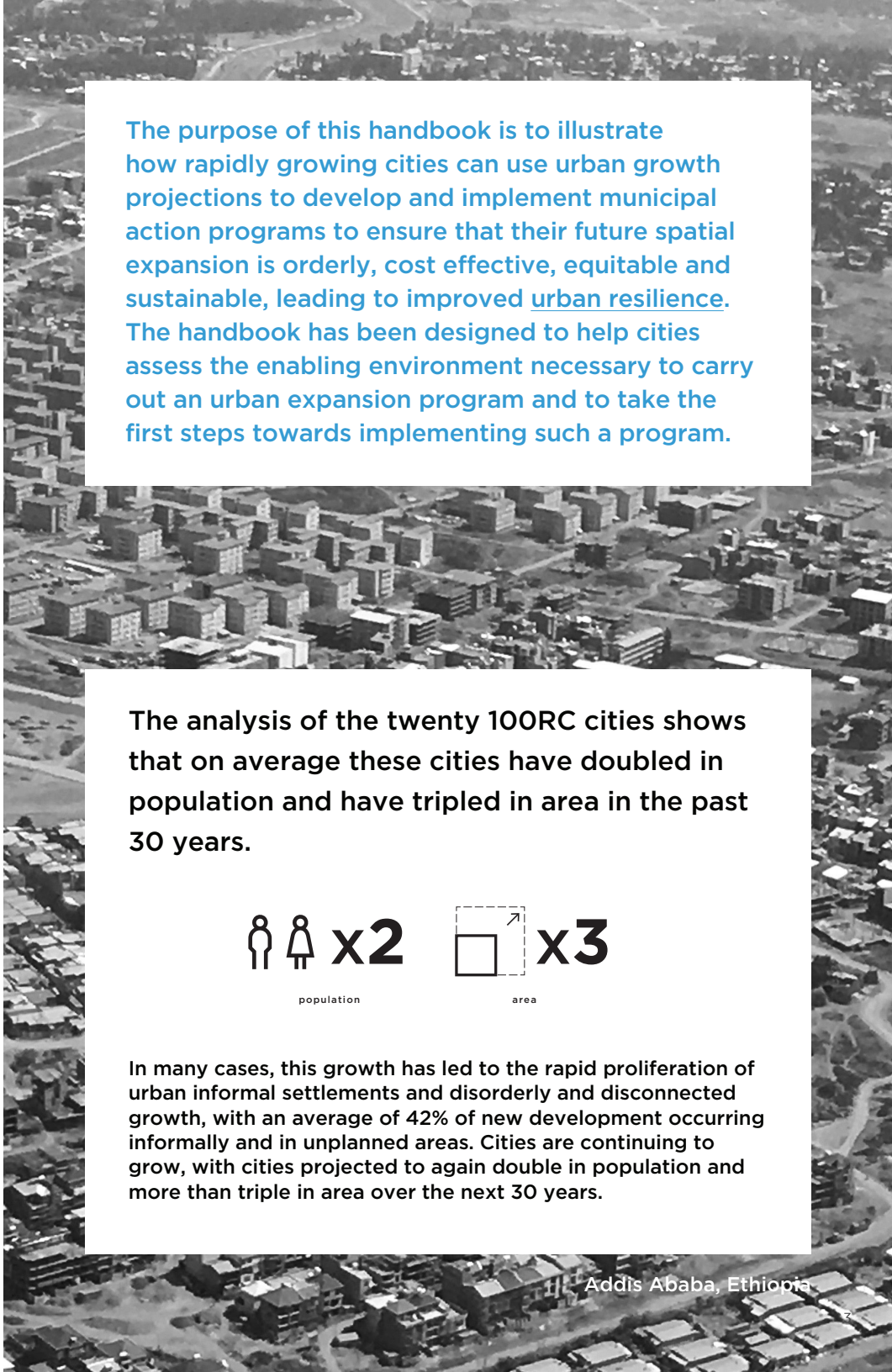
**Urban Resilience is the 'capacity of individuals, communities, institutions, businesses and systems within a city to survive, adapt and grow no matter what kinds of chronic stresses and acute shocks they experience'. Both 100 Resilient Cities and NYU believe that unplanned urban expansion is a root cause of many resilience challenges cities face. Increased levels of informality, lack of service provision, decreased social equity, traffic congestion, environmental degradation and increased disaster risk exposure are all symptoms of uncontrolled expansion in cities experiencing rapid growth.**

Communities on the periphery of cities often experience the most profound negative impacts from this growth, putting these populations at greater risk. Addressing the root cause as opposed to the symptoms of unplanned urban growth will lead to multiple benefits and help each city survive, adapt and thrive in the face of the shocks and stresses it may face and improve the development trajectory and well-being of its citizens.

As illustrated by the City Resilience Framework, NYU's approach to urban expansion in rapidly growing cities is well-aligned with 100RC's approach to resilience. A single intervention – the development and implementation of an urban expansion program in a city – leads to benefits across all 12 drivers of the City Resilience Framework.

In partnership with 100 Resilient Cities (100RC), NYU has studied twenty of the most rapidly growing cities in the 100RC network to understand how fast they are growing and to project their future urban growth. This partnership relies on the work and experience of the NYU Urban Expansion Program, building on decades of research and ongoing partnerships with cities in Africa, Asia and Latin America as well as the implementation of city-level urban expansion initiatives in 18 cities in Ethiopia and 109 cities in Colombia.





The purpose of this handbook is to illustrate how rapidly growing cities can use urban growth projections to develop and implement municipal action programs to ensure that their future spatial expansion is orderly, cost effective, equitable and sustainable, leading to improved urban resilience. The handbook has been designed to help cities assess the enabling environment necessary to carry out an urban expansion program and to take the first steps towards implementing such a program.

**The analysis of the twenty 100RC cities shows that on average these cities have doubled in population and have tripled in area in the past 30 years.**



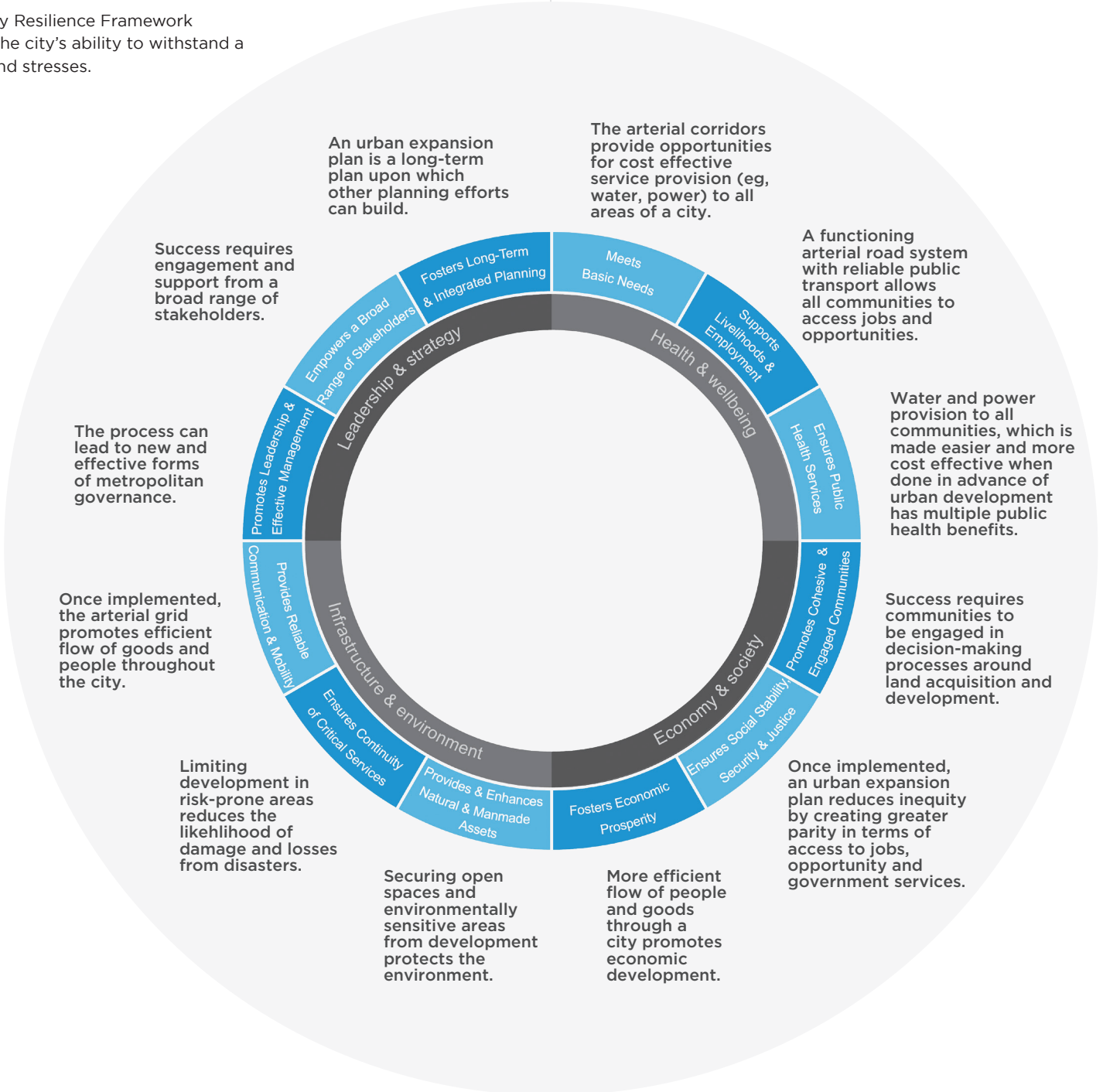

**In many cases, this growth has led to the rapid proliferation of urban informal settlements and disorderly and disconnected growth, with an average of 42% of new development occurring informally and in unplanned areas. Cities are continuing to grow, with cities projected to again double in population and more than triple in area over the next 30 years.**

Addis Ababa, Ethiopia

Figure 1

# City Resilience Framework

The 12 drivers in the City Resilience Framework collectively determine the city's ability to withstand a wide range of shocks and stresses.

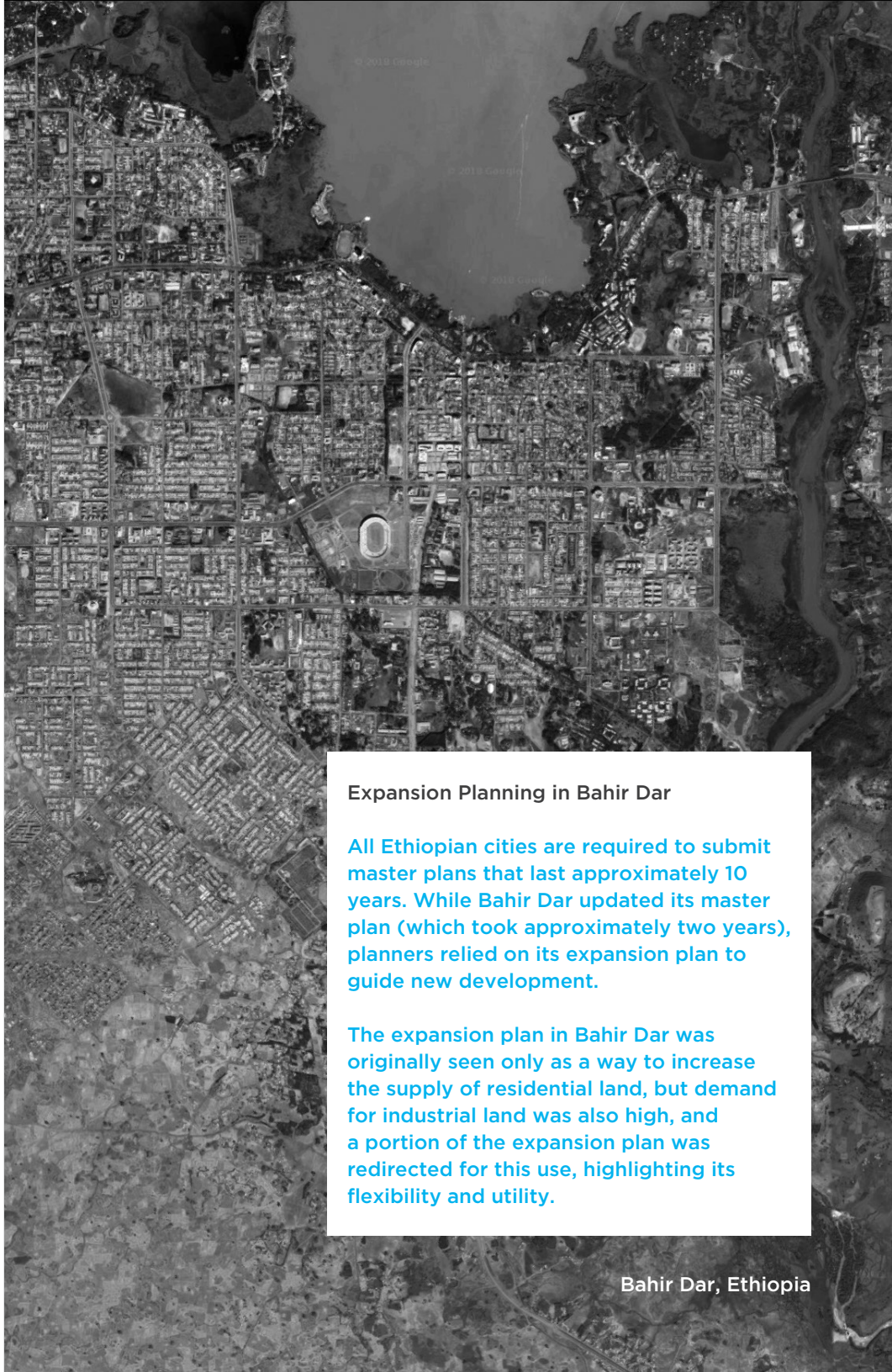


# Section I
## The Benefits of Proactive Planning

Proactively planning for urban expansion is essential to achieve inclusive and resilient urban growth for cities experiencing rapid urban growth (on the order of 2% annual population growth). The challenge for a fast growing city is to make room for its inevitable expansion, based on realistic projections of its future land needs to accommodate the city's population growth in an orderly and sustainable manner.

The NYU Urban Expansion Program has collaborated with a number of rapidly growing cities in Africa, Asia, and Latin America to help them implement urban expansion initiatives to prepare for their growth over the next 30 years. The methodology used in these initiatives is simple, inexpensive and easy to implement. **The basic approach involves securing the land needed for arterial roads, basic infrastructure and public open spaces before urban development happens.** Getting out in front of urban expansion is critical, because once the city's periphery is settled, it is generally neither feasible nor desirable to relocate residents and businesses in order to create a system of arterial roads, related infrastructure and public open spaces.

An urban expansion plan is both a radical paring down of the expensive and time consuming comprehensive master planning approach and a dramatic increase in its scope and ambition, because the expansion plan is designed to accommodate the city's future population growth with a minimum number of cost-effective measures that can be implemented immediately, on a 30-year time horizon. Expansion plans and master plans are complimentary because any new planning exercise needs to be synchronized with existing plans. But the simple nature of the plan also makes it flexible and multi-purpose.



**Expansion Planning in Bahir Dar**

**All Ethiopian cities are required to submit master plans that last approximately 10 years. While Bahir Dar updated its master plan (which took approximately two years), planners relied on its expansion plan to guide new development.**

**The expansion plan in Bahir Dar was originally seen only as a way to increase the supply of residential land, but demand for industrial land was also high, and a portion of the expansion plan was redirected for this use, highlighting its flexibility and utility.**

Bahir Dar, Ethiopia

## Addis Ababa


Urban footprint in **2017**

Projected Urban footprint in **2050**

## Accra


Urban footprint in **2014**

Projected Urban footprint in **2050**

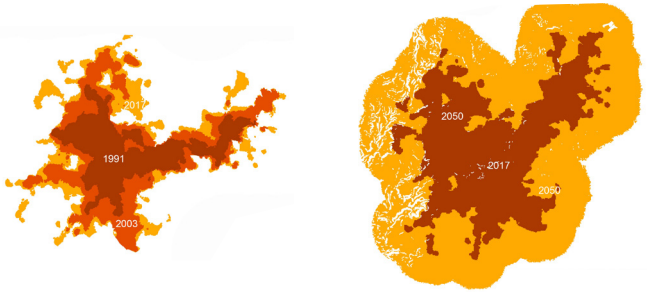
**Figure 2:** Population in Addis Ababa is projected to increase 3.4-fold and area will increase 6.6-fold by 2050. Population in Accra is projected to increase 2-fold and area will increase 3.9-fold by 2050.

## Kigali


Urban footprint in **2014**

Projected Urban footprint in **2050**

## Amman




Urban footprint in **2017**

Projected Urban footprint in **2050**

**Figure 3:** Population in Kigali is projected to increase 3-fold and area will increase 5.9-fold by 2050. Population in Amman is projected to increase 1.4-fold and area will increase 2.8-fold by 2050.

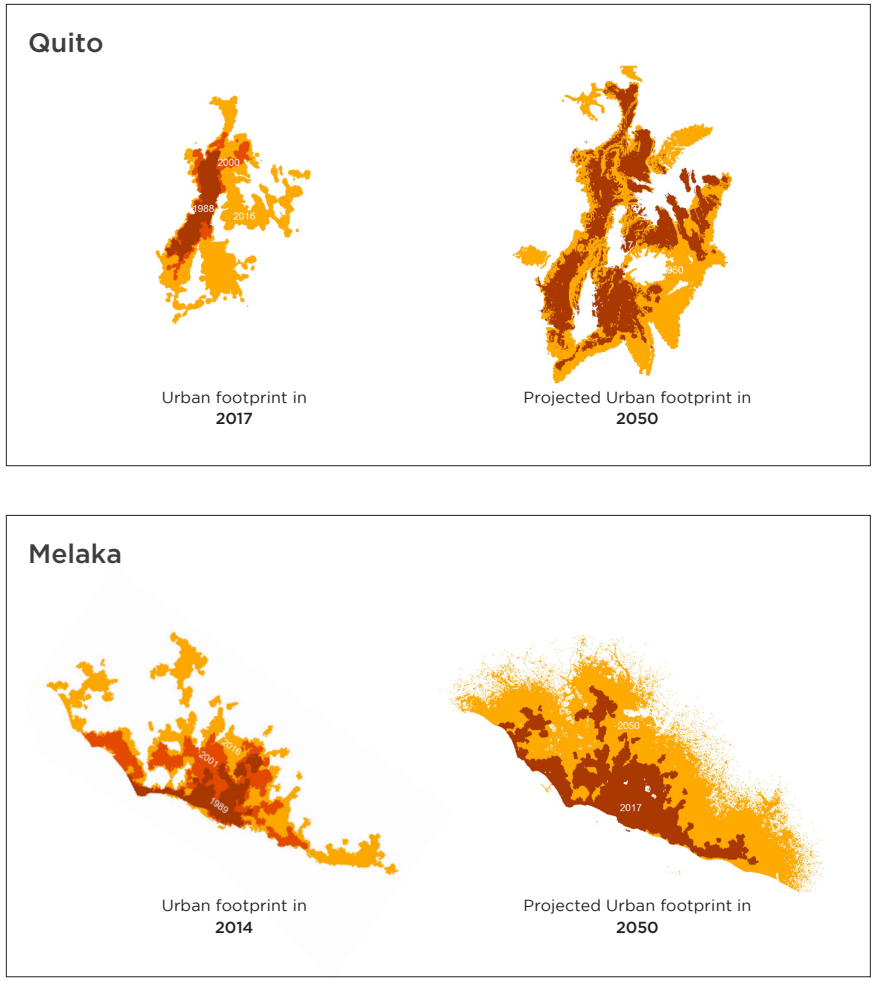



Figure 4: Population in Quito is projected to increase 1.6-fold and area will increase 3.1-fold by 2050. Population in Melaka is projected to increase 1.6-fold and area will increase 3-fold by 2050.

Maps similar to those shown in Figures 2 - 4 are available for the following twenty cities: **Accra**, Ghana • **Addis Ababa**, Ethiopia • **Amman**, Jordan • **Byblos**, Lebanon • **Cali**, Colombia • **Can Tho**, Vietnam • **Cape Town**, South Africa • **Da Nang**, Vietnam • **Deyang**, China • **Durban**, South Africa • **Haiyan**, China • **Kigali**, Rwanda • **Lagos**, Nigeria • **Mandalay**, Myanmar • **Melaka**, Malaysia • **Medellin**, Colombia • **Nairobi**, Kenya • **Pune**, India • **Quito**, Ecuador • **Santa Fe**, Argentina



Cities often want to limit or constrain physical expansion. Some cities like to believe that all future population growth will be absorbed by densification of the existing area, and there are obviously many social, economic, and environmental benefits to density. But how much of a city's population growth is typically absorbed through densification, versus expansion? A global analysis of 200 cities over 30 years found that that 40% of growth took place through infill and densification, and 60% took place through urban expansion. Cities in less developed countries tended to have a greater share of growth taking place through expansion.

Densification and expansion are complimentary processes that occur in tandem as a city grows, but it is important to recognize that as cities become more prosperous, population density declines. For example, in 2015, Paris had almost the same population, but 10 times the GDP of Lagos. Because of their greater wealth, the people of Paris consume more services, transportation, and housing (among other things) than those of Lagos. As a consequence Paris has 3.5 times the urban area of Lagos (Figure 5).

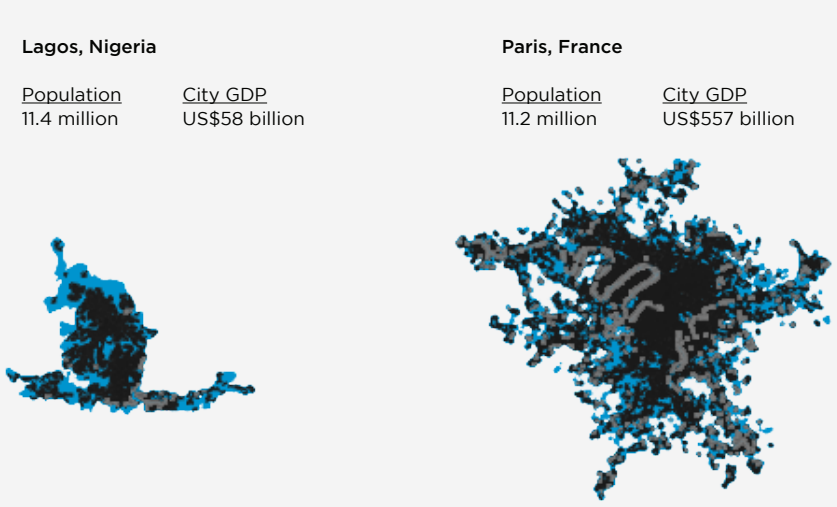



Figure 5: In 2015, Paris had almost the same population but 10 times the GDP as that of Lagos. As a consequence Paris had 3.5 times the urban extent of Lagos.

Unfortunately, the leaders of many rapidly growing cities often underestimate the amount of land needed to accommodate urban expansion. Others fail to make the minimum preparations necessary to guide their expansion because of budget concerns and other pressing needs. However, since urban expansion is inevitable in most fast growing cities, **it is 3-9 times cheaper to prepare for this expansion before it occurs than to try to retrofit neighborhoods after they have been built.** Figure 6 compares Matina favela of Rio de Janeiro (which was not planned) with a new area of Adama Ethiopia, which was planned.

**Figure 6:** Infrastructure costs in Matina favel in Rio de Janiero (left) were 6 to 9 times higher than providing infrastructure before development occurs, for example in the new subdivisions of Adama, Ethiopia (right).

The investments required to realize the infrastructure in these new areas can be made incrementally as the city grows, and in partnership with private sector developers instead of being borne by the city alone. By taking minimal steps to prepare for expansion by setting aside land for roads and public open spaces, cities will leverage these future investments.



## Planning proactively for urban expansion and investing ahead of the curve by implementing a municipal action program to make room for future growth has the following durable impacts on the city's development:

**Inclusive and affordable growth:** By opening up a predictable supply of land for urban expansion in plots of all sizes, land prices and hence housing prices in both formal and informal markets will remain affordable, allowing low income citizens to acquire real assets, preventing the growth of new slums and encouraging future investments in commerce, industry, and housing.

**Disaster risk management:** The arterial road grid and the selective protection of public open spaces allows cities to guide development away from environmentally sensitive and risky areas such as flood plains, water catchments and steep hillsides, improving drainage and reducing vulnerability to flooding and other natural disasters.

**Access and public transport that facilitates the integration of labor markets:** The arterial road grid functions as a framework for an efficient public transport network, reducing the city's carbon footprint, reducing congestion and maximizing connectivity. *The grid is designed to link the entire expansion area with arterial roads that are within a 15-minute walk from all locations*, creating a more integrated metropolitan labor market and increasing overall productivity.

**Greater benefits attained at lower cost:** Municipalities can secure the rights-of-way for the land needed for the arterial road grid now, and individual road segments can be improved to higher standards later as demand for travel along them increases. If rights-of-way are acquired now, the costs will be significantly lower than the cost of attempting to push an arterial road through a fully built neighborhood. Securing these rights-of-way also results in much more cost-effective future investments in trunk infrastructure and basic urban services.

# Section II
# The Four Step Municipal Action Program

## Step 1. Realistic Maps

**Realistic projections of urban land needs for future expansion based on rigorous analysis and projections of growth.**

When planning for urban expansion, the first step is to ensure that the proposed plan corresponds to projections of future expansion. A good example is the Regional Plan for the Mumbai Metropolitan Region 1996-2011 (Figure 7 top). This plan acknowledged an accelerated rate of urban expansion, allowing the built-up area of the city to more than triple. Another example can be seen in Valledupar, Colombia, where the municipality used projections of urban growth from NYU to forecast the land needed for the next 30 years of urban expansion (Figure 7 bottom). **Realistic maps of the areas required for projected expansion ensure that there will be an ample land supply for the city to expand into, preventing land supply bottlenecks and corresponding rising land prices.** This will, in turn, help ensure that land and housing remain affordable to all segments of the urban population.

Practically, projections of future urban growth must be grounded in the historical growth of cities – looking at the local context, but also the global and regional context. Each city is unique, but some things can be generalized. For example, globally, **population density in cities has been declining by approximately 3% per year for at least the past 30 years,** and average urban density declines since 1800 are on the order of 1.5% per year. Projecting urban growth means not just prescribing desired densification scenarios, but seriously considering the facts and the data to see how likely each scenario is.

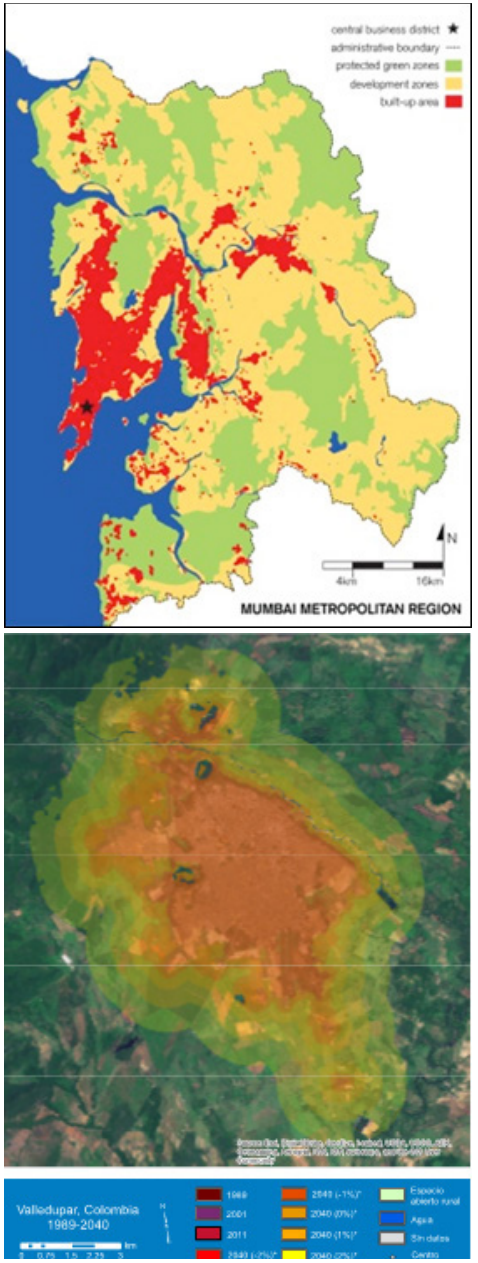



**Figure 7:** The Mumbai Metropolitan Region Land Use Plan, 1996-2011, allowed its built-up area to more than triple. The likely growth projections for Valledupar, Colombia, allowed that city to how much land will be needed for expansion in the coming decades.

The biggest factors in estimating future growth are population growth and GDP per capita. **In general, a 1% increase in population results in a 2% increase in urban extent.** The explanation for this is the steady increase in global GDP per capita. As income rises, people consume more transportation and more housing, and therefore more land. Per capita land consumption is the inverse of density – as per capita land consumption goes up, density goes down. This is the case in most cities, both around the world and in the 100RC sample.

When projecting future growth, estimates of the likely change in density are combined with estimates of future population growth to create an estimate of future land consumption for the metropolitan area. Jurisdictional boundaries are disregarded during this process, and the projections focus only on the physical extent of the city – the built-up area. Ultimately, the goal is to produce realistic projections at the correct order of magnitude that will allow cities to accurately plan for their future growth.

Equally important is to integrate these projections into government planning process. Line ministries and departments must be aware of the expected future growth so that planning for infrastructure and services can take place in consideration of it. Even more important is to ensure that politicians understand their context – that their city is dynamic, not static, and that the trend (at least in land use) is toward more and greater growth that must be planned for and accommodated.




Bahir Dar, Ethiopia

Using the growth modeling techniques described above, NYU has already produced projections and maps for a subset of the 100 Resilient Cities. This was also a critical step in the Ethiopia and Colombia Urban Expansion Initiatives. As in the 100RC cities, NYU generated projections using data from remote sensing and shared it with local political and technical leaders. Initially, leaders were both shocked and highly skeptical about the projections. By explaining the methodology and by presenting studies of the growth of the city in earlier periods (from 1990 to 2013), it was possible to work through their skepticism and create a real sense of urgency around planning for future urban expansion.

## Step 2. Generous City Limits

**Work with the local and regional authorities to develop and implement expansion plans in the entire expansion area.**

Once the area of projected urban expansion is understood, it is vital that the corresponding urban expansion plan be implemented in its entirety regardless of historical boundaries. In some cases, cities will already have control of a large enough area to make this possible. In other cases, some cities can work with nearby cities as well as regional and sometimes national authorities to expand the administrative boundary of the city to accommodate its projected expansion area. Good examples of this can be seen in Beijing, China, where state regulations provide for large administrative boundaries, and in Mekele, Ethiopia, where the planning boundary was enlarged in response to realistic projections of future urban growth. This was done with help from the regional government in consultation with adjoining cities (Figure 8).

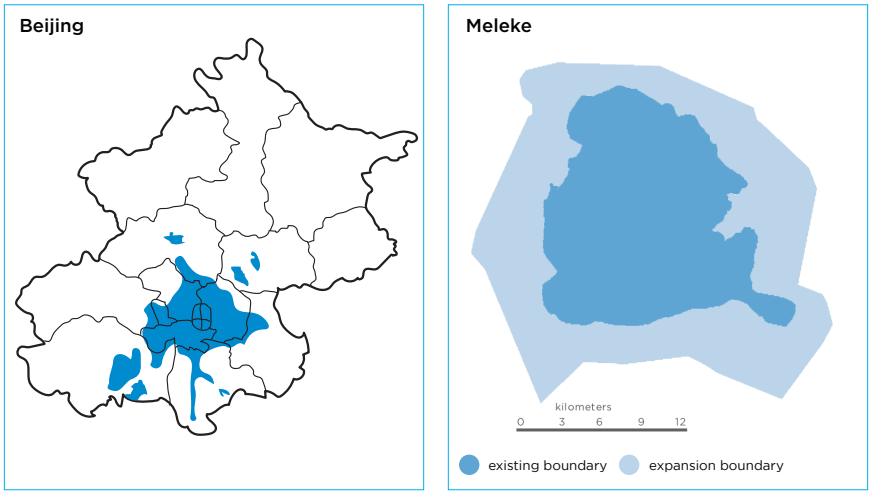



**Figure 8:** In 1999, the administrative area of Beijing was 11 times larger than its built up area (left). In Mekele, Ethiopia, the boundary was expanded in 2014 to include areas of future growth.

When considering the question of city limits, it is important to distinguish between the administrative city and the physical city. The administrative city is defined by the official city boundary of the municipal government. The physical city is made up of the buildings, roads, impervious surfaces, and green spaces of the city, also known as the urban extent. The physical city can be larger or smaller than the administrative city, but because cities grow continuously and administrative boundaries only change occasionally, it is usually larger, and the urban extents of many cities have already expanded beyond their administrative boundaries.

Expansion plans guide the development of the city for the next 30 years by servicing the projected expansion area with arterial roads and preserving public open spaces including areas of environmental risk or sensitivity. These expansion plans work best when the projections are based on the growth of the physical city instead of the administrative city and when they include all of the land around the city.

The key to success is the careful laying out of the projections and the plans, and the connection of those plans to the experiences of the local leaders. It is critical to identify and speak to the needs of stakeholders. The ultimate outcome could be a boundary expansion, an expansion of the planning authority, the creation of a new planning jurisdiction, or the first step on the road to metropolitan governance; regardless, a broad base of support will be needed.


Bogotá, Colombia

**Experiences in Ethiopia and Colombia**

NYU has assisted numerous municipalities in Ethiopia and Colombia in ensuring that growth plans are implemented over the entire area of the city.

In Colombia, most municipalities are quite large, but only a portion of the area is approved for urban development. In that context, it was necessary to convince the government to extend the planning area of the city to include the rural portions of the municipality.

In Ethiopia, cities worked with the regional government and local rural governments (kebeles) to come up with mutually agreeable frameworks for boundary extension. City leaders in Ethiopia assumed that kebele governments would be resistant to the expansion plans. In fact, the leaders were already facing the consequences of unplanned growth in their villages and were eager to have a framework and support for orderly development.



## Step 3. Arterial Road Grid

**Plan and secure the rights-of-way for an arterial road and trunk infrastructure grid throughout the expansion area.**

The heart of preparing for urban expansion is planning and securing land for a grid of arterial roads in the expansion area. Arterial roads are major urban roads carrying intra-urban traffic, public transport and critical trunk infrastructure like water, sewer, power and telecom which form a network to connect different areas of the city. To accommodate urban expansion, an arterial road grid on the urban fringe must have four essential properties:

1) it must cover the entire area designated for expansion and not just a segment of that area;
2) it must be a network of long, continuous roads that crisscross the expansion area and are connected to the city's existing road network;
3) roads should be spaced about one kilometer apart to ensure that everyone is within a 15-min walk of a road that can carry public transportation;
4) the roads should have a 25-30 meter width, so that they can have designated bus lanes, bike paths, a median, and several lanes to carry intra-city traffic.

This road grid typically takes up no more than 8% of the expansion area.

The arterial road grid pertains only to the network of major arterial roads. Initially, only rights-of-way for the grid should be acquired by municipal authorities; dirt roads can then be opened up in large portions of the grid; selected segments can then be improved over the years but only as demand requires them and as budgets become available.

As new areas are built, developers or the city government can lay out and build smaller roads to provide access to individual plots of land. Arterial roads, in contrast, should be

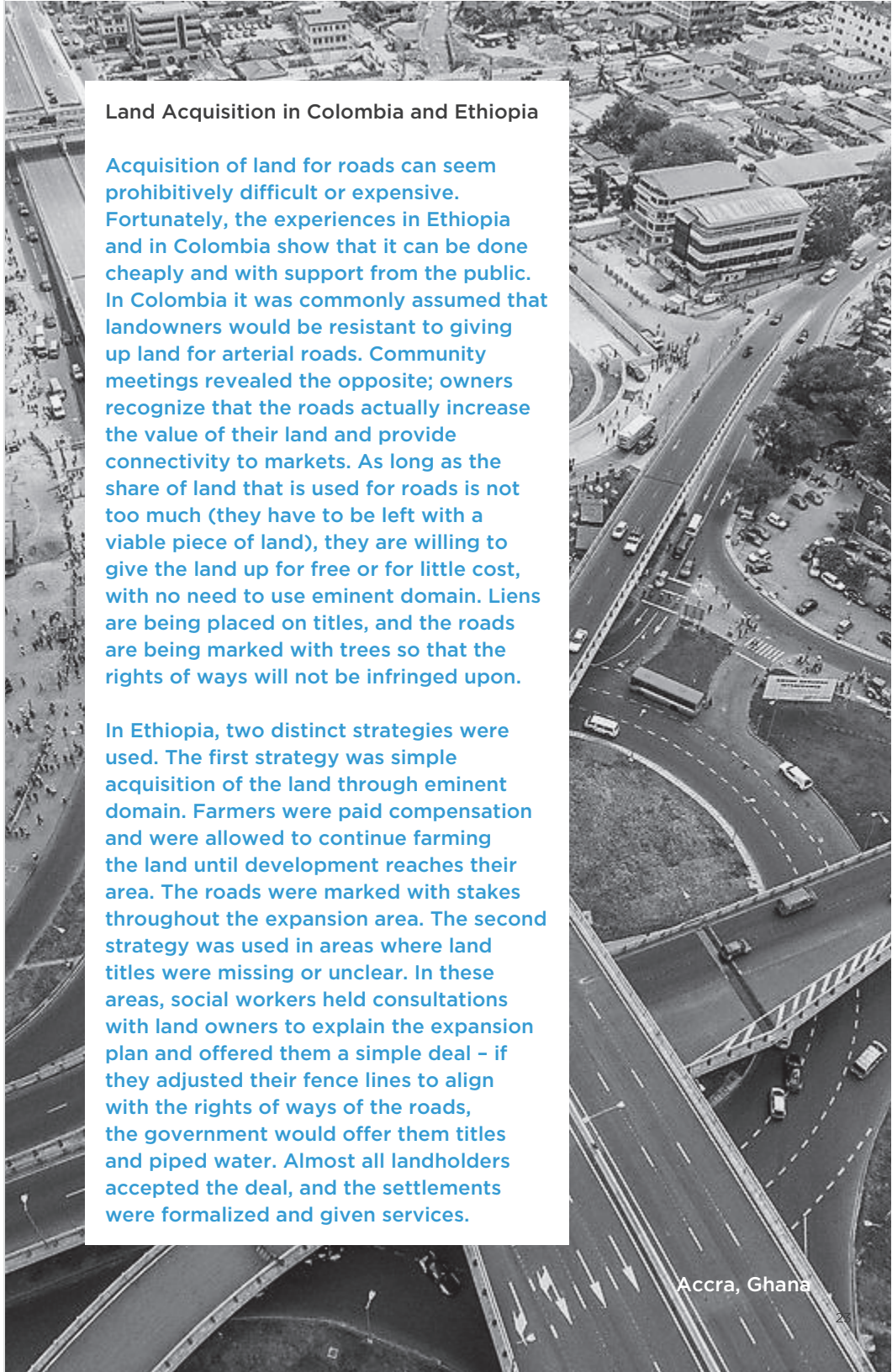
laid out before development occurs. Planning 30 years of the arterial road grid will make this neighborhood development process more orderly, using public space to organize the layout of the city.

There is no need to construct all of these roads in advance, and it would actually be a waste of resources to do so. But securing the land for the road right of way means that the organization of the roads is set in advance, and it means that land for the roads can be secured while it is still affordable. In areas that are rapidly developing or already developed, this process is difficult and prohibitively expensive.

When rights of ways are not acquired before development occurs, there often are not enough arterial roads to efficiently move traffic and bring infrastructure to neighborhoods. This leads to traffic congestion and makes services more expensive or inaccessible to certain communities. It also means that some neighborhoods will be isolated from the job market in the city. Cities with strong networks of arterial roads are connected, workers have access to jobs and services, and firms have access to a larger pool of workers.

**To succeed, the plan requires the support of the majority of landowners along the proposed road rights of ways.** Roads should be laid out in a way that minimizes the impact on a particular plot, and a consultative approach should be used. As the experience in Colombia and Ethiopia shows, this can reduce the cost of land acquisition to almost nothing. Funding for surveying should come from the municipality if possible. Support can also come from the regional government or the national government. **International funds often come with strict limitations on the acquisition of land, so this will likely need to be paid with local resources**.





### Land Acquisition in Colombia and Ethiopia

**Acquisition of land for roads can seem prohibitively difficult or expensive. Fortunately, the experiences in Ethiopia and in Colombia show that it can be done cheaply and with support from the public. In Colombia it was commonly assumed that landowners would be resistant to giving up land for arterial roads. Community meetings revealed the opposite; owners recognize that the roads actually increase the value of their land and provide connectivity to markets. As long as the share of land that is used for roads is not too much (they have to be left with a viable piece of land), they are willing to give the land up for free or for little cost, with no need to use eminent domain. Liens are being placed on titles, and the roads are being marked with trees so that the rights of ways will not be infringed upon.**

**In Ethiopia, two distinct strategies were used. The first strategy was simple acquisition of the land through eminent domain. Farmers were paid compensation and were allowed to continue farming the land until development reaches their area. The roads were marked with stakes throughout the expansion area. The second strategy was used in areas where land titles were missing or unclear. In these areas, social workers held consultations with land owners to explain the expansion plan and offered them a simple deal – if they adjusted their fence lines to align with the rights of ways of the roads, the government would offer them titles and piped water. Almost all landholders accepted the deal, and the settlements were formalized and given services.**

Accra, Ghana

The level of investment required for these activities will vary depending on the strategies used for land acquisition. In some cases, land can be acquired at little to no cost beyond the expense of surveying. This is true in cases where having proximity to a road increases the value of the remaining land enough that it exceeds the current cost of the land that is given up for the road.  In other cases, particularly in rural areas and in areas in which average landholdings are small, compensation must be paid in order to secure the land. **Our experience in Ethiopia indicates that the total cost of compensation for the arterial road network is on the order of USD$1 million to USD$5 million for a mid-sized rapidly growing city.**

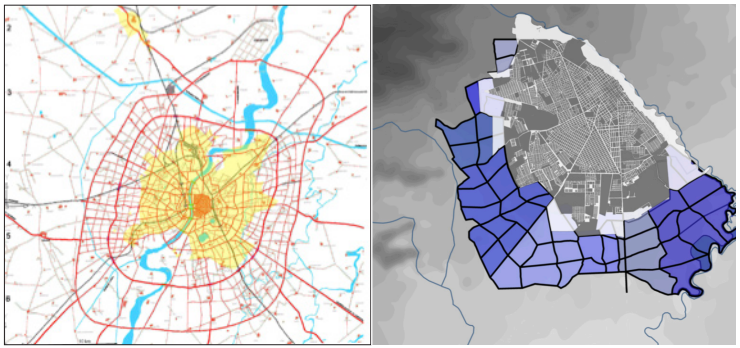


**Figure 9:** The 2011 development plan for Ahmedabad, India (left) adopted an arterial road grid as its basic framework for expansion. In Valledupar, Colombia, the proposed arterial grid covers the entire expansion area (right).



## 4. Selective Protection of Public Open Spaces

**Identify and selectively protect a hierarchy of public open spaces including environmentally sensitive and high risk areas in the expansion zone.**

The final critical portion of expansion planning is the identification and protection of environmentally sensitive land and areas prone to flooding, landslides, subsidence or liquifaction on the urban periphery. This includes protecting these areas from informal development, not simply marking the areas as green on the map. This is an opportunity to engage in real preservation and risk reduction – blocking development in some areas is much more effective if people have somewhere else to go, and this is what the expansion plan provides.

Protection of these areas fulfills important environmental and social functions. It ensures that citizens will have access to public open spaces in the future. Many rapidly growing cities fail to set aside land for public open spaces. Creating public spaces after development has occurred is prohibitively expensive, and these cities are stuck with an undersupply.

Securing these lands in advance is an opportunity to prevent the development of environmentally sensitive areas such as marshlands and land adjacent to water bodies. This land is not only critical for the health of the environment, but also it provides environmental services and benefits that are costly to replicate. By preserving the land now, the municipality can save on infrastructure costs down the road.

Most importantly, development can be guided away from hazardous zones. In many cities in Latin America and Africa, illicit development takes place on steep slopes and in flood plains because those areas have proximity to the centers of economic activity. With the expansion plan, the network of arterial roads makes it possible to connect less risky areas to the center and locate new residents in those areas. This dramatically reduces disaster risk.

Cities can buy the land, development rights can be acquired through purchase and exchange, or open space conservancies can be created, to cite several examples that have been successfully used in other countries. Public open spaces can be preserved by involving stakeholders and community members. High-risk areas can be preserved by guiding development elsewhere. **Environmentally sensitive and high risk areas will require active enforcement of development restrictions.**

It is important to recognize that the extent of public open spaces that can be protected will be limited by the private, public and civic resources, both financial and human, that can be mobilized. That is why it must be selective. **The aim should be to protect necessary lands at a minimal cost to the public so that they remain open in perpetuity**. Toronto, for example, has an enviable hierarchy of urban parks large and small distributed throughout the city, taking up 11 percent of its urban area (Figure 10).

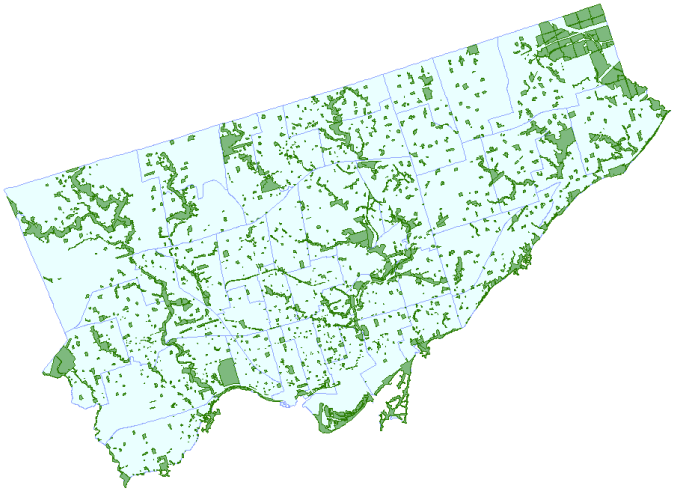


**Figure 10:** The network of public open spaces in Toronto, Canada.

**Urban land preservation in Colombia and Ethiopia**

**The key to protecting public open spaces is creating areas that the citizens will want to use. In Colombia, NYU helped create a public open space partnership that engaged citizens in the development of parkland. This required changing cultural expectations for public open spaces, and understanding them as a collaborative effort. As a result, the community is largely responsible for protecting these areas from encroachment.**

**In Ethiopia, small and medium sized neighborhood parks are effectively provided by developers, and the emphasis for the municipality is on protecting larger environmentally sensitive areas. Hawassa, Ethiopia recently designated its lakeshore a linear park, to provide an environmental buffer that will preserve water quality (Figure 11).**


**Figure 11:** The new proposed buffer park in Hawassa, Ethiopia.

# Section III
# Moving forward with urban expansion

The argument for taking the four actions outlined in Section II now (out of all possible actions) is simple: land for key public works, including trunk infrastructure for transport, drainage, communications, sanitation and water supply must be secured in advance of development. Other no less important planning activities, such as determining specific land uses, deciding on zoning or densities, laying out local streets, or locating new public facilities, can come next, once these lands are secured. Creating a skeleton that the city can expand into allows the local authorities to take control of the urban expansion process, rather than trailing behind both formal and informal developers.

This requires the commitment and ability of the city to work closely with both regional and national authorities as well as with multiple stakeholders in the public, private and civic sectors. In most cases the support of the regional and sometimes national authorities will be required for the city to expand its administrative boundary, and it will be necessary to develop a suitable financing mechanism for the acquisition of rights of ways for arterial road and public open spaces.

Based upon the experience of cities in Colombia and Ethiopia, this exercise of planning for urban expansion to the point of formal approvals can be expected to take between six months to one year. Securing the rights of ways for the roads and the land for public open spaces can take as little as three to five years, and it is possible to see an impact on the ground very quickly, if the project is prioritized and supported.



To help cities proactively address their urban expansion, NYU and 100RC have provided a rigorous analysis of current and projected growth and density projections, as well as the current and projected expansion of built-up areas for 20 cities in the 100RC Network (in Figures 2 – 4, for example). The following worksheets outline short-term goals and questions that will assist cities in taking the next step by assessing the feasibility of implementing an urban expansion program. This assessment can be organized into four sections with four corresponding worksheets:

- ☑ **Worksheet 1:** City commitment and engagement of partners
- ☑ **Worksheet 2:** Administrative Boundaries - the Metropolitan Issue
- ☑ **Worksheet 3:** Rights of Way Issue
- ☑ **Worksheet 4:** The public open space issue
- ☑ **Worksheet 5:** Urban Growth 'Lens' for Initiative Development

In addition to assessing the feasibility of implementing an urban expansion program, the urban growth analyses and projections may also be used to inform the Strategy Development process of cities in the 100RC Network as well as the development of individual initiatives. To assist in this process, a final worksheet for use by a city's Chief Resilience Officer (CRO) provides an 'Urban Growth Lens', a series of prompting questions that should be considered for all resilience initiatives and projects in a city with rapid urban growth.

# Worksheet 1
## City commitment and engagement of partners

Because the goal is not to produce paper plans, but to empower municipalities to create their own plans and action programs and to support their implementation, city commitment is paramount. This includes the commitment and ability of the city to work closely with regional and national authorities as well as with multiple stakeholders in the public, private, and civic sectors.

Making the case for the support of these other actors should not be difficult because proactively planning for urban expansion is not only critical to achieving resilient urban growth, but is also necessary for sustaining both regional and national economic growth, as well as reducing economic disparities.

Experience to date shows that success depends on the political will of city authorities in collaboration with other levels of government to address the issues described above, and to build coalitions around these issues. In Colombia for example, support was gathered from the national government, the cities themselves, local landowners, and also the private sector.

### Short-term goals

1. **The emphasis should be on recruiting a public champion for this initiative. This person can be at the local, regional, or national level, but should have the authority to take meaningful actions and the power to compel or convince participants to hear the message of the program.**

2. **This will also require coordination at different levels of government. It is useful to identify stakeholders and get a sense of how realistic it is that they will take real action.**



### Questions to consider moving forward:

**What ministries or departments will be most impacted by future urban growth?**

**What level of government has the authority to take action on the various issues related to the growth projections? Is it at the line ministry level, or elsewhere?**

**What other growth projections exist and how were they developed? How are they being used?**

**Does the city have a history of completing projects? What has prevented plans from being implemented in the past?**

**Does the city have an existing master plan? Is it a living document, or is it commonly ignored?**

**What is the general attitude on the issue of urban growth? How friendly are political leaders toward new residents?**

**Is the political situation stable, or are leaders likely to change?**

**Does the city have the authority to raise municipal revenues, or is it dependent on central transfers?**

# Worksheet 2
## Administrative Boundaries - the Metropolitan Issue

As cities grow, they often expand beyond their official administrative and planning boundaries. If it has not already, a city will soon be expanding into areas outside its current administrative boundary. Planning boundaries should be generous enough to accommodate 30 years of urban expansion. Cities that have grown beyond their boundaries have many options for creating plans at the metropolitan level, as the examples from Colombia and Ethiopia show.

## Short-term goals

1. Study the urban growth projections showing current administrative boundaries.
2. In consultation with local leaders, determine possible strategies to expand the planning authority of the city – either through metropolitan governance, expansion of municipal boundaries, or the creation of a special zone.
3. Identify the political actors with the authority and the motivation to advance this project.

## Questions to consider moving forward:

Does the municipality have authority over city planning?

Has the physical city already expanded beyond its administrative boundaries?

Does the municipality have adequate land to accommodate the next 30 years of growth?

In which governments or municipalities will growth take place within in the next 30 years?

What are the needs of those governments, and how can urban expansion planning make the jobs of city leaders easier?

Does a framework for metropolitan-level planning already exist?

What government entities are in charge of municipal boundaries, and how do boundary changes occur?

EXAMPLE 1

### STAKES IN THE GROUND: BUILDING METROPOLITAN GOVERNANCE

In both Colombia and Ethiopia, the creation of an enlarged planning jurisdiction was done by collaborating with regional authorities and adjoining local governments. This allowed them to extend the planning authority of the city to cover the expansion area. In some cities, this has not been possible; whereas in other cities, this was possible because they figured out how to collaborate around this issue.

In Ethiopia, growth projections showed that most cities would eventually grow beyond their current administrative boundaries. In some cases this would take decades and in other cases it was only a few years away.

Ethiopia has a strong federalist system with decentralized municipalities and village governments, regional governments that provide oversight, and a central government. For reasons of technical capacity, it was clear that the best solution in Ethiopia was to simply expand the boundaries of the existing municipalities. To do this, the regional government convened a meeting of the stakeholders and described the general plan.

The plan met with the approval of local stakeholders, largely because urbanization is an on-the-ground reality in Ethiopia, and village governments lack the resources of the municipalities to address it. A solution was reached in which none of the villages lose any status or any territory, but the planning boundary of the municipality is being expanded to enable the provision of urban infrastructure across a larger area.

# Worksheet 3
## The Rights of Way Issue

The main mechanism for planning orderly urban expansion is the identification and protection of the rights of ways of the future arterial roads. Because of the win-win nature of the exercise - expanding access, creating new land for housing, and extending infrastructure and services - this was accomplished in both Colombia and in Ethiopia at little to no cost to the government, as described in Box 2. This required working in partnership with concerned actors in both the public and the private sector, as well as civil society. In the experience of cities in both Colombia and Ethiopia, resources were mobilized to support the cities in this process.

### Short-term goals

1 Gather information about the legal framework, financing mechanisms, land ownership regime, and tools.

2 Consider possible constituencies for a coalition.

### Questions to consider moving forward:

What legal tools are available for land acquisition for public purpose?

What government agency ordinarily acquires rights of ways for infrastructure?

What funding sources are available at the municipal level?

Does the municipality have the capacity to survey and mark the roads?

Who are the constituents of the project, and what are their needs?

Who are the major landowners in in the urban expansion zone?

How can informal settlements be upgraded as part of the process?

Does the city currently build roads? What is the capacity of the city for road construction and surveying?

What rules and laws are in place to protect the rights and ensure fair compensation of existing land owners or users?

EXAMPLE 2

**FINDING SUPPORT FOR NEW ROADS IN UNEXPECTED QUARTERS**

Securing the land for roads rights of ways seems like one of the most daunting challenges of the whole program. Fortunately, experiences from both Colombia and Ethiopia show that this need not be the case.

The experience in Colombia and Ethiopia proves that adding support even from stakeholders that in principle are against the process is perfectly possible.

Landowners in the urban expansion area of Valledupar were considered firmly opposed to the urban expansion plan. However, after examining the proposal, they fully agreed to it. In their view, avoiding uncertainty regarding the future of their lands is, by far, the best possible result they can expect.

After a pilot exercise of planting trees for marking the path of one of the future arterial roads in the expansion area of Valledupar, landowners have agreed to expand the exercise to all their lands, so the whole grid of arterial roads will be clearly marked on the ground.

Simultaneously, liens will be added to their ownership titles to secure the future rights of use of those paths, but their properties and its use will remain in their hands and, most importantly, the city will have no need of investing resources for buying the implied lands in the near future.

In Ethiopia, the government assumed that farmers in the expansion area would be against the proposal because it required them to cede land for development, in exchange for relatively meager compensation. To address this, the government held consultative meetings with farmers along the proposed routes and invited the heads of local villages as well.

The results were surprising – both the farmers and the village heads were in favor of the plan. For the village heads, it was clear to them that urbanization was already occurring and they were happy to be getting support in the form of infrastructure. For the farmers, the concern was more basic. They were happy to be connected to the city so that they could sell their goods there. In both cases, they were excited because proximity to a road raises the value of rural land as well as urban land.

# Worksheet 4
## The public open space issue

When planning where future development will take place, the complementary exercise is to identify and protect areas where development should not take place - areas of high environmental risk in the expansion zone, such as steep slopes, wetlands, riparian zones, and areas adjacent to rivers and lakes. Cities can use regulatory mechanisms, purchase, or other means to protect these areas from development. The exact strategy will depend on local conditions and local capacity. For example, in Hawassa, Ethiopia, a public-private partnership was used to secure and protect a greenbelt surrounding Lake Hawassa.

## Short-term goals

1 **Study legal and financial tools that are available to acquiring land in environmentally sensitive areas and for public open spaces.**

## Questions to consider moving forward:

**Does the municipality have a parks department? What agency manages parks and public open spaces?**

**Are there requirements for public open spaces in new developments?**

**What tools are available to prevent development for environmental reasons?**

**What resources are available to purchase or acquire land for these reasons?**

**Who are the stakeholders that have the power to take action on this issue?**

**How can the line ministries (water, power, etc) be engaged in this preservation effort?**

**How much land could the city government realistically protect? What is the capacity constraint?**

**What data is available on areas of natural hazard risk and ecological sensitivity?**

**Is there an open space masterplan? Does the city have targets or goals or mandates on the ratio of open space?**

EXAMPLE 3

### PROTECTING GREEN AREAS THROUGH INNOVATIVE PARTNERSHIPS

Preserving environmentally sensitive public open spaces represents an amazing opportunity for city leaders to leave a visible legacy for future generations. Some financial and political commitment is required, but the experiences of Valledupar, Colombia and Hawassa, Ethiopia show that both citizens and businesses react enthusiastically to these efforts.

The preservation of environmentally sensitive areas can be justified on a number of grounds, including preservation of watersheds, protection of endangered species, and provision of recreation areas for citizens. Because it is a broad-based agenda, technical and financial support can come from many sources including the regional and national government, the water agency, international cooperation agencies, development banks, and even local businesses.

In Hawassa and Valledupar, the proper strategy was a combination of public action in the form of designating protected area, and private/public action in the form of a parks alliance. This provided funds to actually develop the spaces as environmental preserves, ensuring that citizens could access them and grow to love them, and protecting them from squatting and incursion. This was all done at a minimal cost to the government – so far, besides the provision of some staff-working hours, these cities have used none of their budget resources for protecting environmental spaces in areas of urban expansion, and parks will soon be built that will protect lakes, rivers, and watersheds.

Valledupar, Colombia

EXAMPLE 4

### PLANNING FOR URBAN EXPANSION FROM THE BOTTOM UP AND THE TOP DOWN

The Urban Expansion Program completed a pilot exercise to provide technical support to five fast-growing intermediate cities in Colombia on their future expansion.

It is clear that the formulation of an action plan relies on solid evidence and updated inputs (such as maps or population data), but those plans can - and must - be formulated by the local authorities and municipal officials on their own: The mayors and senior planning staff of five Colombian cities drew the basic outlines of their own urban expansion plans during a workshop that lasted only three days. Two of those cities - Monteria and Valledupar - formulated their own action plans and immediately began to implement them very rapidly.

Those initial advances were presented at a regional meeting of the National Builders Association of Colombia, CAMACOL. This vested entity valued the importance of the proposal and invited the director of the Stern – NYU Urbanization Program as main speaker for their annual national congress. At this event, he met the Director of Departamento Nacional de Planeacion, DNP, the Ministry of Planning of Colombia.

Subsequently, DNP resolved to upscale the process to the national level. The NYU Urban Expansion Program assumed the role of the technical support entity for a national program named POT-M, executed by DNP and aimed to provide direct assistance to 100 cities -and indirectly support the whole universe of 1,120 cities and villages within the Country- towards the objective of elaborating and updating their local territorial development plans, incorporating in them proposals for their future urban expansion, among other innovations.

In Ethiopia, the initial pilot program engaged four cities. The local city governments were enthusiastic about the program and pushed for more support from the region and the center. The center responded, and scaled the work up to all secondary cities in the country. It is now a pillar of the national development plan, the Growth and Transformation Plan II, and will soon be integrated into the national urban planning policy.



# Worksheet 5
## Urban Growth 'Lens' for Initiative Depelopment

In any city with rapid urban growth, the anticipated future footprint and character of the city should be considered in the planning and development of any initiative, but in particular, those with the objective of promoting urban resilience.

**For cities which have access to urban growth analyses and projections, the following questions should be considered in the Resilience Strategy development process:**

**Do other projections exist? How were they developed? How do they compare to these projections? How are they currently being used?**

**Do all city departments use the same growth scenarios and data in their planning processes?**

**What levels of government should be aware of this new information on growth projections?**

**Can these growth projections integrate into or support existing statutory planning tools?**

**Which city shocks and stresses are most likely to be exacerbated by anticipated urban expansion?**

Which city shocks and stresses could be mitigated by proactive planning for urban expansion?

What city systems are most likely to be impacted by uncontrolled urban expansion?

Which existing initiatives underway in the city may be impacted by these projections?

## For cities which have access to urban growth analyses and projections, the following questions should be considered in the development of individual initiatives:

Does the initiative consider/address/service future areas of expansion? If so, how?

If not, what steps are necessary to integrate these data into the initiative design? Who needs to be involved?

Initiative risks: What are the ways in which anticipated urban expansion could negatively impact the initiative?

Initiative benefits: What are the ways in which anticipated urban expansion could positively impact the initiative?



City risks: If the initiative does not consider anticipated urban expansion, how does this increase the risk profile for the city and these future areas of the city?

City benefits: What can the initiative do to support the resilience of these future areas of the city?