

# Atlas of Urban Expansion

The 2016 Edition  
Volume 2: Blocks and Roads



Shlomo Angel, Patrick Lamson-Hall, Manuel Madrid,  
Alejandro M. Blei, and Jason Parent,

*with*

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NEW YORK UNIVERSITY

UN HABITAT  
FOR A BETTER URBAN FUTURE



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OF LAND POLICY

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Cover Image: The urban periphery of Kolkata, India (left) and Lima, Peru (right)

# CONTENTS

v	Foreward
1	Chapter 1: The Dynamics of Global Urban Expansion
9	Chapter 2: The Global Sample of 200 Cities, 1990-2014
21	Chapter 3: Understanding and Measuring Urban Layouts
41	Maps and Metric Pages for 200 Cities, 1990-2014
443	Maps and Metric Pages for 30 Cities, 1900-2014
506	Table 1: Blocks and Roads metrics for 200 cities: Pre-1990 and 1990-2014
530	Table 2: Blocks and Roads metrics for 30 cities for five periods: From the pre-1900 period to the 1990-2014 period
541	Acknowledgments
544	Image Credits
545	References
547	Index of Cities by Country and Region
551	About the Research Partnership



## FOREWARD

The *Atlas of Urban Expansion—2016 Edition* presents maps and measures of the recent, as well as the long-term, expansion of cities in an easily accessible format, providing authoritative data, information, and advice on current and emerging urbanization trends and conditions in cities the world over.

The study underlying the Atlas pushes forward the borders of the ‘science of cities’ using state-of-the-art research, satellite imagery, and novel analytical techniques to produce one of the most critical masses of urban indicators and metrics since Habitat II. Much like medical science before it, this book adopts cities as units of analysis and studies them together to discover patterns of similarities and differences among them.

UN-Habitat, the UN agency charged with overseeing, reporting, and advising on world urbanization trends and developments, has started to monitor these trends and developments with a new UN Global Sample of Cities. This sample—composed of 200 cities that statistically represent the urban world—was created, tested, and applied in a series of studies undertaken by a tri-partite collaboration between UN-Habitat, New York University, and the Lincoln Institute of Land Policy. The *Atlas of Urban Expansion—2016 Edition* is part of a broader research programme entitled *Monitoring Global Urban Expansion* that, in different products, provides maps and metrics on the growth and expansion of cities the world over, along with information regarding the quality of that expansion, the performance of the housing sector, and the state of regulatory regimes in the expansion areas of cities, the areas built between 1990 and 2014. All these studies provide globally representative evidence to substantiate and support the implementation, follow-up, and review of the city-related Sustainable Development Goals

and the New Urban Agenda.

The results of this study are quite shocking: urban growth is mostly taking place in an unplanned and disorderly manner, informality is becoming more common over time, cities are expanding their territories faster than their populations, residential densities are decreasing dramatically, public spaces and the lands allocated to streets and arterial roads are also in decline. All these are real, empirical facts, proving that the contemporary model of urbanization is becoming highly unsustainable.

The aim of this study is to provide informed analyses to policy makers, public officials, research administrators, and scientists for use in their decision-making processes. In this sense, the *Atlas of Urban Expansion* is part of the emerging ‘science of policy’ that is dedicated to the production of knowledge that best serves the public interest.

Joan Clos, Under-Secretary-General, United Nations  
Executive Director, UN-Habitat  
Nairobi, Kenya  
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The chronicle of global urbanization that follows offers a visually stunning example of how increasingly enhanced satellite technology might be used to guide the future growth of the world’s cities. The *Atlas of Urban Expansion—The 2016 Edition* underscores a basic truth: we’ll need to do a better job managing this planet of cities over the next decades than we did during the last few. The next half-century represents our last and only opportunity to get urbanization right. As we welcome hundreds of millions of people into our cities in the coming decades, we’ll need our best tools to craft them into the cities we, and the planet, need. The *Atlas* is one of those tools.

Buttressed by survey research that connects actions on the ground with the view from space, the *Atlas* begins to articulate a more informed narrative about the relationship between land policies and urban form. Only by understanding the quality of urban growth that has occurred up to this point, and the efficacy of our efforts to manage it, can we hope to make the necessary changes in urban practice that we need to build environmentally and fiscally sustainable places.

An urban observatory based on the approach demonstrated in the *Atlas* will play an important role in monitoring the implementation of the New Urban Agenda following Habitat III in Quito, Ecuador in October 2016. It will produce a more scientific, evidence-based record of city-building—holding us, and UN member states, accountable for delivering on our commitments to create the better urban future embodied in the New Urban Agenda and the Sustainable Development Goals. We will see whether cities



are on the right track by observing from space and on the ground if cities are getting better for all of the billions of citizens inhabiting them; and not just observing, but testing hypotheses regarding what we think will work, and finding out what does.

The Lincoln Institute of Land Policy was honored to begin this work with Shlomo “Solly” Angel and his team, establishing the original online Atlas of Urban Expansion and publishing two books, *The Atlas of Urban Expansion* and *Planet of Cities*. We celebrate this next stage of this important undertaking, in partnership with New York University and UN-Habitat: *The Atlas of Urban Expansion—2016 edition*.

George W. “Mac” McCarthy  
President and CEO, Lincoln Institute of Land Policy  
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The anti-sprawl agenda—decrying unplanned, low density, fragmented and non-compact urban expansion—has been guiding city planners for decades and we now find that the majority of cities have adopted land use plans that seek to contain their outward expansion in one form or another. This new finding raises a number of important questions: Has the expansion of cities—still propelled by urban population growth, by larger incomes that allow residents to consume more land, by inexpensive transport that allows them to travel to work over longer distances, and by resistance to the densification of built-up neighborhoods—slowed down, or even halted? Are average urban population densities increasing or decreasing? Where are the new urban areas, the areas developed during the past twenty-five years? Are these areas being properly laid out before development occurs? Are sufficient public works—be they local roads that organize neighborhoods or arterial roads that connect workers to the best jobs available to them—being put in place, or does the new urban periphery remain largely invisible to municipal officials, suffering from benign neglect?

In the past, these questions could only be answered, if at all, by studies that focused on one city in detail, on a few cities in one country, or on a few cities in a few countries, and concluding these studies with hints or implications for overall urban policy everywhere. Worse yet, researchers—attracted to cities with better data—often chose to study cities in more developed countries and then offer urban policy recipes for cities in less developed ones, where conditions—rapid rates of population growth, inadequate municipal or housing finance, and weak rule of law, for example—make the transfer of knowledge, policy prescriptions, and planning practices rather irrelevant. The observation that there will be eighteen or more new urban residents in less developed countries in the coming decades for each new urban

resident in more developed ones, makes such intellectual exports even less relevant.

The new *Atlas of Urban Expansion—2016 Edition* sheds new light on some of these questions by studying urban expansion and urban peripheries in cities the world over, be they in more developed or less developed countries, be they familiar megacities with many millions of residents or unfamiliar provincial towns with 100,000 inhabitants or more. With a new focus on a carefully chosen sample of 200 cities from the entire universe of cities—all 4,231 cities and metropolitan areas that had 100,000 people or more in 2010—it becomes possible to gather new knowledge about cities, knowledge that had thus far eluded us. The new Atlas explores a number of new data layers that pertain to this global sample of cities and that can now inform us about the universe of cities as a whole. It also offers us a new platform for studying more and more data layers in the future in a systematic manner, quickly becoming an effective tool for monitoring cities globally, a tool that will allow us to monitor the New Urban Agenda and the city-based Sustainable Development Goals in a rigorous and systematic manner in the years to come.

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## CHAPTER 1

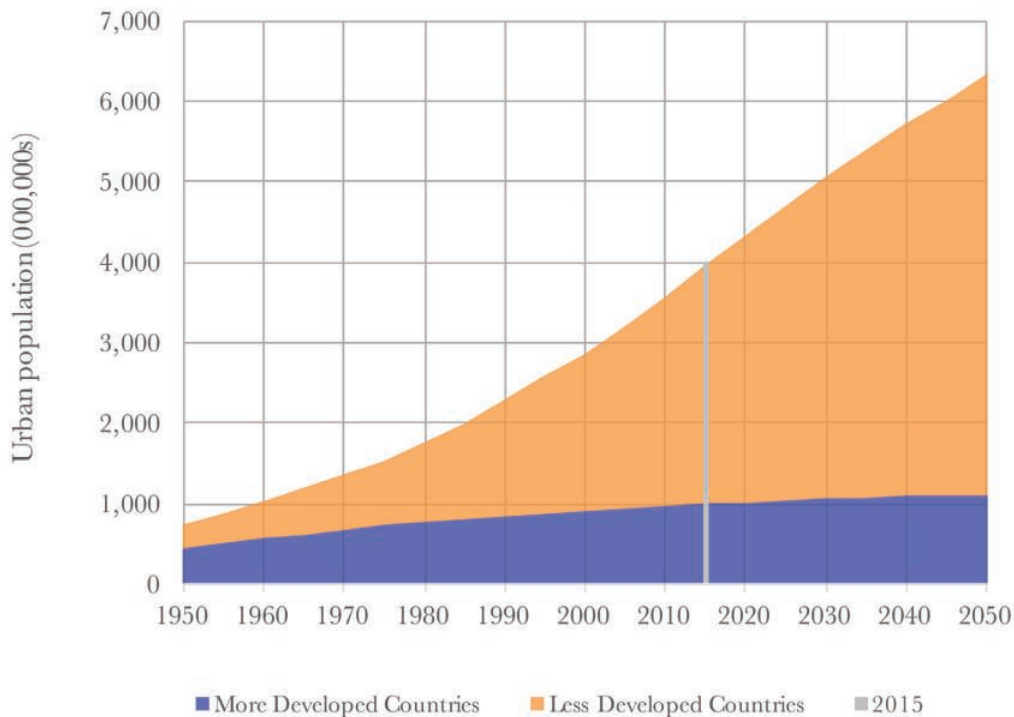
# The Dynamics of Global Urban Expansion

The *Atlas of Urban Expansion—The 2016 Edition* provides maps and estimates of the dimensions and attributes of urban expansion in a global sample of 200 cities. These maps and estimates should help us examine two sets of simple questions. First, what are the physical extents of urban areas on our planet today, what are their key attributes, and how and why are they changing over time? Second, how well configured are recently built urban peripheries, and how and why are layouts changing over time? Answers to these questions, provisional as they may be, may make us all less fearful of the rapid expansion of the urban peripheries of our cities, and hence better able to confront this expansion in a meaningful way. In large part, these are not theoretical questions but rather practical ones. Allowing cities to expand simply through the cumulative acts of their residents carries heavy costs. City residents need to engage—as responsible citizens acting together in their common interest—in ensuring that urban peripheries are laid out in a timely and pragmatic manner before they are occupied, as urban communities have done many times in the past. This is a seemingly simple task that, for one reason or another, we are failing at today—as an initial inspection of the Atlas clearly shows—with serious consequences for the productivity, inclusiveness, and sustainability of our cities in the decades to come.

Humanity is in the midst of its most ambitious project, the Urbanization Project—the gradual movement of people away from being closer to the land to being closer to each other. This project, which entails accommodating increasing numbers of people in cities, started in earnest at the beginning of the eighteenth century when less than 10% of the people lived in cities, and will be largely complete by the end of the twenty-first century when three-quarters or more of humanity will live in cities. By 1950, only 30% of the world’s population resided in cities. That share increased to 54% by 2015 and is now expected to increase to 66% by 2050. The world’s urban population is expected to increase from 4.0 billion in 2015 to 6.3 billion in 2050, and almost all of this growth is expected to take place in less developed countries (figure 1.1). Cities in more developed countries will add only 130 million people to their populations during this period. Cities in less developed countries will need to absorb 18 times that number, or close to 2.3 billion people, thereby increasing their total urban population of 3.0 billion in 2015 by 75% (United Nations Population Division 2014, files 2 and 3).

FIGURE 1.1:

**Increases in the urban population of more developed and less developed countries, 1950-2050**



When cities grow in population and income, they grow outwards and upwards (figure 1.2). The amount of outward expansion is typically underestimated and the quality of urban layouts in expansion areas is largely unknown. The population of cities in less developed countries doubled between 1990 and 2015, for example—the time period covered in this Atlas—and their urban extents increased on average

by a factor of 3.5. In parallel, the population of cities in more developed countries increased by a factor of 1.2 between 1990 and 2015; their urban extents increased by a factor of 1.8. The areas of cities are growing at a faster rate than their populations, in part because economic development results in more consumption in general and more land consumption per capita. In fact, average urban densities in less developed countries—3.3 times higher than densities in more developed countries in 1990—declined at an average annual rate of 2.1% between 1990 and 2015. In more developed countries, densities declined at 1.5% during this period. Urban land consumption per capita in these regions—the reciprocal of density—increased at identical rates.

FIGURE 1.2:

**The outward and upward growth of Panama City, Panama, 1930 – 2009**



Images via: Skyscraper City, Brian Gratwicke

These trends are likely to continue in one form or another. Between 2015 and 2050, urban extents in more developed countries can be expected to increase by a factor of 1.9 at the current rate of increase in land consumption, by a factor of 1.5 at half the current rate, and by a factor of 1.1 if land consumption per capita remains constant over time. During this period, urban extents in less developed countries will increase by a factor of 3.7 at the current rate of increase in land consumption, by a factor of 2.5 at half the current rate, and by a factor of 1.8 if land consumption remains constant.

By now, it should be clear that we cannot hope to slow down the urbanization process or to shift populations among cities. People are free to move within their own countries and their right to move is

enshrined in the Universal Declaration of Human Rights.<sup>1</sup> We know that population growth in cities large and small cannot be guided by policy effectively. But the conversion of land from rural to urban use is very much guided and influenced by policy.

When cities grow in population and wealth they expand. As cities expand, they need to convert and prepare lands for urban use. Stated as a broad policy goal, cities need adequate lands to accommodate their growing populations and these lands need to be affordable, properly serviced, and accessible to jobs to be of optimum use to their inhabitants. To meet this goal, cities need concerted public action—action that secures adequate lands for public works and public open spaces in advance of development, for example—that precedes and guides the operation of the free market on the urban fringe. In the absence of concerted public action, land and housing markets, efficient as they may be in theory, will fail to perform properly in practice.

Indeed, an initial inspection of urban layouts in the global sample of cities suggests that most of the residential fabric in the expansion areas of cities (1990–2014), especially in less developed countries, is unplanned and disorderly, taking place in defiance of municipal plans or regulations. It suggests that the share of urban lands that are laid out before occupation is declining over time; it also suggests that the share of the areas of cities within walking distance of arterial roads is declining as well, failing to connect urban peripheries effectively to metropolitan labor markets, making cities less productive, less inclusive, and less sustainable. In many cities, not enough land is allocated to local streets, segregating neighborhoods, minimizing redundancy in route selection, and creating serious bottlenecks, all of which impede the integration of the urban fringe into the city. The share of the land allocated to streets in newly urbanized areas is also declining. Substantial areas on the urban fringe consist of large city blocks and a very small share of intersections that are 4-way, which creates traffic jams and compromises walking and biking. In addition, the average block size is increasing over time.

Yet, there is reluctance to engage with the prospects of urban expansion, perhaps for perfectly understandable reasons. Many people believe that cities consume enough land as it is, and that all future construction should take place within existing urban footprints. Others oppose expansion to conserve municipal budgets, reduce commuting and its subsequent traffic congestion, help decaying central cities thrive again, conserve energy, reduce air pollution, or protect precious cultivated lands at the urban

<sup>1</sup> UN General Assembly, Universal Declaration of Human Rights, Article 13, 10 December 1948, 217 A (III), available at: <http://www.un.org/en/documents/udhr/> [accessed 13 August 2015].

fringe. This reluctance, reasonable as it may seem, keeps the reality of urban expansion in the dark and prevents us from addressing it in a clear and forthright manner.

Empirical data on actual urban expansion, its key attributes, and their change over time can provide a much-needed basis for understanding the global and historical contexts of urban expansion. Coupled with theories that could explain the underlying forces that propel and shape urban expansion, these data could provide the evidence needed to assess and address our concerns: that it would be very difficult, if not futile, to resist urban expansion in the face of rapid population growth; that ignoring it or denying it in the hope that it will not occur will simply allow expansion to take place unhindered and in a more costly and destructive way. Acquiring a better understanding of expansion will make it less formidable and more manageable. Making minimal yet effective preparations for it is the only responsible way to proceed.

The Atlas of Urban Expansion—2016 Edition focuses on the land converted to urban use in the past 25 years in a global representative sample of 200 cities. It provides maps and metric data on the spatial changes in these cities during this period with the aim of helping cities the world over make realistic plans in preparing lands for their future expansion. Increased global awareness is urgently needed to better understand and plan for this massive expansion of cities in coming decades. Local and national governments, civic institutions, international organizations, and concerned citizens will need to advocate for and implement minimum adequate preparations of lands for urban expansion. For example, it is vital that cities acquire the rights-of-way for arterial roads that can carry public transport and trunk infrastructure, and that cities protect selected open spaces on the urban periphery from encroachment in advance of the coming expansion. The sooner they act, the more effective and the less costly it will be.

It is important to note that the risks of making at least some preparations on the urban periphery for the expected expansion of cities are asymmetrical. The risk of failure to prepare adequate lands for expansion carries a high cost. It will likely result in disorderly development with a shortage of arterial roads that provide access to the job market from the urban periphery, with land supply bottlenecks that render housing unaffordable, with a shortage of public open spaces, and with damage to areas of high environmental risk. It will be next to impossible to secure lands for arterial roads or public open spaces in the expansion areas of cities after they have been occupied. The damage to the productivity, the inclusiveness, and the sustainability of these cities will have been done. In contrast, as long as investments in land preparation are kept to a minimum, the risk of preparing too much land for urban expansion and keeping it vacant or in agricultural use is rather low.

The main objective of this edition of the Atlas, like its previous 2012 edition, is to increase awareness

and help residents, policy makers, and researchers around the world come to terms with and prepare for the expected global urban expansion in the coming decades. This call for action is timely because, as noted earlier, the Urbanization Project now underway will be largely completed by the end of the twenty-first century. By then, it will be too late to turn the tide. If the land required for public works or public open spaces is not protected from encroachment before it is developed, it will be next to impossible to ensure the orderly development of cities to make them more productive, more inclusive, and more sustainable in the decades to come.

## MONITORING GLOBAL URBAN EXPANSION

The Atlas of Urban Expansion—2016 Edition is part of a long-term research project that includes a series of related publications and online resources and involves a number of partnerships and funding sources. The earlier phases of the research program, leading to the creation of this new atlas, culminated in the publication of *The Dynamics of Global Urban Expansion* (Angel et al., 2005), and *The Atlas of Urban Expansion* (Angel et al., 2012). The World Bank supported the research work for the former publication and the Lincoln Institute of Land Policy supported research for the latter, as well as its publication. Research for both publications focused on the collection and analysis of satellite imagery and population data for a global sample of 120 cities in two time periods, 1990 and 2000. Research for the *Atlas of Urban Expansion* also included collecting, geo-referencing, and digitizing the historical maps of the built-up areas of cities at 20–25 year intervals for the period from 1800 to 2000 for a representative sub-group of 30 cities from the 120-city sample. The policy implications and the general lessons drawn from these data collection and analysis efforts were summarized in a policy focus report entitled *Making Room for a Planet of Cities* (Angel et al., 2011) and elaborated upon in the book *Planet of Cities* (Angel, S., 2012).

The NYU Urban Expansion Program at the Marron Institute of Urban Management and the Stern School of Business at New York University, in partnership with the United Nations Human Settlements Programme (UN-Habitat) and the Lincoln Institute of Land Policy, initiated a multiphase research effort in 2014 to expand the monitoring of the quantitative and qualitative aspects of global urban expansion to more cities, more time periods, and more attributes. The monitoring program is now in advanced stages of completion of three interdependent phases. A number of new phases, requiring new partners and new sources of funding, are in earlier stages of development.

Phase I—the mapping and measurement of global urban expansion—focused on mapping and measuring urban extent, average built-up area density, fragmentation of the built-up area of the city by open spaces, and compactness of the geographical shapes of urban extents in the global sample of 200



cities in three time periods: circa 1990, circa 2000, and circa 2014. This phase required the classification and analysis of medium-resolution Landsat satellite imagery as well as the analysis of population data associated with the enumeration zones that contain the built-up areas of these cities. The key output of this phase is the Atlas of Urban Expansion—2016 Edition, Volume 1: Areas and Densities. This volume will be available online ([www.atlasofurbanexpansion.org](http://www.atlasofurbanexpansion.org)) as an open source of data for all interested parties worldwide, including a PDF version, spreadsheets, and GIS files, all available for download. This phase will include a number of technical reports and publications focused on findings in peer-reviewed journals and other venues.

Phase II—the mapping and measurement of urban layouts—focused on the recently-built urban peripheries (areas built between 1990 and 2014) in the global sample of 200 cities; urban areas built before 1990 compared to areas built between 1990 and 2014 in cities in the global sample; and city areas built in five different time periods (before 1900, between 1900 and 1930, between 1930 and 1960, between 1960 and 1990, and between 1990 and 2014) in a representative subgroup of 30 cities from the global sample. This phase relied on digitizing and analyzing a random sample of 10-hectare locales using high-resolution Bing and Google Earth imagery. This analysis yielded information and metrics on different attributes of urban layouts that could be observed from space: the share of residential areas that were laid out informally, formally, or not at all; the share of the land that was laid out in rectangular grids; the share of the land in streets; the average width of streets; the average size of blocks; the density of 3-way and 4-way intersections; and the share of the built-up area within walking distance of arterial roads, among others. The key output of this phase is the Atlas of Urban Expansion—2016 Edition, Volume 2: Blocks and Roads. This volume will also be available online ([www.atlasofurbanexpansion.org](http://www.atlasofurbanexpansion.org)) as an open source of data for all interested parties worldwide, including a PDF version, spreadsheets, and GIS files, all available for download. This phase will include a number of technical reports and publications focused on findings in peer-reviewed journals and other venues.

Phase III—The Land and Housing Survey in a Global Sample of Cities—included two separate survey instruments in ten languages. The first, The Survey of the Regulatory Regime Governing Land and Housing, captured land ownership patterns, land-use planning practices, and the development of new subdivisions in the expansion areas of cities. The second, The Affordability Survey, measured the prices as well as the key attributes of different types of residential plots, houses, and apartments available for sale or rent in the 200 cities in the global sample and compared them to household incomes in these cities. This phase required the engagement of city-based researchers in the 200 cities in the global sample, as well as regional coordinators based at New York University. The two surveys are now

complete. This phase will also include a number of technical reports and publications focused on the findings in peer-reviewed journals and other venues, but the results of this survey are not included in the Atlas.

Selected findings from all three phases were used by the three partners—UN- Habitat, New York University, and the Lincoln Institute of Land Policy—at Habitat III: United Nations Conference on Housing and Sustainable Urban Development that took place in Quito, Ecuador, from the 17th to the 20th of October 17–20, 2016, and were also presented at Habitat III, both at selected events at Habitat III and in audiovisual displays at conference venues throughout the conference.

## CHAPTER 2

# The Global Sample of Cities

### **THE 2010 UNIVERSE OF 4,231 CITIES**

The study of global urbanization trends from the perspective of countries in which national censuses differentiate between urban and rural populations yields important insights and policy prescriptions as we have seen in the previous chapter. Yet these results are limited because national urban population statistics lump all cities, large and small, together. We can advance our knowledge and understanding of global urbanization attributes and trends if we focus our attention on all the cities in the world, rather than on all countries, as units of analysis.

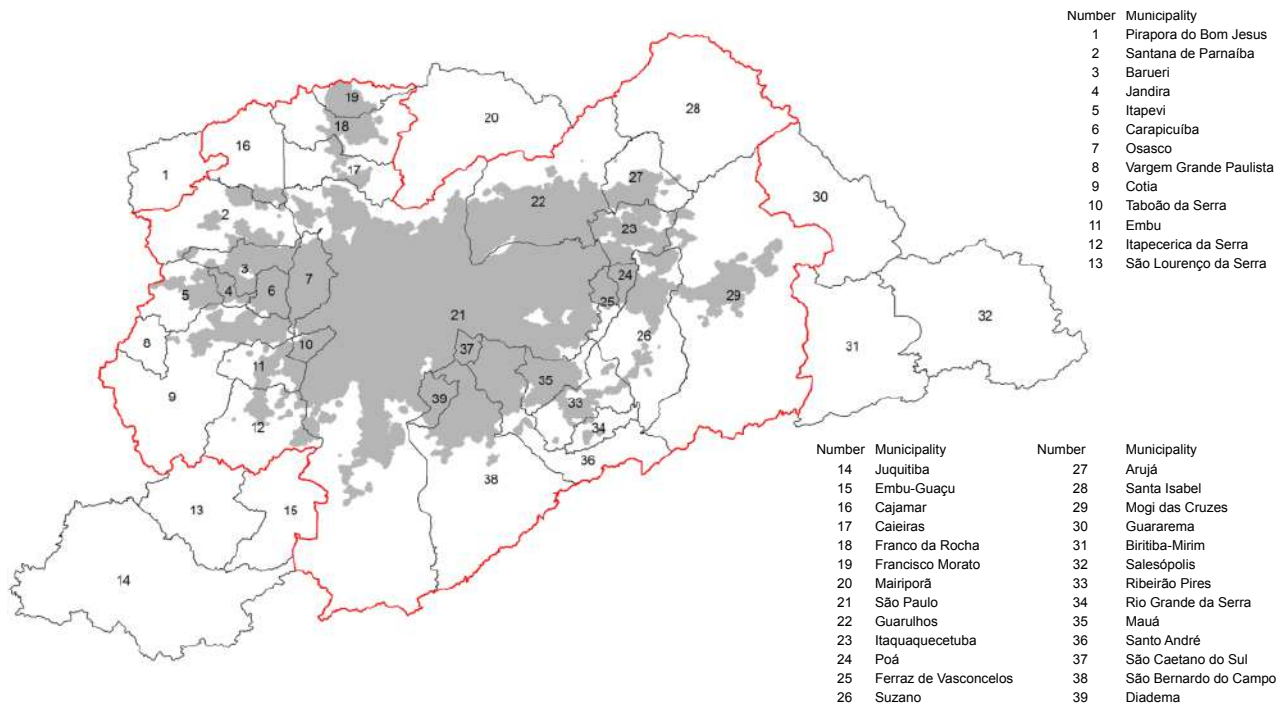
Identifying the universe of all cities in a given year requires a definition of what constitutes a city. Since cities have been defined along many different dimensions, any such definition involves a choice, or rather a number of choices. Cities can be distinguished from hamlets, villages, or towns by population thresholds; they can be identified by their historical centers, their municipal boundaries, the commuting patterns of their workers, or their geographical extent (Parr, 2007). They can also be identified by their local newspapers or by their local sports teams. We chose to identify cities first by a population threshold and then by their geographical extent. To ensure that the settlements we defined were indeed cities, we

chose a population threshold of 100,000, a threshold that is above the thresholds used to define what constitutes a city in all countries except China.

Identifying cities by their geographical extent follows the Roman tradition of defining a city by the edge of its built-up area, its *extrema tectorum*. That geographical extent is typically associated with a city name, the name of its largest and most prominent historical center. The built-up areas of municipalities—the governmental units associated with well-defined administrative boundaries—often merge into each other over time, as do their labor markets, as more and more people live in one municipality and commute to work in another. We define cities as agglomerations of contiguous built-up areas (and the open spaces in and around them) that may contain a large number of municipalities but, more often than not, constitute a single labor market. We consider the metropolitan region of São Paulo, Brazil, for example, to be a single city even though it contains no fewer than 39 municipalities (figure 2.1). We define São Paulo as a city by its urban edge, its *extrema tectorum*, which can be derived from freely available satellite imagery. In 2010, there were 156 free standing cities of 100,000 people or more in Brazil that had their own contiguous built-up areas made up of one or more municipalities. In contrast, there were no fewer than 5,570 municipalities in the country at that time, defined as administrative subdivisions of its national territory.

FIGURE 2.1:

**The urban extent of São Paulo, Brazil (grey), showing the administrative boundaries of the 39 municipalities that constituted its metropolitan region. The urban extent of São Paulo is contained in 31 municipalities (bounded in a red line).**



Using the population threshold and geographical extent definition of a city enables us to construct an entire universe of cities for the world at large. Other, possibly more precise, definitions that use information on commuting patterns or on small-area population densities cannot be used to create such a universe of cities because those data are not universally available for all cities in all countries.

Ideally, the population of a city in the universe, using our definition of population threshold and geographical extent, is the share of the population within the geographical area of the city in all the administrative (or census enumeration) zones that encompass that extent—identifiable in satellite imagery—excluding the population of villages and towns within those zones that are not part of its extent. These population estimates can, in principle, be constructed from available population data for census enumeration zones for dates roughly corresponding to 1990, 2000, and 2010. They require population data for well-defined enumeration zones, as well as rules for allocating the population of a given zone among its urban and rural built-up areas. We used this more demanding method of obtaining population estimates for the urban extent of all 200 cities in the global sample of cities described here.

For the remaining cities in the universe, we used a number of data sources that provide information on their populations, associating population with city names and coordinates without associating a specific set of enumeration zones with those names. Notably, the most useful sources on information on city populations were the United Nations Population Division (for cities of 300,000 or more) and the website [www.citypopulation.de](http://www.citypopulation.de) (Brinkhoff, 2016). Both sources had been consulted extensively to construct the 2010 universe of cities. That said, neither source could provide precise data on Chinese cities. According to the official definition of a city in China, the country had no more than 662 cities in 2010. We have identified a total of 1,029 settlements in China that had contiguous geographical extents of substantial area as well as populations of 100,000 or more in 2010. Their populations were estimated from data we obtained from the Chinese Academy of Sciences.

All the cities that were found to contain 100,000 or more people in 2010 were identified on Google Earth to determine whether they were part of larger urban agglomerations. Urban agglomerations were identified and listed in the universe by a single city name. Only cities that were not part of larger, named urban agglomerations were listed as cities in the universe.

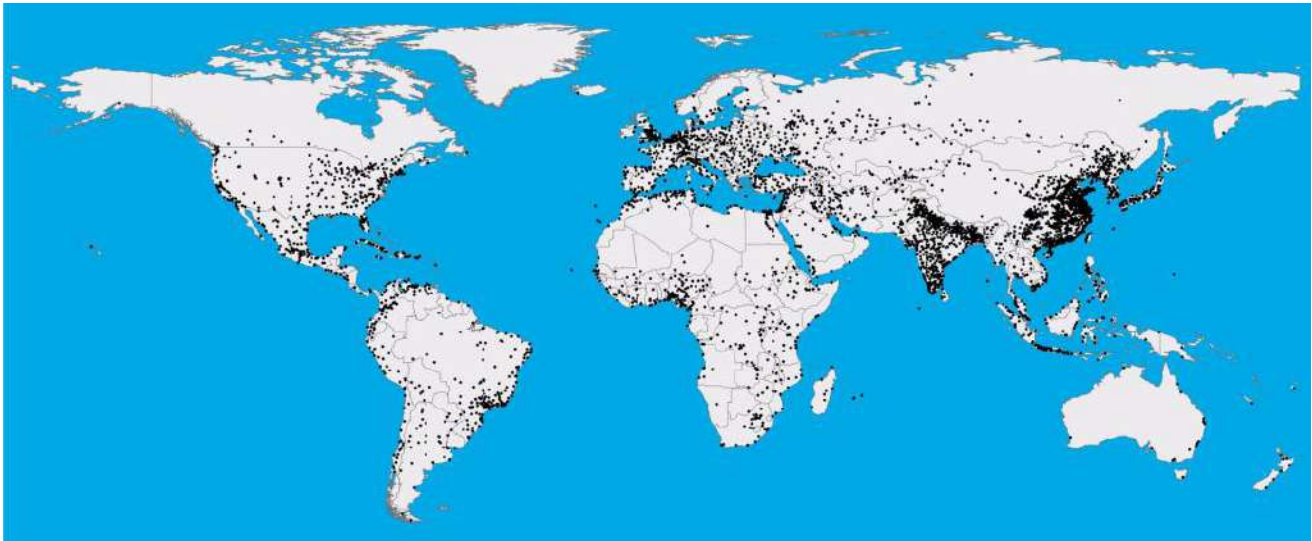
The 2010 universe of cities is the third universe of cities constructed by the authors and their colleagues. The first universe of cities, described in *The Dynamics of Global Urban Expansion* (Angel, S. et al., 2005), identified a total of 3,943 cities with 100,000 or more residents in 2000. The second universe of cities, described in the *Atlas of Urban Expansion* (Angel, S., et al., 2012), identified a total of 3,646 cities that had 100,000 or more people in 2000. The 2010 universe of cities shown in figure 2.2 contains a total

of 4,231 free-standing cities in 172 countries or territories that had 100,000 or more people that year.

The universe of cities provides us with a new and powerful tool for analyzing urbanization patterns, attributes, and trends on a global scale. It makes it possible for us to assign individual values to cities in the universe—such as populations or population growth rates, for example—and then to study variations in these values among regions, income groups, or population sizes. However, the greatest and most promising value of having a universe of cities is in taking a stratified sample of cities from this universe and obtaining rigorous results from this sample and generalizing these results to the universe of cities as a whole. The global sample of 200 cities, drawn from the 2010 universe of cities, is the focus of this Atlas.

FIGURE 2.2:

**The 2010 Universe of Cities, comprising a total of 4,231 cities that had 100,000 people or more in 2010.**



## THE GLOBAL SAMPLE OF CITIES

Beyond the names of cities, their locations, and their estimated populations at several points in time, no quantitative information pertaining to the universe of cities is available at this time. We can learn more about these cities by studying a carefully constructed sample from this universe selected with the goal of obtaining quantitative measures that can be generalized to the entire universe. For this edition of the Atlas, we selected a global sample of 200 cities (see figure 2.1). The sample was stratified so as to be more representative of this universe—namely, to ensure that cities of all sizes, from all regions, and from large and small countries were well-represented. The sample was constructed with three strata in mind:

*World Regions:* Cities were selected at random from eight world regions in proportion to the urban population in each region. The eight regions were:

- (1) East Asia and the Pacific;

- (2) Southeast Asia;
- (3) South and Central Asia;
- (4) Western Asia and North Africa;
- (5) Sub-Saharan Africa;
- (6) Latin America and the Caribbean;
- (7) Europe and Japan; and
- (8) Land-Rich Developed Countries.

*City Population Size:* An approximately equal number of cities were selected at random from four ranges of population size, each range containing one-quarter of the total population of the cities in the universe. The population ranges were:

- (1) 100,000 - 427,000;
- (2) 427,001 - 1,570,000;
- (3) 1,570,001 - 5,715,000; and
- (4) 5,715,001 and above.

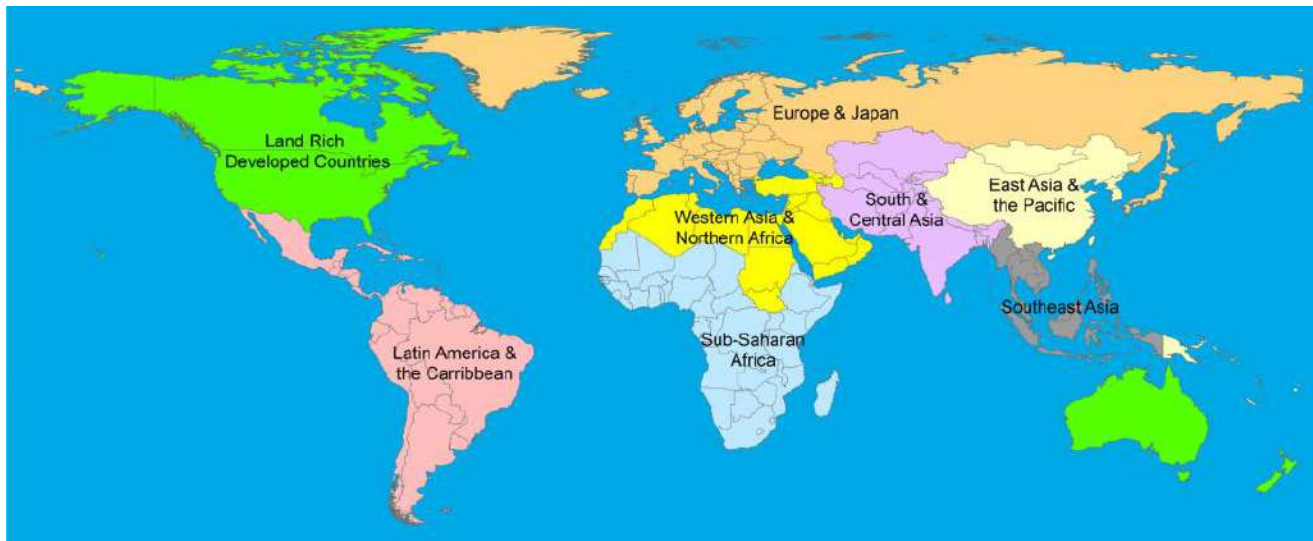
*Number of Cities in the Country:* Cities were selected at random from three country groups identified by the number of cities in the country in proportion to the urban population in each group. The three groups were:

- (1) 1 - 9 cities;
- (2) 10 - 19 cities; and
- (3) 20 or more cities.

The eight world regions largely followed the divisions presented in the United Nations' *World Urbanization Prospects* (U.N. Population Division, 2014), with minor changes. The United Nations divided countries into two mega-regions: more developed countries and less developed countries. The more developed countries mega-region included North America (U.S. and Canada), Australia and New Zealand, Europe, and Japan. The less developed countries mega-region included all other countries, even though some of them, (e.g. Singapore), had higher per capita income than many more developed countries. The more developed countries mega-region was divided in two to reflect different patterns of urban expansion: (1) Europe and Japan, with lower levels of arable land per person and typically higher urban densities; and (2) land-rich developed countries (U.S., Canada, Australia, and New Zealand) with higher levels of arable land per person and typically lower urban densities. The less developed countries

mega-region was divided into six regions: (1) East Asia and the Pacific, (2) Southeast Asia, (3) South and Central Asia, (4) Western Asia and North Africa, (5) Sub-Saharan Africa, and (6) Latin America and the Caribbean (see figure 2.3). To ensure that there were a minimum number of cities representing each of the eight world regions, we over-sampled cities from the smaller regions—Southeast Asia and Western Asia and North Africa—and under-sampled cities from the largest region, East Asia and the Pacific.

FIGURE 2.3:  
**The assignment of countries into eight world regions.**



The assignment of cities in the universe of cities to four population-size categories entailed ranking the cities in the universe in increasing order of their populations and then dividing them into four ranges—small, medium, large, and very large cities—so that each of the four ranges contained approximately the same total population. The universe of cities had a total population of 2.49 billion in 2010. The four population-size ranges had approximately 622 million people in each range. This division into ranges resulted in a highly skewed distribution of the number of cities in each range: there were 3,150 small cities in the first range, 814 medium-sized cities in the second, 227 large cities in the third, and only 54 very large cities in the fourth. Each range contained approximately one-quarter of the number of cities in the preceding range, yet each range contained the same population total. Sampling at random from the universe as a whole would have resulted in three-quarters of the cities in the sample being small cities. Instead, we opted to under-sample small cities and to over-sample larger ones, drawing approximately the same number of cities from each city-size range. More specifically, we drew 56 small cities, 50 medium-sized ones, 54 large ones, and 40 very large ones from the universe. As a result of this decision, the 200 cities in the sample—while constituting only 4.7% of the total number of cities in the universe—contained 29% of the population of the universe.



Finally, the assignment of cities to one of three groups, each pertaining to the number of cities in the country, was important to ensure that countries with fewer cities were adequately represented in the sample. Indeed, less than 7% of the population of the universe of cities was found to be in countries with 1–9 cities and less than 6% in countries with 10–19 cities. Almost 88% were in countries with 20 or more cities. Cities in the first two groups would be under-represented if the sample were drawn at random from the universe as a whole. To correct this bias, we sampled cities from countries with fewer cities in slightly higher proportion than the share of their population in the universe of cities. As a result, the sample contains cities from as many as 79 countries.

Summary values for the three strata comparing the cities in the universe and the cities in the sample are given in table 2.1. The location of cities in the sample is shown in figure 2.4.

TABLE 2.1:  
**A comparison of the universe of cities and the sample of cities, stratified according to world regions, city population ranges, and number-of-cities-in-the-country groups.**

Categories in the Three Strata		Universe of Cities				Sample of Cities				Sample/Universe Ratios	
Category ID Number	Categories	Number of Cities in this Category in Universe	Share of Cities in this Category in Universe	Population in this Category in Universe	Share of Population in this Category in Universe	Number of Cities in this Category in Sample	Share of Cities in this Category in Sample	Population in this Category in Sample	Share of Population in this Category in Sample	Ratio of Cities in this Category in Sample and Universe	Ratio of Population in this Category in Sample and Universe
<b>World Regions</b>											
1	East Asia and the Pacific (EAP)	1,081	26%	652,310,754	26%	42	21%	174,414,516	24%	4%	27%
2	Southeast Asia (SEA)	229	5%	143,551,770	6%	15	8%	53,516,916	7%	7%	37%
3	South and Central Asia (SCA)	693	16%	387,180,823	16%	32	16%	115,807,394	16%	5%	30%
4	Western Asia and North Africa (WANA)	301	7%	176,496,133	7%	15	8%	57,446,118	8%	5%	33%
5	Sub-Saharan Africa (SSA)	329	8%	186,702,647	8%	18	9%	51,003,826	7%	5%	27%
6	Latin America and the Caribbean (LAC)	483	11%	310,444,386	12%	26	13%	89,709,870	12%	5%	29%
7	Europe and Japan (E&J)	781	18%	389,298,026	16%	34	17%	119,848,657	16%	4%	31%
8	Land-Rich Developed Countries (LRDC)	334	8%	242,563,694	10%	18	9%	70,259,700	10%	5%	29%
<b>Grand Total</b>		<b>4,231</b>	<b>100%</b>	<b>2,488,548,233</b>	<b>100%</b>	<b>200</b>	<b>100%</b>	<b>732,006,997</b>	<b>100%</b>	<b>5%</b>	<b>29%</b>
<b>City Population Ranges</b>											
1	100,000 - 427,000	3,143	74%	622,020,086	25%	59	30%	14,185,408	2%	2%	2%
2	427,001 - 1,570,000	811	19%	621,981,767	25%	47	24%	38,611,298	5%	6%	6%
3	1,570,001 - 5,715,000	225	5%	617,006,284	25%	54	27%	173,340,491	24%	24%	28%
4	5,715,001+	52	1%	627,540,096	25%	40	20%	505,869,800	69%	77%	81%
<b>Grand Total</b>		<b>4,231</b>	<b>100%</b>	<b>2,488,548,233</b>	<b>100%</b>	<b>200</b>	<b>100%</b>	<b>732,006,997</b>	<b>100%</b>	<b>5%</b>	<b>29%</b>
<b>Number-of-Cities-in-the-Country Groups</b>											
1	1-9	368	9%	183,410,690	7%	24	12%	38,599,273	5%	7%	21%
2	10-19	306	7%	160,113,938	6%	17	9%	41,477,283	6%	6%	26%
3	20 +	3,557	84%	2,145,023,605	86%	159	80%	651,930,441	89%	4%	30%
<b>Grand Total</b>		<b>4,231</b>	<b>100%</b>	<b>2,488,548,233</b>	<b>100%</b>	<b>200</b>	<b>100%</b>	<b>732,006,997</b>	<b>100%</b>	<b>5%</b>	<b>29%</b>

The new global sample of 200 cities is different in some respects from the sample of 120 cities used in the two earlier publications, *The Dynamics of Global Urban Expansion* (Angel et al., 2005) and *Atlas of Urban Expansion* (Angel et al., 2012). The first two strata, eight world regions, and four city population size ranges used in the earlier sample were maintained. However, the earlier sample used countries' Gross Domestic Product (GDP) per capita as a stratum. This was abandoned because of the strong correlation between the regional affiliation of cities in the sample and their countries' GDP per capita. The number

of cities in the country was introduced instead as a third stratum for the reasons explained here. Cities in the earlier sample that fit into the new sampling framework were retained in the new sample. Other cities were dropped because they were parts of larger metropolitan agglomerations, they had less than 100,000 people in 2010, or they did not represent enough similar cities in the universe. Altogether, 96 cities from the earlier sample of 120 cities are in the new sample. The earlier classifications of the satellite imagery of these cities were revisited, completed, and corrected where necessary. New metrics were derived for them as well, in line with the revised definitions of the metrics in this edition of the Atlas described in detail in the following chapter.

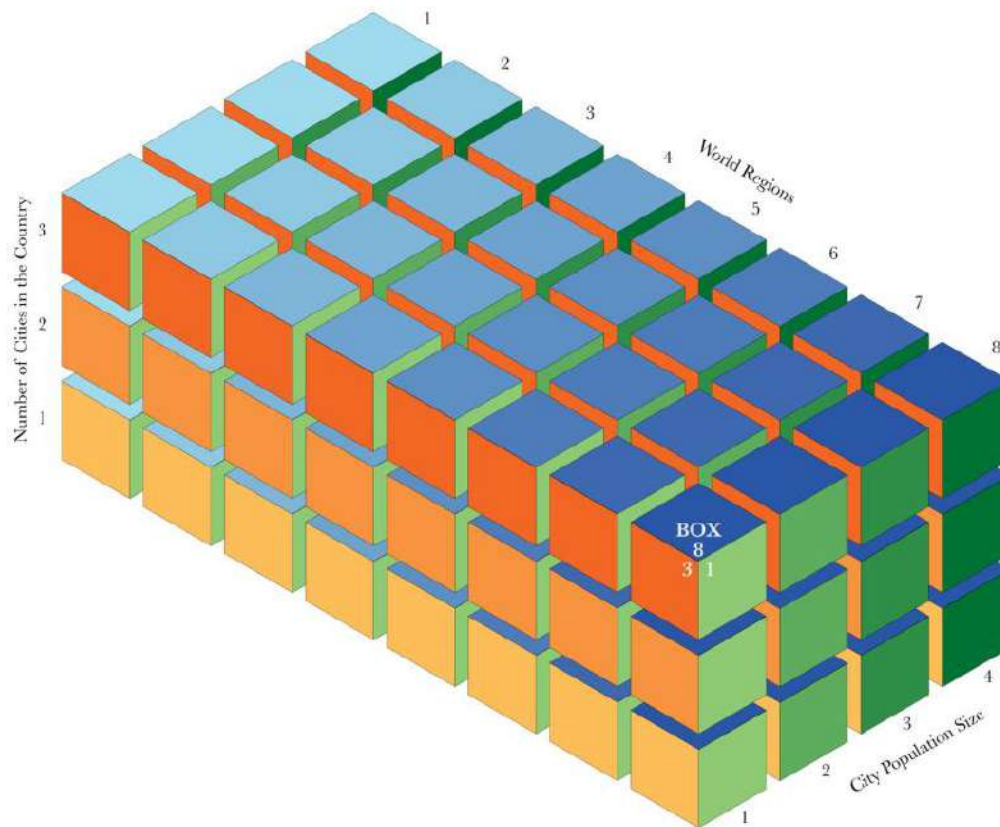
FIGURE 2.4:  
**The global sample of 200 cities.**



The simplest way to envision the stratified sampling process, given the three strata chosen in this edition of the Atlas, is to envision these strata as dimensions: world regions along the x-axis, city population size ranges along the y-axis, and the number of cities in the country groups along the z-axis. Each city in the universe (or in the sample, for that matter) could then be seen as belonging to a box in three-dimensional space, identified by a three-digit number, its world region (1–8), its city population size range (1–4), and its number of cities in the country group (1–3) (see figure 2.5). Halifax, Canada, for example, belongs to box 813. It is located in Region 8 (land-rich developed countries); it had 390,000 people in 2010, assigning it to city population size range 1; and Canada had 34 cities in the 2010 universe of cities, assigning Halifax to number of cities in the country group 3 (20+ cities in the country). Box 813 contains all 210 cities in the universe that were located in land-rich developed countries, that had less than 427,000 people in 2010, and that were in countries with 20 cities or more.

FIGURE 2.5:

**The sampling framework comprising 96 boxes, each box corresponding to one of eight world regions, one of four city-population-size ranges, and one of three number-of-cities-in-the-country groups ( $8 \times 4 \times 3 = 96$ ).**



Of the 96 boxes ( $8 \times 4 \times 3 = 96$ ) shown in figure 2.5, only 76 had cities in the universe of cities. The rest were empty. Of these, 61 boxes had cities in the sample. The remaining 15 boxes that are not represented by cities in the sample contain 114 cities in the universe with a total population of 63.2 million, comprising 3% of the cities and 3% the population of the universe in 2010. These cities were assigned to “nearby” boxes, boxes in the same region with cities with similar population size and similar number of cities in the country assignments, to be represented by the sample as well. In this manner, all the cities in the universe were represented by cities in the sample.

The process of selecting cities in this framework consisted of picking cities at random from each box in rough proportion to the total population in each box. For example, four cities were selected at random to represent box 813: Victoria, British Columbia in Canada, and Gainesville FL, Killeen, TX, and Modesto, CA, in the United States. As there were 210 cities in the universe in this box, one city in the sample represented some 50 cities in the box 813. In parallel, as there were 44.9 million people in the cities in the universe in this box and 1.1 million people in the four sample cities in the box, every urban dweller in the cities in the sample in box 813 represented 40 urban dwellers in the universe of

cities in this box.

The values 50 and 40 in this example can be thought of as city-based and population-based weights respectively. They can be used to obtain weighted averages for the universe from values obtained for the sample. If a city in a given box represents 50 cities, then any value associated with it—say, its population growth rate between 2000 and 2010—is given a city-based weight of 50, while another city in the sample representing, say, only 27 cities is given a city-based weight of 27. Similarly, if the population of a sampled city in a given box represents a population 40 times as large, then each resident in this city is given a population-based weight of 40.

The population growth rates for these cities were not used as a stratum in the creation of the sample. The universe of cities contains data on the population of each city for three time periods, 1990, 2000, and 2010. We could use this information to test whether the sample was representative of the universe. Indeed, when we compared the average population growth rates between 2000 and 2010 in all the cities in the universe with both the city-based and population-based weighted averages of the cities in the sample, we found that they were not different from each other at the 95% confidence level. This assured us that the global sample of cities was indeed representative of the universe of cities.

Using these city-based and population-based weights, we can now answer new questions about the universe of cities as a whole. For example, we determined that average densities in the universe declined significantly between 1990 and 2000, and continued to decline—albeit at a significantly lower rate—between 2000 and 2014. We also determined, for example, that the average share of area that was laid out before it was occupied in the expansion zones of cities in the universe—areas converted to urban use between 1990 and 2014—was significantly lower than it was in areas developed before 1990. In other words, the global sample of cities makes it possible, for the first time, to monitor global urban expansion in a consistent and rigorous manner. Needless to say, it can also be used to monitor other urban attributes of interest, from housing affordability to air quality, from Internet use to access to public open spaces, and from the quality of drinking water to the availability of public transport in the sample of cities to obtain valid, rigorous, comparative data—data that was never available before—on the universe of cities as a whole.

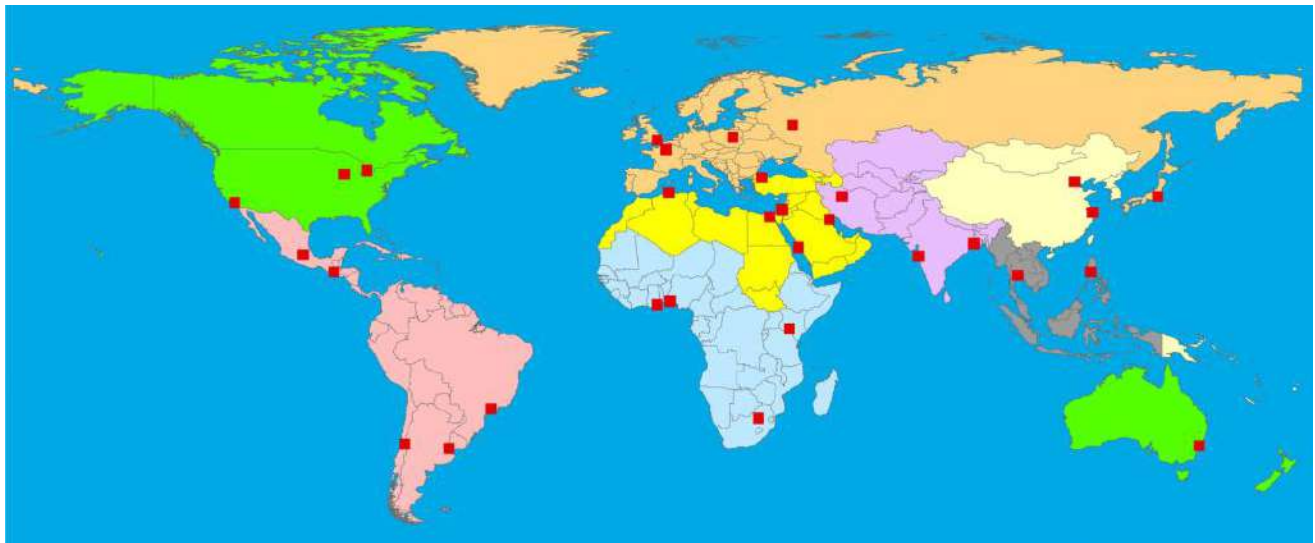
## **THE REPRESENTATIVE GROUP OF 30 CITIES**

A representative group of 30 cities, including 27 from the global sample of 200 cities, was created to explore long-term changes in urban expansion, urban population density, and the attributes of urban

layouts from circa 1800 until circa 2014. The selection of cities for this historical analysis was guided by two factors: their regional distribution and the availability of historic maps depicting their built-up areas at 20- to 25-year intervals. Three cities—Jeddah, Saudi Arabia, Nairobi, Kenya, and Kuwait City, Kuwait—were added to the 27 representative cities from the global sample to ensure a balanced sub-regional distribution of cities (figure 2.6).

FIGURE 2.6:

**The location of the 30 cities in the representative group of cities where urban expansion was mapped and animated between 1800 and 2014.**



To be included in this representative group, the relevant maps of a given city needed to depict the totality of the urban extent of the city for time periods some 20–25 years apart and have sufficiently clear landmarks to be georeferenced to Google Earth imagery. This geo-referencing process aligned the maps to a common coordinate system, thereby allowing them to be accurately compared to each other. A complete list of the map references containing the original maps used to construct the composite maps for each city is available in the earlier *Atlas of Urban Expansion* (Angel, S. et al., 2012).

The maps are digitized composite maps of the urban extent of a given city on different dates. A total of 261 maps were used to create the composite maps for the 30 cities in this representative sample, an average of 8.7 maps per city approximately  $19 \pm 1$  years apart. The composite maps for each city with their associated populations, densities, and changes over time appear in the 2012 edition of the *Atlas of Urban Expansion*. They were subsequently animated to show the long-term expansion of these cities. These animations can be seen on the Atlas website at [www.atlasofurbanexpansion.org](http://www.atlasofurbanexpansion.org).

These maps were also used in Volume 2 of the Atlas to study the changes in the attributes of urban extents over time. We divided the urban extents of the 30 cities in this representative sample to areas

that were built-up in five time periods: (1) Before ~1990, (2) between ~1900 and ~1930, (3) between ~1930 and ~1960, (4) between ~1960 and ~1990, and (5) between ~1990 and 2014. We then studied the attributes of the urban fabric and calculated the metrics associated with them in each one of these areas for each city. We used these metrics to calculate average values of each attribute—say, the share of the built-up area in streets or the average block size—in each one of the five time periods, so as to observe their changes over a century or more.

## CHAPTER 3

# Understanding and Measuring Urban Layouts

### INTRODUCTION

*Volume 1: Areas and Densities* focused on the physical extents of urban areas on our planet today, their key attributes, and their change over time. Its main thrust was to alert readers—be they policy makers, public officials, academics, civic groups, or interested citizens—to the *quantity* of land converted to urban use and its relation to urban population growth, as well as to key attributes of the resulting physical extent of cities—density, fragmentation, and compactness—and their change over time. As the maps and metrics in Volume 1 clearly illustrate, the majority of cities expand outwards at a faster rate than the population they accommodate. While higher rates of land consumption per capita are largely accounted for by economic growth, by the availability of inexpensive transport, and by the plentitude of land for urban expansion, they may still be a cause for concern, calling for public intervention in urban real estate markets. Slowing down the existing rates of urban expansion would require effective strategies to facilitate the densification of existing urban extents, both by removing regulatory barriers and by addressing local community resistance to densification in its various forms. It may entail, among other things, allowing and promoting smaller dwelling units, smaller plots, higher plot coverage, taller

buildings, the transformation of more land to residential use, and the infill of vacant open spaces, both public and private. It may also entail facilitating higher-density development in the expansion areas of cities, permitting, among other things, the construction of multi-family dwellings and small-lot townhouses, and the designation of more lands for residential use.

However, regardless of whether the rapid rate of urban expansion requires public intervention to slow it down or not, there is a second and separate concern that needs to be addressed: None of the attributes described and measured in Volume 1 informs us about the physical layouts of urban areas or about their change over time. It may well be that cities are expanding in an orderly manner—ensuring that they are as productive, as inclusive, and as sustainable as can be—and if they indeed are, then we need not be unduly concerned about the quality of their expansion. But it may also be that cities are expanding in a disorderly manner that is not productive, not inclusive, and not sustainable. In this case, the *quality* of their physical expansion should be of great concern, regardless of its quantitative dimensions.

Cities become more productive when *all* workers have access to *all* jobs; they become more inclusive when they provide decent and affordable housing for all, with residential amenities and good access to these jobs; and they are more sustainable when they provide more of this access with good public transport while preserving public open spaces and areas of high environmental risk from urban development. Cities expand in an orderly manner when they plan, prepare, and secure adequate lands for arterial roads and for streets—as well as their public open spaces—to organize their urban peripheries *before development occurs* in ways that make them more productive, more inclusive, and more sustainable. Whether they do so or not, and whether they are doing it better or worse than before, raises a set of questions that, until now, could not be properly answered: How well laid out are recently built urban peripheries, how are layouts changing over time, and why?

**Volume 2: *Blocks and Roads*** begins to provide answers to these questions by the mapping and measurement of urban layouts in the global sample of 200 cities using freely available, high-resolution, *Bing* satellite imagery. More specifically, it addresses three questions:

1. How well laid out are the expansion areas (areas converted to urban use between ~1990 and ~2014) in the global sample of 200 cities?
2. How well laid out are areas converted to urban use before ~1990—the pre-1990 areas—compared to expansion areas in the global sample of 200 cities? and
3. How well laid out are the areas converted to urban use in five different time periods —Period

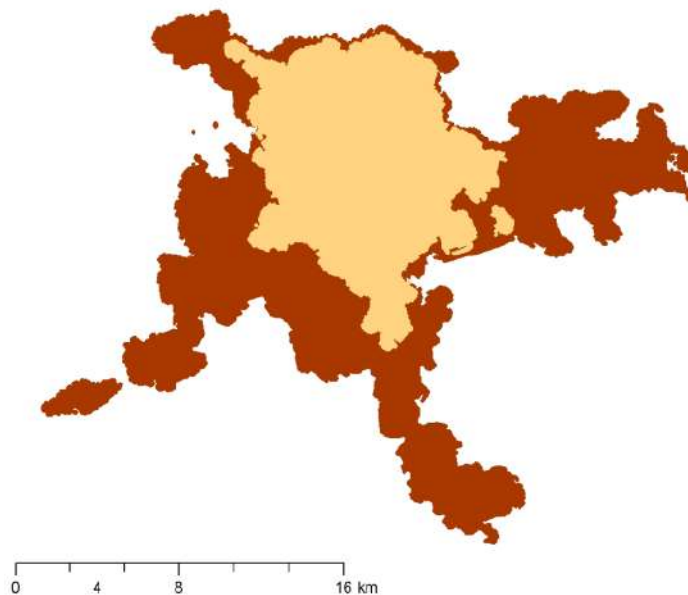


1: before ~1900; Period 2: ~1900 – ~1930; Period 3: ~1930 – ~1960; Period 4: ~1960 - ~1990; and Period 5: ~1990 - ~2014— in a representative sub-sample of 30 cities?

## THE SELECTION OF AREAS FOR ANALYSIS

The answers to the first two questions require maps identifying the pre-1990 areas and the expansion areas of all the 200 cities in the global sample. These maps can be drawn from the urban extent maps for each city in the global sample compiled in Volume 1 of this Atlas. The map of the pre-1990 area of Addis Ababa, Ethiopia, for example, is simply the map of its urban extent in ~1990. For purposes of analysis, we combined the areas converted to urban use between ~1990 and ~2000 and between ~2000 and ~2014 into one area, referring to it as the expansion area. The map of the expansion area of the city is then simply the map of its urban extent in ~2014, with its pre-1990 area excluded (see figure 3.1). That said, in the maps of the 200 cities presented in the main section of this volume of the Atlas, the two areas are shown as two distinct expansion areas.

FIGURE 3.1:  
**The Pre-1990 Area (ochre) and the Expansion Area (red) of Addis Ababa, Ethiopia.**

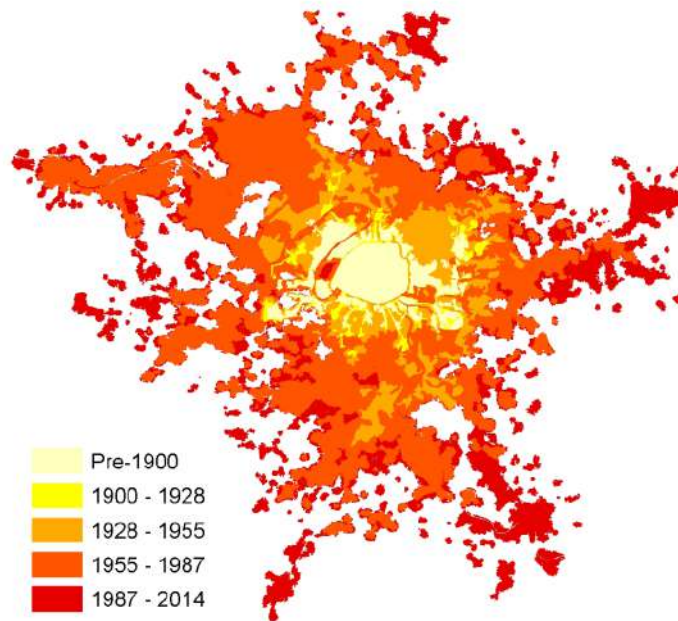


Answers to the third question posed in the previous section require maps that show the history of the expansion of the 30 cities in the global representative sample of cities over the past two centuries. These maps were created and presented in the first edition of the *Atlas of Urban Expansion* (S. Angel et al. 2011, 260-319), and they are not reproduced in full in this edition of the Atlas. Instead, summary maps for all 30 cities, showing the areas converted to urban use in each of the five periods listed in the

previous section are given in the pages pertaining to these cities. An example of a summary map for Paris, France, showing the areas developed in five consecutive periods is given in figure 3.2.

FIGURE 3.2:

**Area converted to urban use in the five different time periods in Paris, France.**



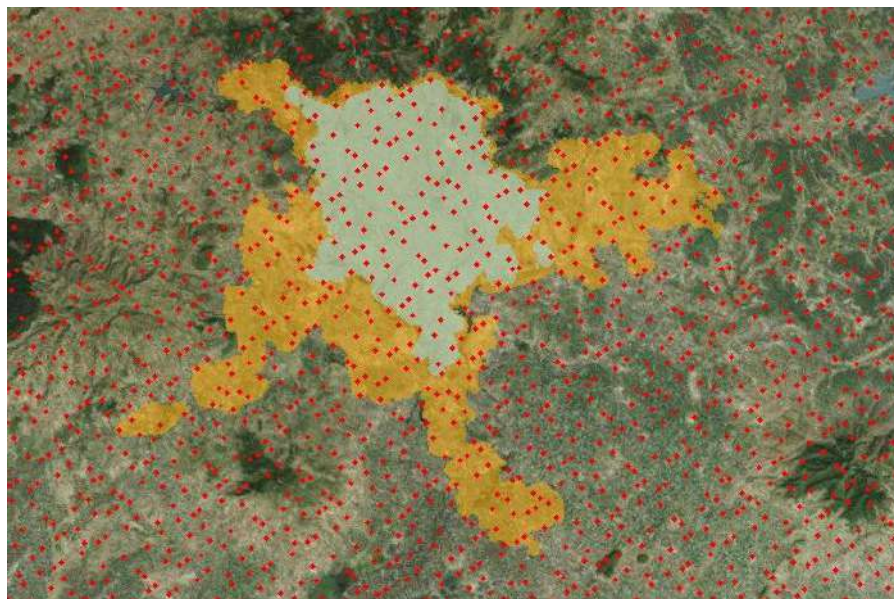
We can answer a number of important questions regarding the quality of urban layouts by patiently digitizing and analyzing high-resolution satellite imagery. *Bing* imagery, for example, is now freely available worldwide (similar *Google Earth* imagery is still proprietary) and can be analyzed using identical methods in each city in the sample, thus ensuring that results are consistent and comparable. That said, such studies are very labor intensive. In small cities, digitizing key features of urban layouts can be carried out in almost the entire urban extent of the city—including both its pre-1990 area and its expansion area. In larger cities, some layout features, like the presence of arterial roads, can be digitized and analyzed for the city as a whole, but more detailed features—like residential types, the share of the land in roads, block sizes, or plot sizes—cannot be. They can be more thoroughly investigated by sampling a limited number of 10-hectare locales at random in each of the areas of interest in the city, calculating the relevant metrics from these sampled locales, and generalizing the results for these areas of interest as a whole. In the largest cities, even the presence of arterial roads may need to be determined by sampling as well, in our case by sampling randomly selected one-kilometer squares throughout their urban extents. In broad terms, this is the procedure followed in generating the maps and metrics for this volume of the Atlas.

Most of the analysis focused on digitizing and analyzing randomly selected 10-hectare locales in the 200 cities in the global sample. All in all, a total of 20,795 locales were digitized, approximately 100 locales per city, on average. In addition, a total of 5,638 additional locales were analyzed in the sub-sample of the 30 cities used to study changes in urban layouts over a longer period: ~1900 - ~2014.

The locations of these locales in a given city were determined by combining a quasi-random series of numbers known as a Halton Sequence with the XY (latitude and longitude) origins of a bounding box that encompassed the city as a whole. This procedure generates a set of points in two-dimensional space that appear to be randomly distributed but cover the space more evenly than a set of points generated at random. A particular Halton Sequence, using the same initial XY origin to generate point coordinates, always generates the same set of points in the same order. We used one tenth of a degree of longitude and latitude as XY origins to generate points for every city in the global sample. The set of points generated for the study area of Addis Ababa, Ethiopia, is shown in figure 3.3. Subsequently, in every area of interest, say the expansion area of Addis Ababa, we initially selected 40 points for analysis in the order they were identified by the Halton sequence.

FIGURE 3.3:

**Quasi-random placement of potential 10-hectare locales for the analysis of urban layouts in the study area of Addis Ababa, Ethiopia, using a Halton sequence.**

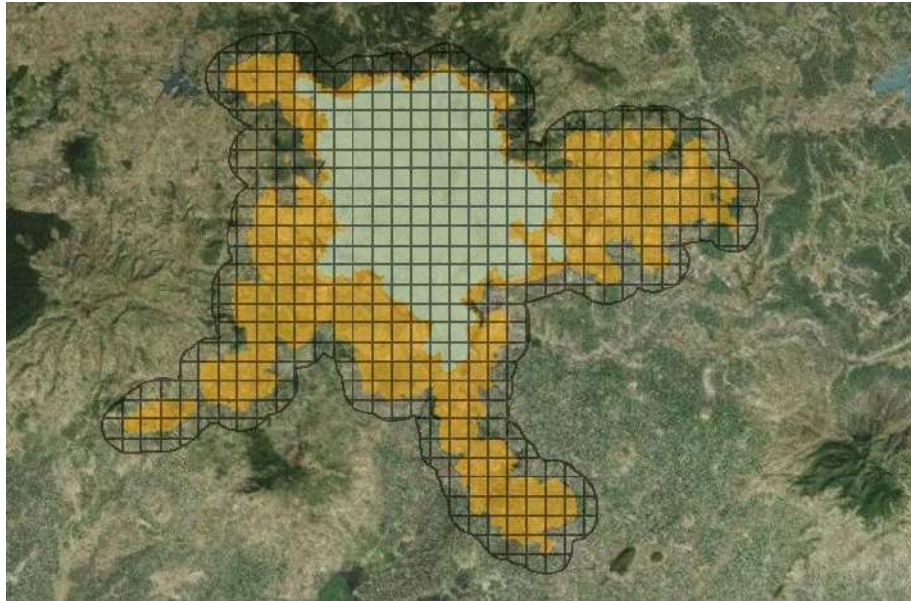


As noted earlier, in each city in the sample we digitized the arterial road network in its entire urban extent in order to determine the share of the relevant area within that extent that was within walking distance of an arterial road, as well as to estimate the share of the built-up area in arterial roads. To do so in an orderly fashion, we placed a one-kilometer grid over the entire urban extent of the city and then identified and digitized arterial roads in each of the grid squares. Since arterial roads within walking

distance of a built-up area may include roads outside the urban extent, we also included areas within one-kilometer of the edge of the urban extent in our analysis. The one-kilometer grid for the 2014 urban extent of Addis Ababa, Ethiopia, is shown in figure 3.4.

FIGURE 3.4:

**The one-kilometer grid used to identify arterial roads in the urban extent of Addis Ababa, Ethiopia, including a one-kilometer-wide buffer around it.**



In the largest cities in the global sample, identifying, digitizing, and analyzing arterial roads in their entire urban extent proved unnecessary. Instead, we selected a set of one-kilometer squares at random, using our set of Halton points described earlier. We then identified the arterial roads within each square, as well as in an area within one-kilometer of its edge, so as to be able to determine the share of the area within the square that was within walking distance of an arterial road, a road that could well be outside that square. The resulting set of randomly placed 3-by-3-kilometer areas (their rounded edges are the result of being one kilometer away from the corners of the one-kilometer squares) used to identify, digitize, and analyze arterial roads on the periphery of Tokyo, Japan, is illustrated in figure 3.5.

To summarize: Measuring the attributes of urban layouts requires a focus on high-resolution satellite imagery which, in turn, requires a more careful selection of representative areas for analysis within the urban extents of cities in the global sample. In order to study the changes over time in the attributes of urban layouts, we divided the urban extents of all cities in ~2014 into two: pre-1990 and post-1990 areas. To study changes in these attributes over a longer time period, we also differentiated the urban extents of 30 cities into five periods, spanning the twentieth century and the first fifteen years of the present century. In the absence of sampling, the study of urban layouts in the global sample of cities would be a daunting task. We rendered it doable by sampling 10-hectare locales within the urban extents of cities.

The actual locales randomly selected for digitizing and analysis of the change in urban layouts over time in Paris, France, are shown in figure 3.6. In a number of the largest cities in the global sample, we also sampled a number of one-kilometer squares throughout their urban extents to map enough of their arterial road networks to calculate the various metrics associated with them.

FIGURE 3.5:

**Randomly selected 3-by-3-kilometer areas used to identify, digitize, and analyze arterial roads (in yellow) on the urban periphery of Tokyo, Japan.**

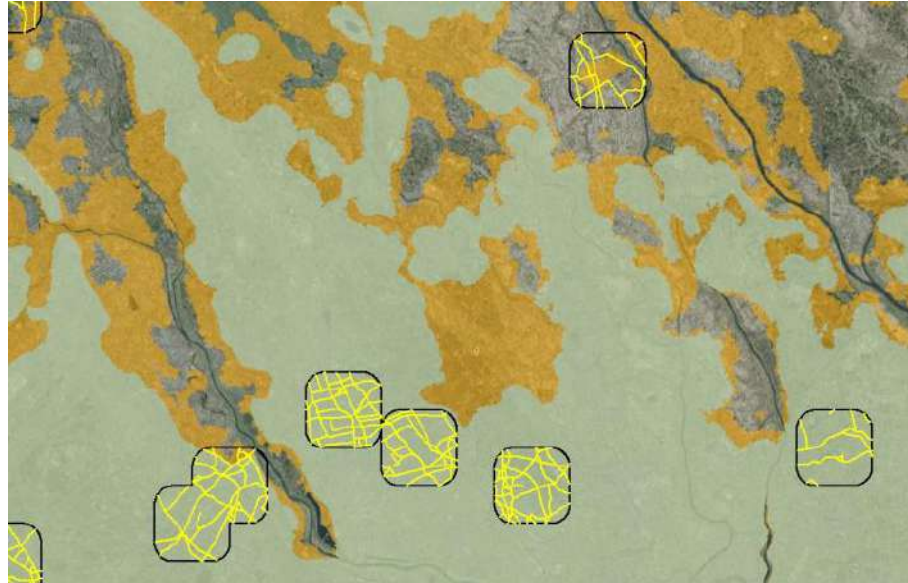
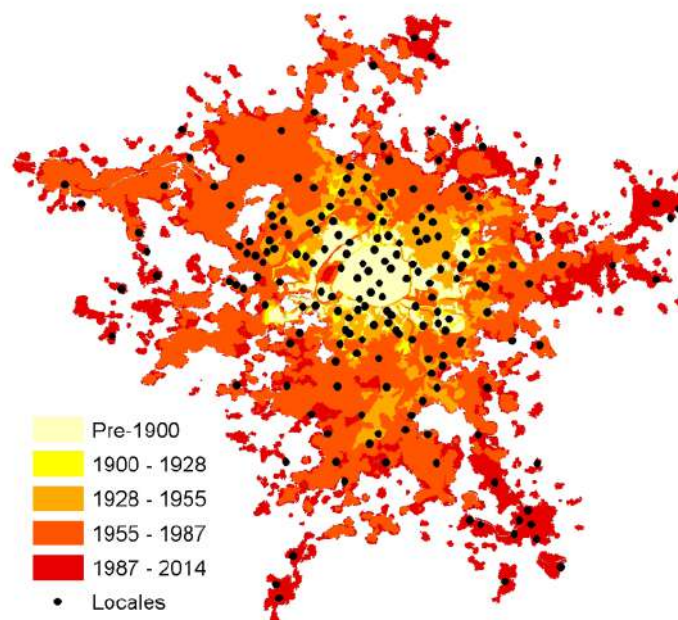


FIGURE 3.6:

**Actual locales selected in a quasi-random process from the total number of available locales in the study area of Paris, France, to record the changes in the attributes of urban layouts over time.**



## MEASURING KEY ATTRIBUTES OF URBAN LAYOUTS

Within each 10-hectare locale, manual digitization techniques were used to identify, map, and measure the physical characteristics of its urban fabric. The primary focus was on the quality and orderliness of their block and road layouts, the quality of their visible infrastructure, the size of blocks and residential plots, and the density of street intersections. Orderliness or disorderliness that can be assessed from satellite imagery largely comes down to the way in which public space is used to organize the urban fabric (through road and block layouts), the level of infrastructure that is provided in a given area (indicative of formality or informality), and the form of dwellings, both through identification of plot boundaries and through a visual assessment of building types. Much of this work falls on the image analyst. With that in mind, detailed rules were developed to assist the analyst in classifying the imagery. We summarize these rules here so that the method we used to arrive at the maps and metrics in the following Atlas pages can be better understood and easily replicated.

### Blocks and Roads

Classification of satellite imagery is fundamentally an exercise in pattern recognition. As with all pattern recognition, the first task in identifying the elements of a locale involves making a primary distinction between these elements. In our case, that distinction is between block space and road space. Road space consists of all land that is currently or potentially used by either pedestrians or vehicles to travel from one place to another. We seek to identify the *right-of-way* of streets and roads, containing both the area that is currently in use and any lands that are clearly reserved for future use. All of these areas constitute road space. Block space, in turn, consists of all other uses, including open space and off-street parking areas. Road space and block space add up to the entire area of a 10-hectare locale. In other words, all space that is not road space is block space, and all block space is assigned a land use. The division of a high-resolution satellite image of a locale in Accra, Ghana, into street space and block space is illustrated in figure 3.7.

Block space is subdivided into units identified as *blocks*. Individual blocks are areas that are continuously bounded by roads or vacant open spaces (for instance, a block at the edge of a built-up area that borders on farmland). Any given block might contain several different land uses (say, apartment buildings on one end, single-family homes in the middle, and a school at the far end). Blocks and block space can be further subdivided into *plots*, individual parcels of land that would likely be identified as separate properties in a cadaster. Any given block is composed of either one large plot or a series of smaller plots. Much like the identification of rights-of-way, plot boundaries are identified through surface indicators,

pattern recognition, and comparisons with nearby areas. The concept of the plot is very important in differentiating residential categories. A suburban plot in a formal residential area might contain several structures—a house, a garage, and a toolshed, for example. We were not interested in measuring the dimensions of these structures in this Atlas. Instead, our goal was to measure the use of the underlying land so as to get a sense of the shares of land in different uses. When land uses are determined, it is the land use of the *plot* as a whole that is determined and measured, not the land occupied by a specific building. The same principle holds true when assessing patterns to determine land use in a larger area: The key is to focus on the pattern of plot boundaries and not on building footprints.

FIGURE 3.7:

**The division of a high-resolution satellite image of a 10-hectare locale in Accra, Ghana, into road space (light brown) and block space (orange borders)**



### Land Use Categories

Each city in the global sample has specific residential and non-residential typologies, along with unique characteristics of form and layout that deserve recognition and study in their own right. However, in order to study land use on a global scale, the land use categories must be simple enough and broad enough to be identified in any city in the world, encompassing (to the maximum extent possible) the whole range of land use types found in cities. Following a review of numerous land use classifications, we narrowed our classification to seven land uses that could be reliably identified in high-resolution satellite imagery, with a focus on four types of residential land use: (1) open space; (2) non-residential areas; (3) atomistic settlements; (4) informal land subdivisions; (5) formal land subdivisions; (6) housing projects; and (7) road space.

1. *Open Space* includes open countryside, forests, cultivated lands, parks, vacant lands that have not been subdivided, cleared land, and water bodies: seas, rivers, lakes, and canals.
2. *Non-Residential Areas* include all built-up areas, both public and private, that are not in residential use.
3. *Atomistic Settlements* are areas with irregular layouts that were clearly not subdivided or laid out before residential construction took place. This category includes squatter settlements that grew incrementally without an overall plan, homes built on irregular parcels of land, or homes built on rural plots that were not regularly subdivided before their conversion to urban use.
4. *Informal Land Subdivisions* are areas that have been subdivided for urban use, but that lack visible evidence of conformity to land subdivision regulations such as regular plot dimensions, paved roads, streetlights, or sidewalks. That said, structures in these informal land subdivisions, although different in size and form, are typically laid out along straight or almost-straight roads, with regular intersections and standardized widths. Blocks are also regular or semi-regular in size and shape, when topography permits.
5. *Formal Land Subdivisions* are similar in layout to informal layouts, but exhibit a higher level of regularity, a higher level of provision of infrastructure, and better connections to existing roads. All roads must be paved for an area to be classified as a formal land subdivision. Sidewalks and streetlights are often visible as well.
6. *Housing Projects* range from large apartment tower projects to suburban tract housing. Housing projects share one feature: their structures must be essentially homogenous. These are projects in which all structures are built by a single developer using variations on the same plan.
7. *Road Space* includes the rights-of-way of lanes, streets and roads, both paved and unpaved, containing both the area that is currently in use and any lands that are clearly reserved for future use.

The four types of residential land use are illustrated with examples in figure 3.8. These types were chosen to reflect stages in the evolution of the housing sector, from a state of weaker planning skills and traditions, less regimented property-right and regulatory regimes, low availability of capital, and an absence of housing finance, to a state of stronger planning and regulatory regimes and a broader availability of capital. The housing sector is at its most basic in atomistic settlements, where the organization of the settlements is insufficient even to ensure consistent plot size or road width and



where dwellings are located haphazardly and constructed over time. The housing sector is at its most complex when it is able to support large, planned housing projects, whether private or public, with access to capital, constructed from start to finish over a short period of time. The characterizations of these seven land use categories were used by analysts to determine the land uses within blocks in the 10-hectare locales, taking into account that a single block surrounded by roads or open spaces on all sides may contain more than one of six land uses.

FIGURE 3.8:

**Four types of residential land use identified in locales, using high-resolution satellite imagery: Atomistic settlements (top left), informal land subdivisions (top right), formal land subdivisions (bottom right), and housing projects (bottom left).**



### Plots, Blocks, and Intersections

The dimensions of residential plots in formal and informal land subdivisions are of interest because they may tell us, for example, whether large plot sizes in formal subdivisions are leading to high rates of land consumption per capita or whether small plot sizes in informal subdivisions reflect a discrepancy between minimum official plot sizes and those offered in the informal market. It is possible to measure plot sizes in land subdivisions using high-resolution satellite imagery when plots are relatively uniform. In these cases, it is possible to identify the boundaries between plots, to count the plots, and to determine their widths and depths. To measure plot dimensions in residential subdivisions, a block that had an array of plots of uniform size was identified and two lines were drawn along two of its edges. Each line was tagged

with the number of plots along it, creating an estimate of typical plot depth and width in that area. This procedure is illustrated in figure 3.9. In this example, the length of the block (160 meters) is divided by 22 and its depth (40 meters) is divided by 2 to yield a typical plot size of 7.3-by-20 meters or 146m<sup>2</sup>.

FIGURE 3.9:

**Arriving at a typical plot size in an informal subdivision in Guadelajara, Mexico, by measuring overall block length and depth and dividing each dimension by the number of plots along it.**



The size of city blocks or, alternatively, the density of 4-way intersections compared to 3-way ones in typical city neighborhoods is of interest because neighborhoods with small blocks and with high 4-way intersection densities facilitate walking and bicycling, reducing the reliance on private automobiles and making the urban environment healthier and more convivial. It is indeed possible to measure the size of blocks and the density of both 3-way and 4-way intersections using high-resolution satellite imagery, and we did indeed measure them in all locales.

To measure block sizes and intersection density, the analysis of locales required the digitization of road *medians* (the lines along the middle of roads). This was done for all blocks in every locale, and included the digitization of medians along the entire perimeter of all blocks within the locale, including those clipped by the circular boundary of the locale. It is important to note that using this procedure implied that the area of blocks was calculated as the entire area enclosed by road medians, including the area of roads. The procedure for identifying and mapping blocks is illustrated in figure 3.10. The density of intersections was calculated by counting the intersections within the locale and dividing their total by the built-up area of the local, excluding areas identified as open space. The procedure for identifying and counting road intersections is illustrated in figure 3.11. In this example, there are 4

4-way intersections, 33 3-way intersections, and a total area of 9.3 hectares (or 0.093 km<sup>2</sup>) in built-up areas. The 3-way intersection density in this locale is therefore 354 per km<sup>2</sup> and the 4-way intersection density is 43 per km<sup>2</sup>.

FIGURE 3.10:

**Identifying all the blocks in a typical locale by digitizing the road medians around them, including blocks that are clipped by the circular boundary of the locale.**

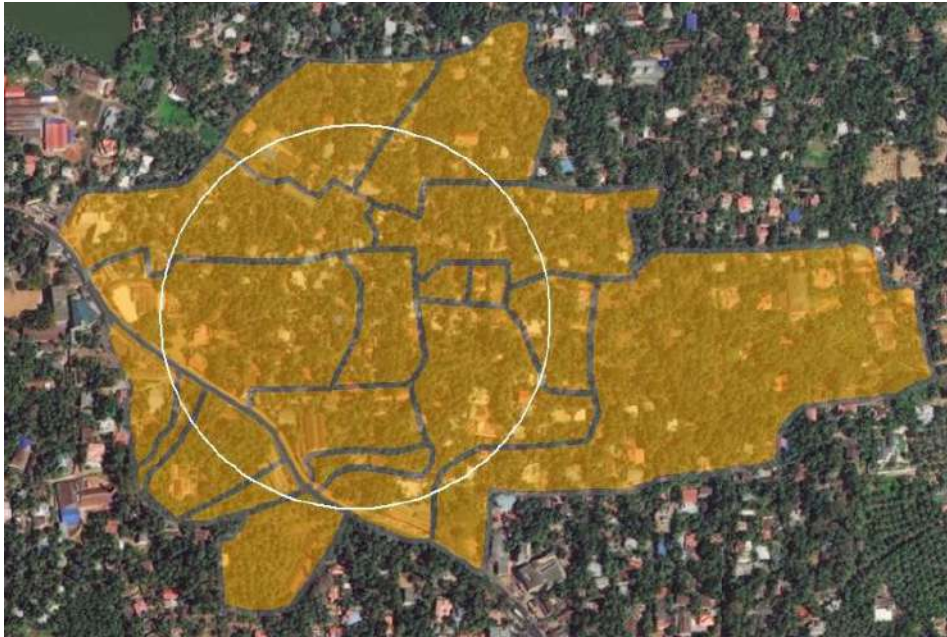


FIGURE 3.11:

**Identifying all the 3-way and 4-way road intersections in a typical locale by digitizing the road medians within the locale (4-way intersections are marked with a + and 3-way intersections are marked with a T).**



## Arterial Roads

Arterial roads in cities are of interest because they are essential for integrating urban labor markets—providing access, by all transport modes, from all residences to all workplaces in the city—and the more integrated their labor markets, the more productive they are. The road network in every country typically forms a three-tier hierarchy of primary, secondary, and tertiary roads. Central or state governments usually plan, acquire land, finance, construct, and maintain the primary intercity road network that connects the country together. Municipalities typically plan, acquire land, finance, construct, and maintain the secondary or arterial road network within their jurisdictions. In many cases, private developers of residential neighborhoods or of commercial, office, and industrial projects typically plan, acquire land, finance, and construct the tertiary roads that serve buildings within their projects. In many other cases, municipalities plan and build the tertiary road network as well. The network of arterial roads is a classic public good (i.e., users cannot be effectively excluded from using it). Since it is a public good, there is no market mechanism that can ensure that arterial roads are in adequate supply in appropriate locations. In other words, a shortage of arterial roads may be a form of market failure. This means that it is up to public authorities to supply arterial roads in adequate quantities, in the right locations throughout the city, preferably before development takes place. Whether or not this happens in practice can only be determined by observation and measurement.

We identified and digitized arterial roads throughout the urban extents of all cities in the sample. As noted earlier, in the largest cities in the sample we opted to sample locations selected at random and to identify and digitize arterial roads only in these sampled locations. The information obtained from digitizing arterial roads was then used to calculate the share of the built-up area within walking distance to arterial roads, the average beeline distance to an arterial road, and the density of arterial roads. All of these measures provide some insight, for the first time, on the availability of arterial roads in cities the world over, as well as on its change over time.

All roads that fall within the urban footprint (or its surrounding one-kilometer buffer) were considered as possible arterial roads. Likely candidate roads were identified in three data sources: Java Open Street Map, Google maps, and Bing maps, where roads are available as map layers. On any of these three road map layers, roads having through-connectivity are distinguished by width and color. Analysts examined each one-kilometer grid square in the urban extent to identify arterial roads. A candidate road was identified as an arterial road when it met two criteria:

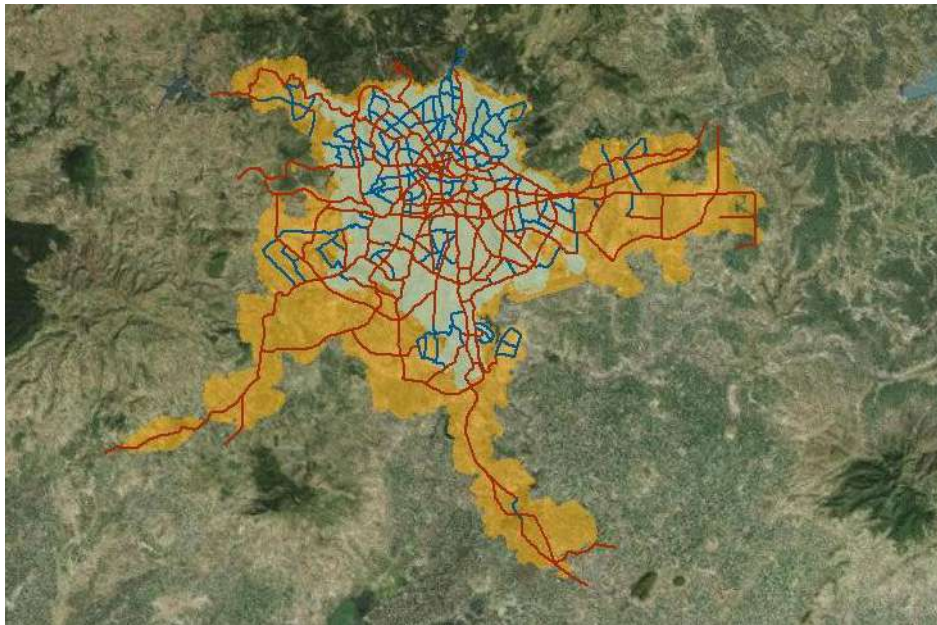
1. It connected to other arterial roads, forming part of a network that extends throughout the city; and

2. It connected to the nearby minor roads. Limited access roads (freeways or expressways) were not considered arterial roads, even though they were connected to other arterial roads.

When an analyst identified a road as *arterial*, they differentiated it further into two categories: Wide and Narrow, where wide roads were those having rights-of-way of 18-meters or more. The network of wide and narrow arterial roads in the urban extent of Addis Ababa, Ethiopia in 2014 is shown in figure 3.12. The same procedure was followed in identifying wide and narrow arterial roads in randomly selected 3-by-3-kilometer squares in the largest cities in the sample, as previously shown (figure 3.4).

FIGURE 3.12:

**The network of arterial roads in the urban extent of Addis Ababa, Ethiopia in 2014, distinguishing wide arterial roads (brown) from narrow ones (blue).**



### Urban Layout Metrics

In each city in the global sample of 200 cities, we initially selected at random 40 locales for analysis in its pre-1990 area and 40 locales in its expansion area, a total of 80 locales per city or 16,000 locales for the global sample as a whole. Key layout features of these locales, observed in high-resolution satellite imagery, were then digitized, analyzed, and stored. The digital files associated with locales were processed in ArcGIS using a Python script that calculated the following metrics for each locale:

- **Land Use**

- Share of land in open space (open space in locale/area of locale);
- Share of built-up area in non-residential use (non-residential land in locale excluding roads/area of locale);

- Share of the built-up area in residential use (all area in residential use in locale/built-up area of locale);
- Share of built-up area occupied by roads (area in roads/built-up area)
- Share of the residential area not laid out before development (area of atomistic settlements/residential area);
- Share of the residential area in informal land subdivisions (area in informal land subdivisions/residential area);
- Share of the residential area in formal land subdivisions (area in formal land subdivisions/residential area);
- Share of the residential area in housing projects (area in housing projects/residential area);
- Share of the residential areas laid out before development (area in both formal and informal land subdivisions/residential area);
- Share of locale that is gridded [visual assessment of the presence of orthogonal street grids in the locale and their assignment to three categories: not gridded, partially gridded (covering 10-90% of the locale area), and gridded (covering 90% or more of the locale area)].
- Average plot size in informal land subdivisions; and
- Average plot size in formal land subdivisions.

#### • Roads

- Share of roads less than 4-meters-wide (length of roads less than 4-meters-wide in locale/length of total road network in locale);
- Share of roads that are 4-to-8-meters-wide (length of roads 4-8-meters-wide in locale/length of total road network in locale);
- Share of roads that are 8-to-12-meters-wide (length of roads 8-12-meters-wide in locale/length of total road network in locale);
- Share of roads that are more than 16-meters-wide (length of roads more than 16-meters-wide in locale/length of total road network in locale); and
- Average road width in locale.

### • **Block Layout**

- Average block size (hectares);
- The density of 3-way intersections (number per square kilometer of locale area);
- The density of 4-way intersections (number per square kilometer of locale area);
- Share of intersections that are 4-way (ratio of 4-way intersections to total number of intersections in locale);
- The Walkability Ratio (The average ratio of the beeline distance and the street travel distance for 40 pairs of sample points within the locale that are more than 200-meters apart);

In addition to calculating metrics for individual locales, a number of metrics were calculated for the arterial road network identified in each city:

### • **Arterial Roads**

- The average density of all arterial roads (linear kilometers of arterial roads/square kilometers of urban extent);
- The average density of wide (18m+) arterial roads (linear kilometers of wide arterial roads/square kilometers of urban extent);
- Average beeline distance to all arterial roads (meters);
- Average beeline distance to wide arterial roads (meters);
- Share of the urban extent within walking distance (625m) of all arterial roads; and
- Share of urban extent within walking distance (625m) of wide arterial roads.

Data for each locale is stored in four files: (1) Locale boundary file; (2) Blocks file; (3) Plot measurement file; and (4) Street medians file. Arterial roads data is stored in two additional files: (5) Arterials master file; and (6) Arterials study area file. All of the data is stored in shapefile format and can be downloaded on a city-by-city basis or in batches at [www.atlasofurbanexpansion.org](http://www.atlasofurbanexpansion.org).

The Atlas pages that follow provide average values for the locales in each area of interest in each of the 200 cities in the global sample for many, but not all, of these metrics. Some metrics were chosen over others as more illustrative of the quality of urban layouts in cities at the present time. Tables summarizing these metrics in Excel format are given following the city-focused pages.

### **Improving the confidence in the metric averages**

The metrics that we calculated exhibited a high degree of variation across locales within a city. This

intra-city variability poses a challenge for making correct inferences. More specifically, in order to detect statistically significant differences in the mean value of a metric across cities, precise estimates of the mean value of a metric within a city are needed. Although the sample average for a given metric—say, the average share of the built-up area in roads—might differ in two cities, the number of locales in each city might not be large enough to reject the null hypothesis that the two means are equal to each other. We can improve the precision of our estimates by adding locale observations to each city, but additional locales entail additional costs, in terms of both time and money.

Given the time and cost associated with extracting data from each locale, the study leading to the production of this volume of the Atlas operated with a budget allowing for the analysis of approximately 20,000 locales in the 200 cities in the global sample. All in all, some 30 analysts worked for an average of 90 days each to digitize and analyze these locales. We initially allocated 80 locales to each city in the sample, 40 in the pre-1990 area of the city and 40 in its expansion area. Then, rather than equally dividing the remaining 4,000 locales evenly among all cities, these locales were allocated using a rule to improve the overall precision of our subsequent estimates of city averages. This rule was based on the understanding that some cities are more complex than others and feature more variability in key metrics of interest. Adding locales to these cities may therefore be especially useful in improving the precision of our estimates.

We chose to focus on three principle metrics, or ‘variables of interest’, that are of key importance in assessing the quality of urban layouts: (1) the share of the built-up area in roads; (2) the share of residential land in atomistic settlements; and (3) the share of residential land in informal land subdivisions. Each sampled locale provides values for each one of these three metrics. For each city, given a set of sampled locales, we can calculate the sample average and sample standard deviation of each variable of interest. The method chosen to add locales to particular cities uses the information on the averages and standard deviations for these three metrics to improve the statistical power to detect differences between hypothesized means in the cities in the global sample (For a general discussion of statistical power see Casella and Berger, 2002, pp. 382-383). The procedure we followed involved the following steps:

- Initially, allocate 80 locales to each city;
- Calculate the statistical power associated with one-sided hypothesis tests for each of the variables of interest in all the cities in the sample;
- Create a power index for each city, which is the average statistical power associated with the tests for the three variables of interest;



- Sort cities on the basis of the power index from lowest to highest;
- Select the 20 cities with the lowest rankings on the power index;
- Add 10 new locales to each of these 20 cities, then calculate new metrics and new power indices;
- Rank cities again, using this new information;
- Repeat the process until all 4,000 new locales have been allocated.

It should be noted that in some cities, the expansion area is sufficiently small that it might be completely covered with locales, either before the initial 80 locales are randomly chosen or before the termination of the procedure for adding locales. As soon as it becomes impossible to add another locale that does not overlap with the existing locales, no more locales are added to a given city. As noted earlier, all in all, 20,795 locales were digitized and analyzed, a maximum of 270 locales in Cairo, Egypt and a minimum of 25 locales in Zhijin, China. Unfortunately, the addition of locales at this scale does not yet ensure that the average values reported in the Atlas pages that follow are significantly different from each other.

There are two pages in Volume 2 of the Atlas for each city in the global sample of 200 cities, arranged in alphabetical order in the following pages. They are followed by Atlas pages with maps and metrics for the 30 cities for which we have data on urban layouts that were created from 1800 onwards. These maps and metrics pages are followed by summary tables in Excel format that provide metric values for all attributes shown in the individual city tables.



# Maps and Metrics for 200 Cities, 1990-2014

The following pages provide maps and metrics for the 200 cities in the global sample. The cities are arranged in alphabetical order. The Index at the end of the volume lists them by country and by world region. There are two pages for every city. The left hand pages provide six high-resolution satellite images of typical locales, three in the pre-1990 area (top row) and three in the expansion area (bottom row). Below these images there is a map showing the network of arterial roads overlaid on a map of recent urban expansion. The right hand pages provide a table with metric values for different attributes of urban layouts in the city and six charts showing comparisons to other cities in the region and the world.

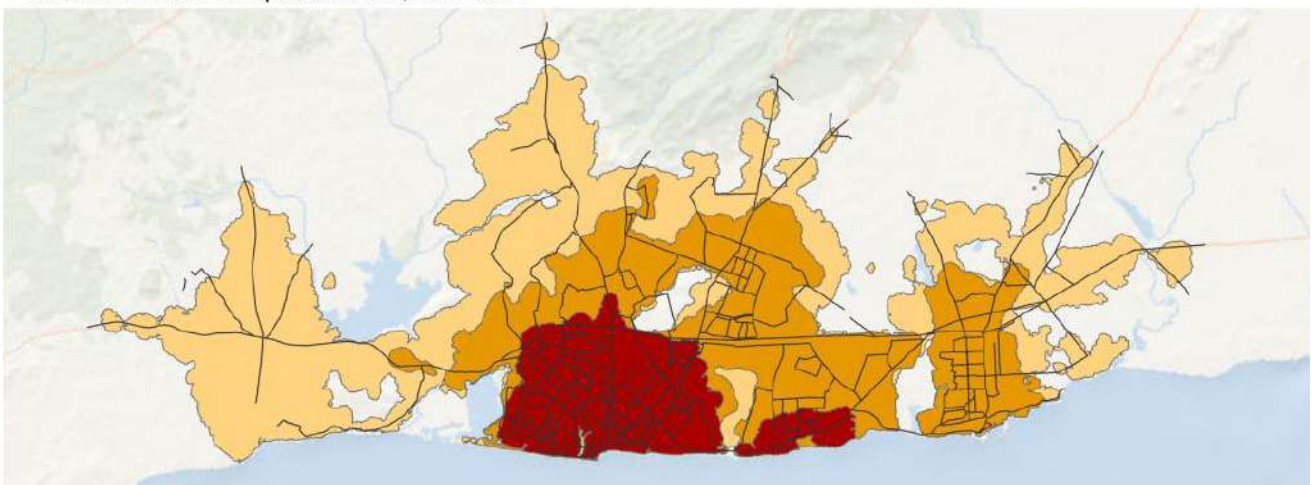
# Accra, Ghana (Sub-Saharan Africa)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2014



## Accra, Ghana 1991-2014



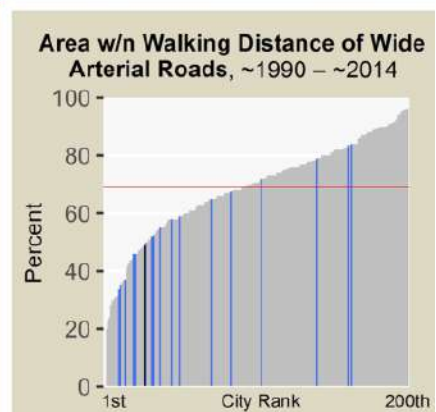
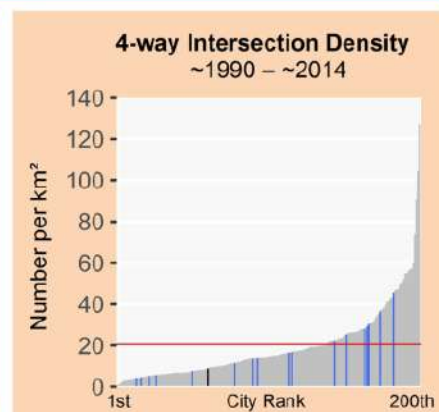
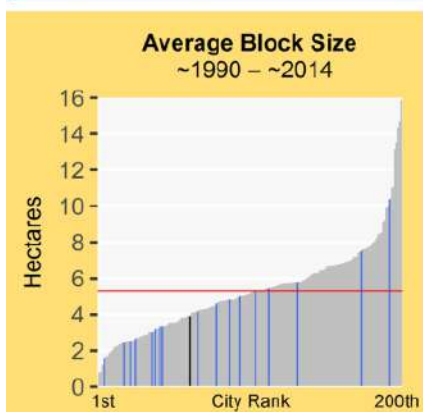
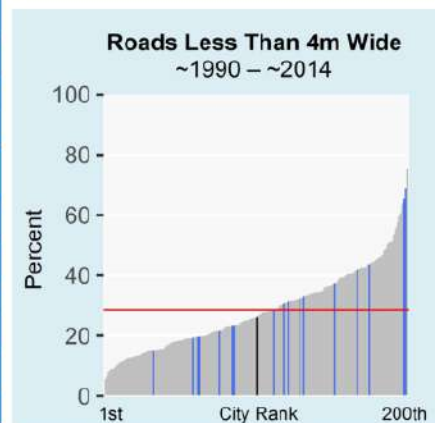
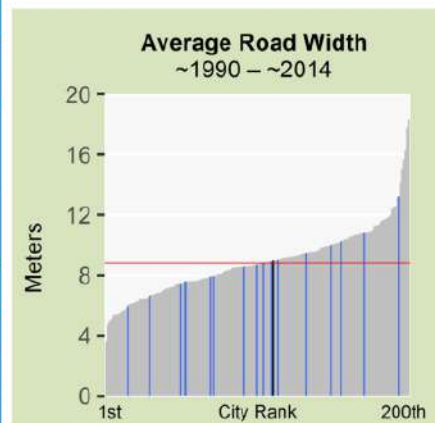
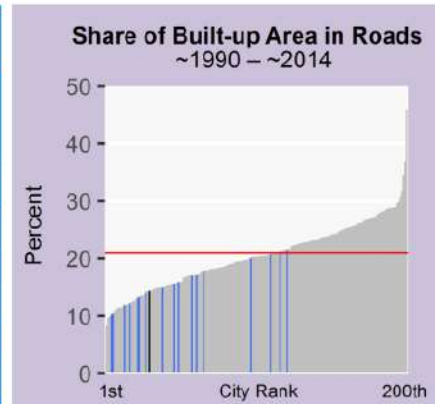
- Urban Extent in 1991
- Expansion, 1991 - 2000
- Expansion, 2000 - 2014

Arterial Roads

# Accra, Ghana (Sub-Saharan Africa)



Legend for Charts			
	Accra	Other cities in region	All other cities
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	15%	14%	
Share of Built-Up Area that is Gridded or Partially Gridded	23%	10%	
Average Road Width (m)	9.0	6.6	
Share of Roads less than 4m Wide	7%	26%	
Share of Roads more than 16m Wide	7%	3%	
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	1.9	0.8	
Average Beeline Distance to Arterial Roads (m)	199	575	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	95%	67%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	77%	49%	
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	19%	5%	
Average Block Size (ha)	6.2	3.9	
3-way Intersection Density (number per km <sup>2</sup> )	47	117	
4-way Intersection Density (number per km <sup>2</sup> )	14	9	
Walkability Ratio	1.8	1.7	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	22	949	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	555	636	
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	69%	78%	
Share of Residential Area Not Laid Out Before Occupation	42%	47%	
Share of Residential Area Laid Out Before Occupation	50%	52%	
Share of Residential Area in Informal Land Subdivisions	34%	47%	
Share of Residential Area in Formal Land Subdivisions	12%	4%	
Share of Residential Area in Housing Projects	10%	0%	



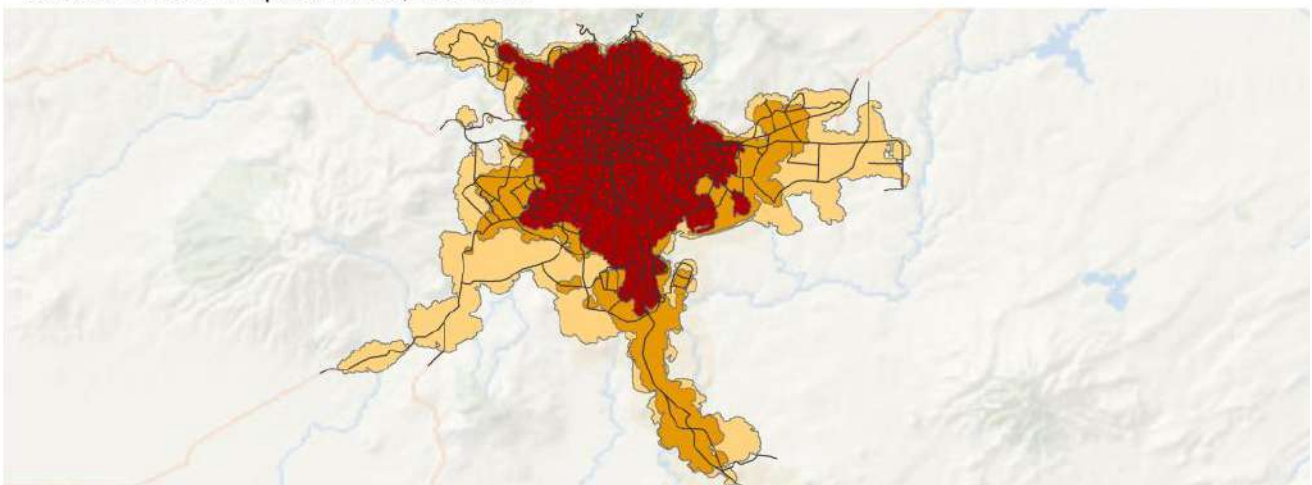
# Addis Ababa, Ethiopia (Sub-Saharan Africa)



Selected Locales in Area Developed Before 1986



Selected Locales in Expansion Area, 1986-2010



**Addis Ababa, Ethiopia**  
1986-2010

0 5 10 15 20 km

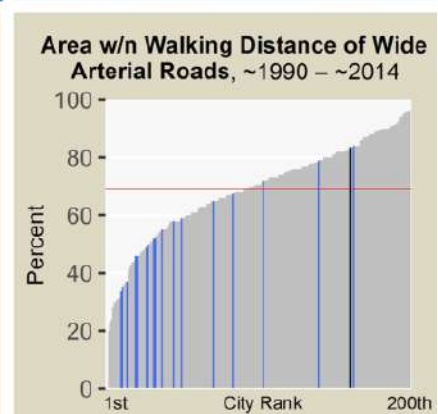
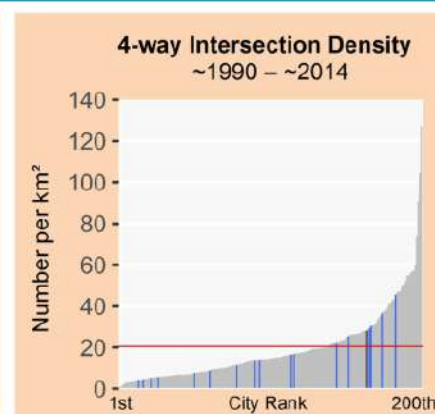
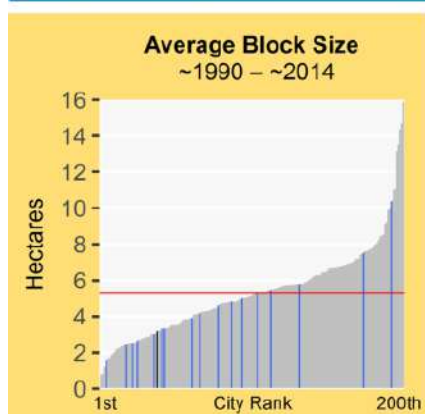
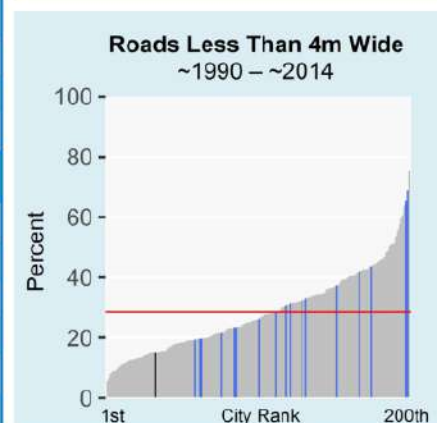
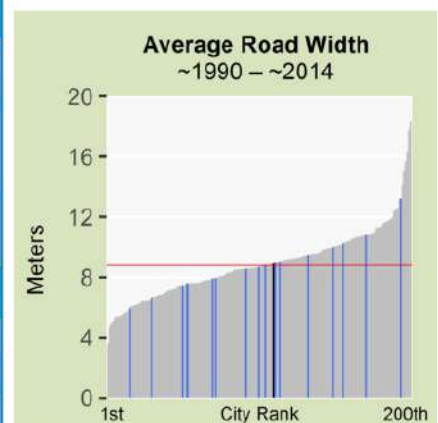
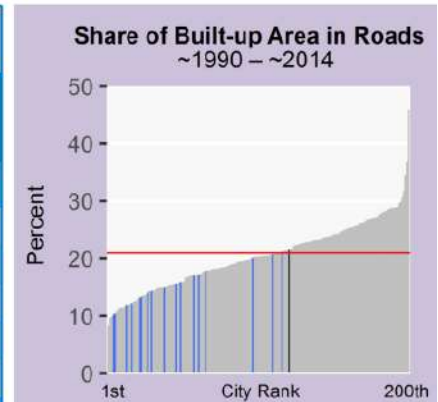
N

- Urban Extent in 1986
- Expansion, 1986 - 2000
- Expansion, 2000 - 2010
- Arterial Roads

# Addis Ababa, Ethiopia (Sub-Saharan Africa)



Legend for Charts		
Addis Ababa	Other cities in region	All other cities
		Global average
Metrics		
	Pre-1986	1986-2010
Roads		
Share of Built-Up Area Occupied by Roads	18%	21%
Share of Built-Up Area that is Gridded or Partially Gridded	2%	30%
Average Road Width (m)	9.0	8.1
Share of Roads less than 4m Wide	13%	15%
Share of Roads more than 16m Wide	12%	8%
Arterial Roads		
Density of Arterial Roads (km/km <sup>2</sup> )	2.7	1.7
Average Beeline Distance to Arterial Roads (m)	123	257
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	99%	89%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	93%	83%
Block Size, Plot Size, Intersection Density, and Walkability		
Share of Intersections that are 4-way	7%	12%
Average Block Size (ha)	3.1	3.2
3-way Intersection Density (number per km <sup>2</sup> )	104	176
4-way Intersection Density (number per km <sup>2</sup> )	10	28
Walkability Ratio	1.8	1.6
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		244
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	675	187
Stages in the Evolution of Residential Layouts		
Share of Built-Up Area in Residential Use	56%	73%
Share of Residential Area Not Laid Out Before Occupation	65%	41%
Share of Residential Area Laid Out Before Occupation	34%	58%
Share of Residential Area in Informal Land Subdivisions	15%	43%
Share of Residential Area in Formal Land Subdivisions	18%	1%
Share of Residential Area in Housing Projects	1%	12%



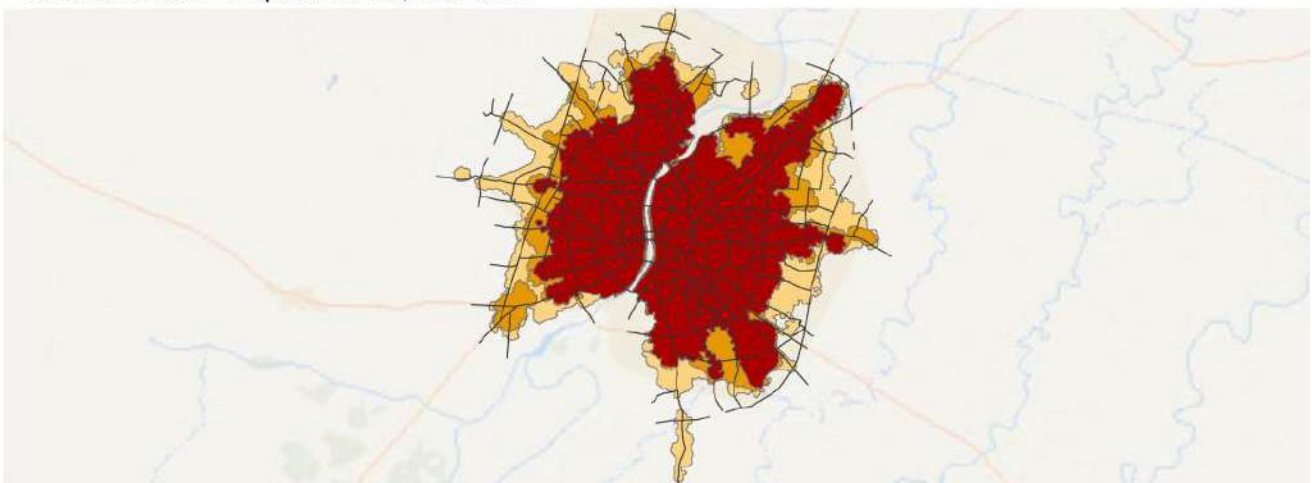
# Ahmedabad, India (South and Central Asia)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2013



**Ahmedabad, India**  
1989-2013

0 5 10 15 20 km

N

- Urban Extent in 1989
- Expansion, 1989 - 2000
- Expansion, 2000 - 2013
- Arterial Roads



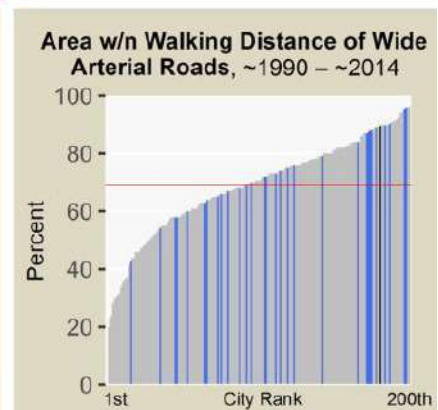
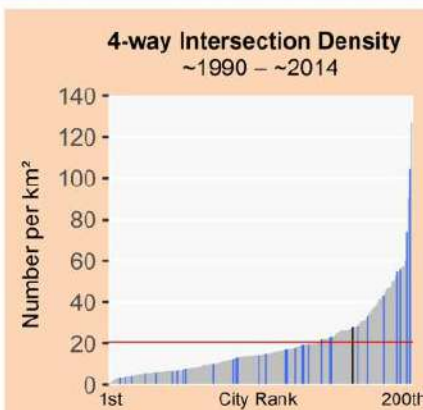
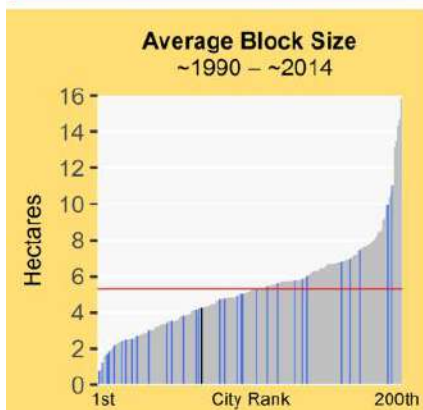
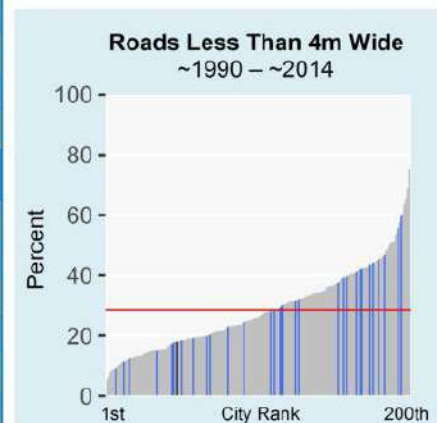
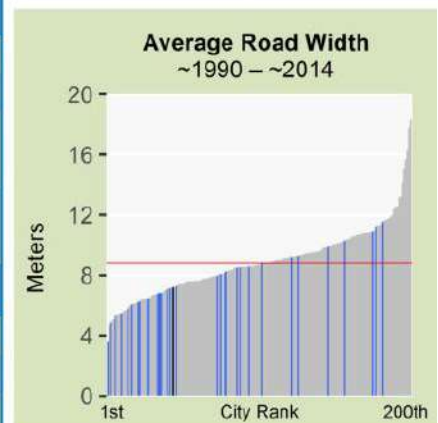
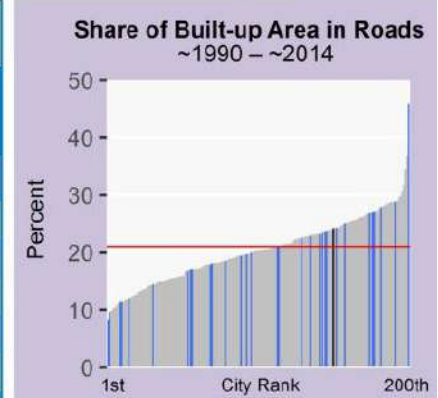
# Ahmedabad, India (South and Central Asia)



### Legend for Charts

Ahmedabad | Other cities in region | All other cities | Global average —

Metrics	Pre-1989	1989-2013
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	23%	24%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	7.2	8.4
Share of Roads less than 4m Wide	37%	17%
Share of Roads more than 16m Wide	9%	8%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.9	1.6
Average Beeline Distance to Arterial Roads (m)	185	218
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	97%	94%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	93%	89%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	8%	17%
Average Block Size (ha)	2.4	4.2
3-way Intersection Density (number per km <sup>2</sup> )	297	139
4-way Intersection Density (number per km <sup>2</sup> )	35	28
Walkability Ratio	1.8	1.6
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	342	100
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	389	120
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	71%	73%
Share of Residential Area Not Laid Out Before Occupation	20%	14%
Share of Residential Area Laid Out Before Occupation	79%	85%
Share of Residential Area in Informal Land Subdivisions	30%	31%
Share of Residential Area in Formal Land Subdivisions	35%	10%
Share of Residential Area in Housing Projects	13%	44%



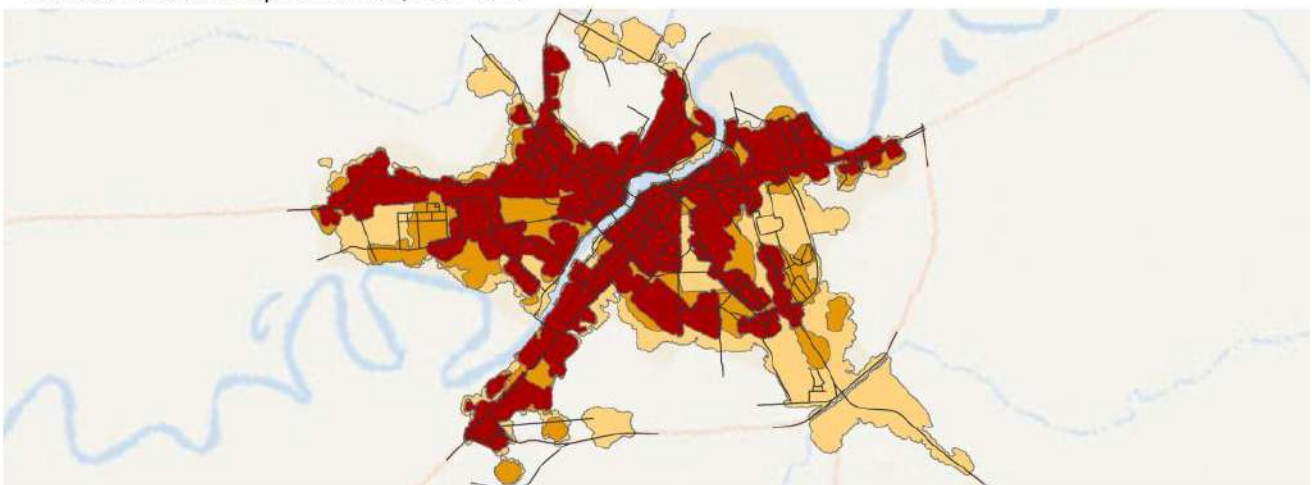
# Ahvaz, Iran (South and Central Asia)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2013



**Ahvaz, Iran**  
**1991-2013**

0 3 6 9 12 km

N

- Urban Extent in 1991
- Expansion, 1991 - 2000
- Expansion, 2000 - 2013
- Arterial Roads

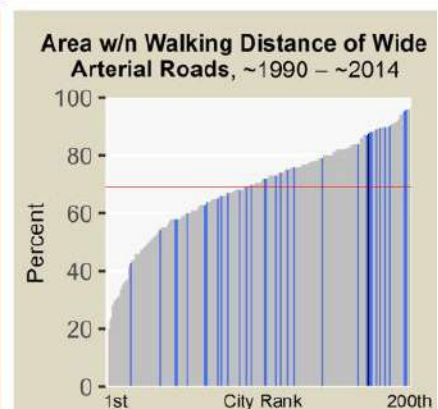
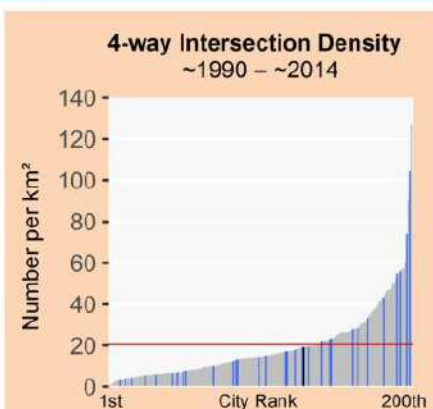
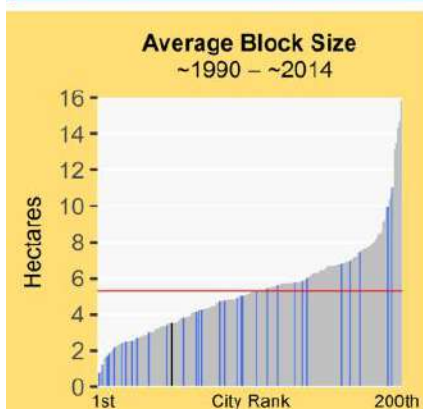
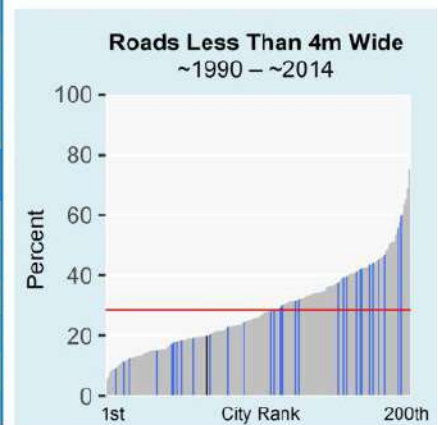
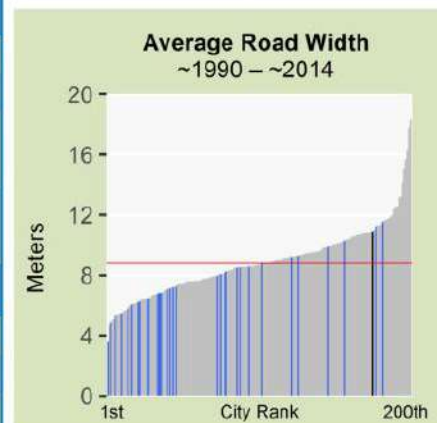
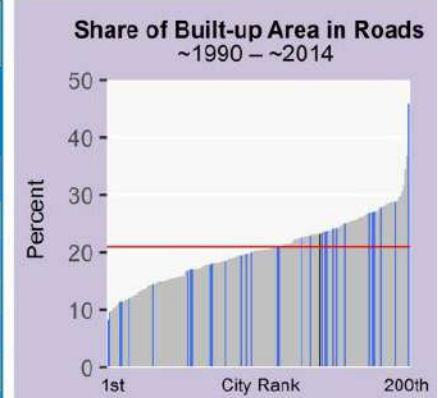
# Ahvaz, Iran (South and Central Asia)



### Legend for Charts

Ahvaz | Other cities in region | All other cities | Global average

Metrics	Pre-1991	1991-2013
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	27%	23%
Share of Built-Up Area that is Gridded or Partially Gridded	15%	0%
Average Road Width (m)	10.9	8.5
Share of Roads less than 4m Wide	11%	19%
Share of Roads more than 16m Wide	18%	9%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.0	1.6
Average Beeline Distance to Arterial Roads (m)	197	253
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	95%	90%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	94%	87%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	17%	13%
Average Block Size (ha)	2.2	3.5
3-way Intersection Density (number per km <sup>2</sup> )	97	106
4-way Intersection Density (number per km <sup>2</sup> )	24	19
Walkability Ratio	1.6	2.0
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	181	295
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	207	217
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	77%	61%
Share of Residential Area Not Laid Out Before Occupation	0%	7%
Share of Residential Area Laid Out Before Occupation	99%	92%
Share of Residential Area in Informal Land Subdivisions	15%	29%
Share of Residential Area in Formal Land Subdivisions	74%	41%
Share of Residential Area in Housing Projects	8%	21%



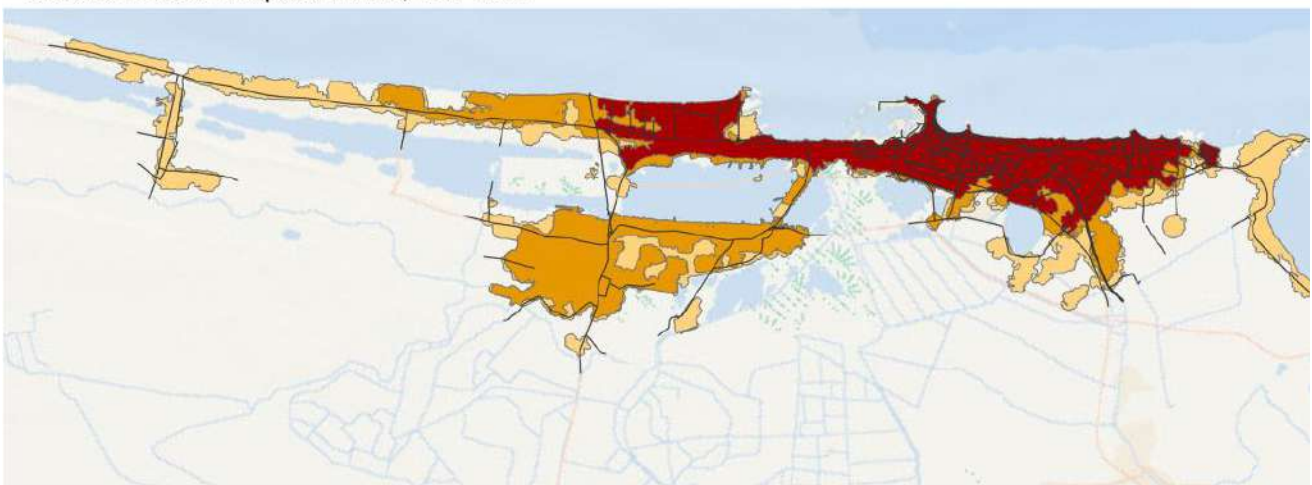
# Alexandria, Egypt (Western Asia and North Africa)



Selected Locales in Area Developed Before 1987



Selected Locales in Expansion Area, 1987-2013



## Alexandria, Egypt 1987-2013



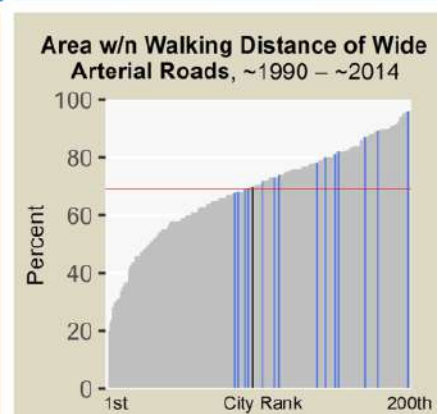
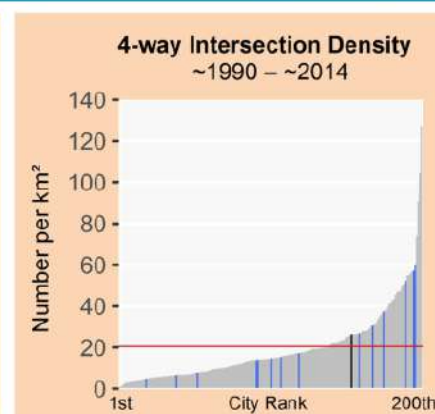
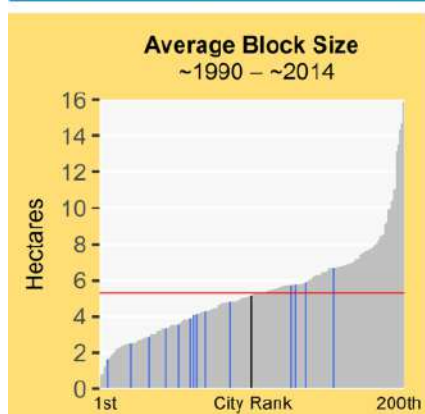
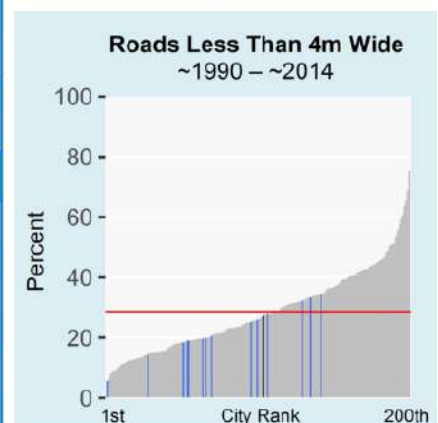
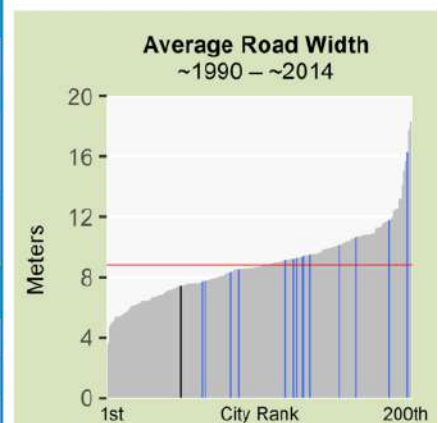
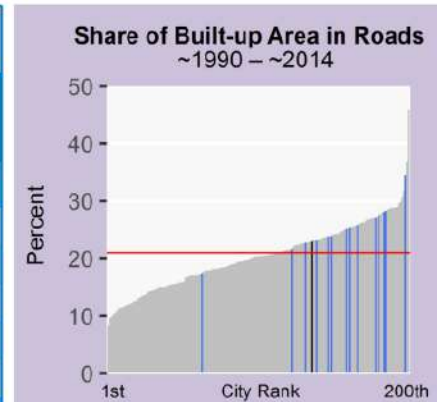
- Urban Extent in 1987
- Expansion, 1987 - 1999
- Expansion, 1999 - 2013

Arterial Roads

# Alexandria, Egypt (Western Asia and North Africa)



Legend for Charts			
	Alexandria	Other cities in region	All other cities   Global average
Metrics	Pre-1987	1987-2013	
Roads			
Share of Built-Up Area Occupied by Roads	16%	23%	
Share of Built-Up Area that is Gridded or Partially Gridded	15%	0%	
Average Road Width (m)	7.5	9.1	
Share of Roads less than 4m Wide	20%	27%	
Share of Roads more than 16m Wide	7%	13%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	2.7	1.5	
Average Beeline Distance to Arterial Roads (m)	162	356	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	96%	80%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	82%	70%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	9%	9%	
Average Block Size (ha)	1.9	5.2	
3-way Intersection Density (number per km <sup>2</sup> )	120	198	
4-way Intersection Density (number per km <sup>2</sup> )	22	26	
Walkability Ratio	1.8	2.0	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	354		
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	63%	81%	
Share of Residential Area Not Laid Out Before Occupation	5%	20%	
Share of Residential Area Laid Out Before Occupation	94%	79%	
Share of Residential Area in Informal Land Subdivisions	15%	55%	
Share of Residential Area in Formal Land Subdivisions	72%	2%	
Share of Residential Area in Housing Projects	6%	21%	



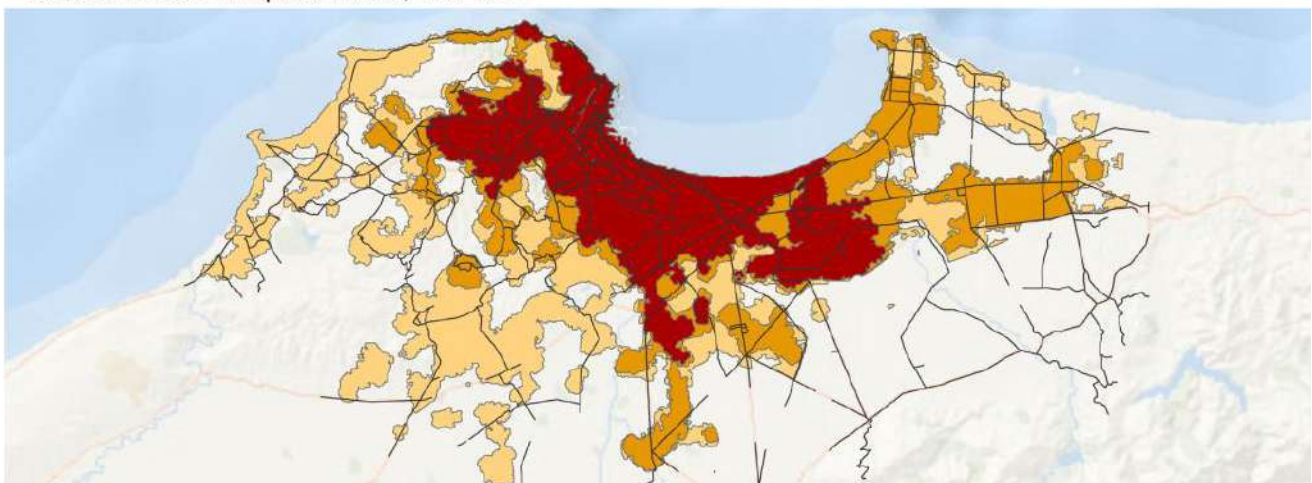
## Algiers, Algeria (Western Asia and North Africa)



Selected Locales in Area Developed Before 1987



Selected Locales in Expansion Area, 1987-2014

Algiers, Algeria  
1987-2014

0 5 10 15 20 km



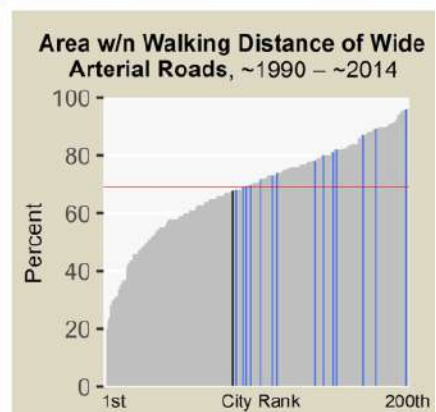
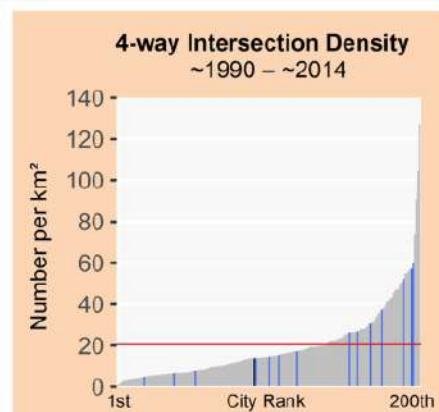
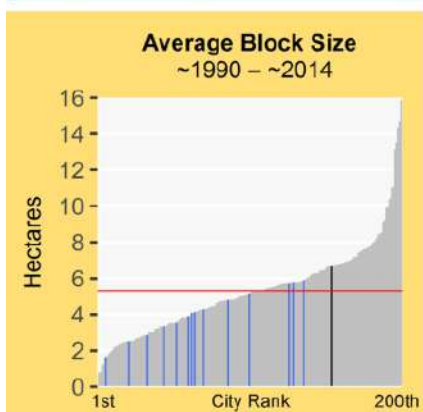
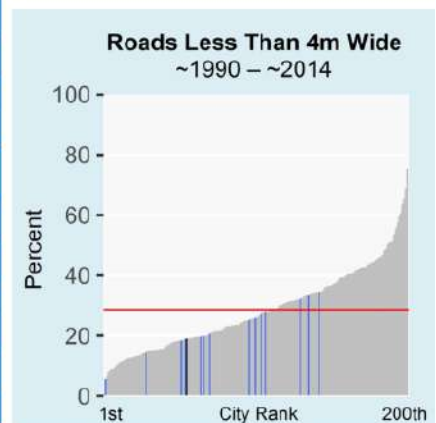
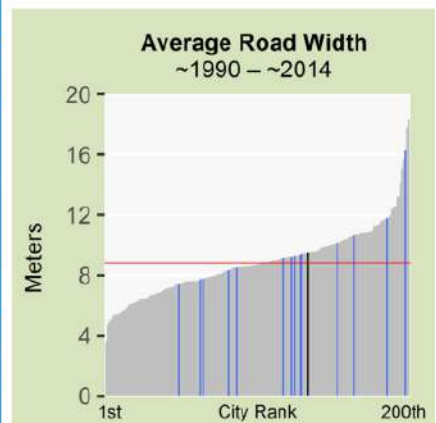
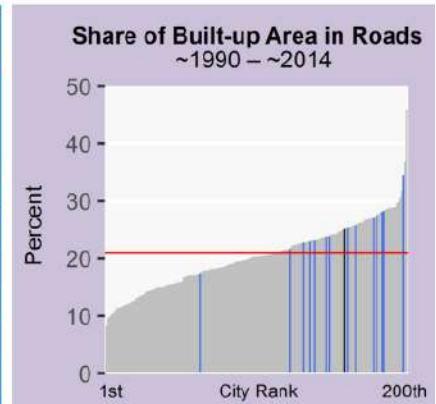
Urban Extent in 1987  
 Expansion, 1987 - 2000  
 Expansion, 2000 - 2014

Arterial Roads

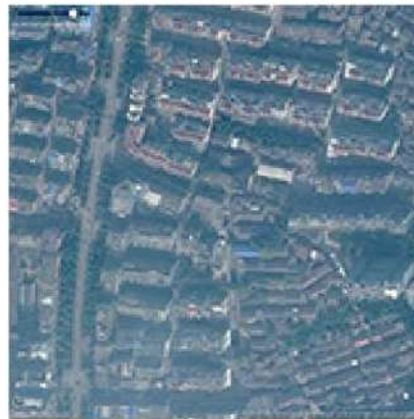
# Algiers, Algeria (Western Asia and North Africa)



Legend for Charts			
	Algiers	Other cities in region	All other cities
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	22%		25%
Share of Built-Up Area that is Gridded or Partially Gridded	1%		7%
Average Road Width (m)	9.5		6.6
Share of Roads less than 4m Wide	12%		19%
Share of Roads more than 16m Wide	13%		3%
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	1.7		1.1
Average Beeline Distance to Arterial Roads (m)	267		376
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	89%		79%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	86%		67%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	8%		6%
Average Block Size (ha)	4.5		6.7
3-way Intersection Density (number per km <sup>2</sup> )	62		140
4-way Intersection Density (number per km <sup>2</sup> )	16		14
Walkability Ratio	1.9		1.8
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	356		225
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	61%		60%
Share of Residential Area Not Laid Out Before Occupation	59%		33%
Share of Residential Area Laid Out Before Occupation	34%		66%
Share of Residential Area in Informal Land Subdivisions	2%		15%
Share of Residential Area in Formal Land Subdivisions	23%		24%
Share of Residential Area in Housing Projects	13%		26%



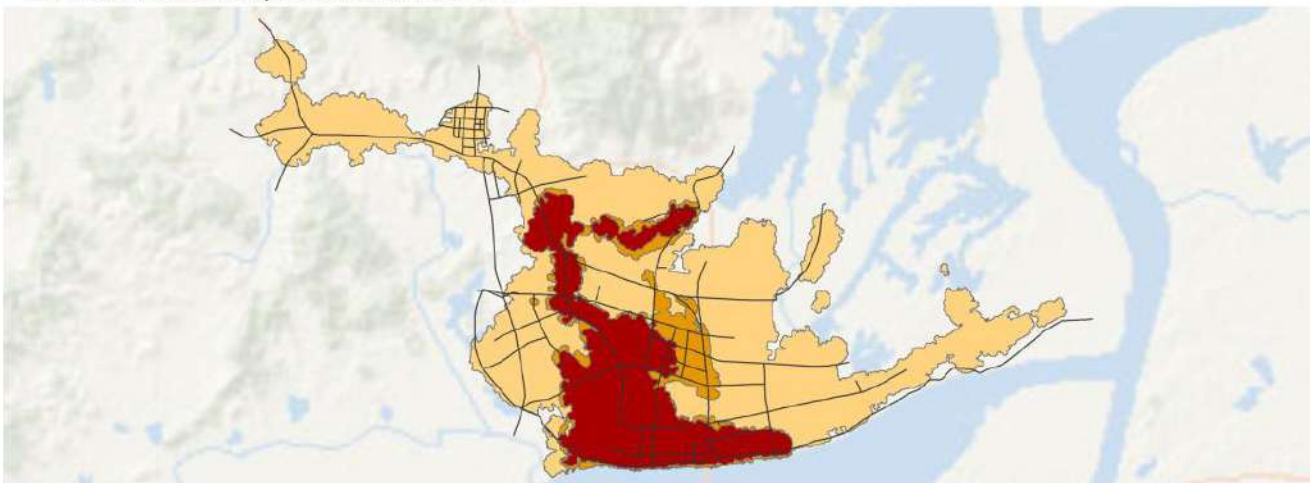
# Anqing, Anhui, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013



## Anqing, Anhui, China 1990-2013



- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2013

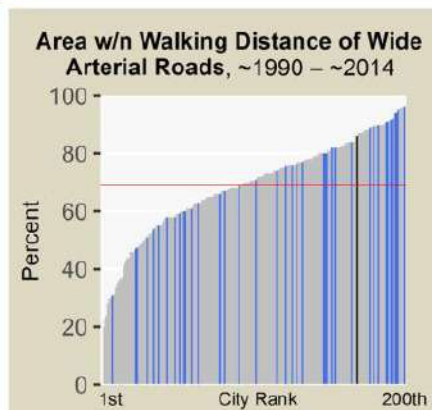
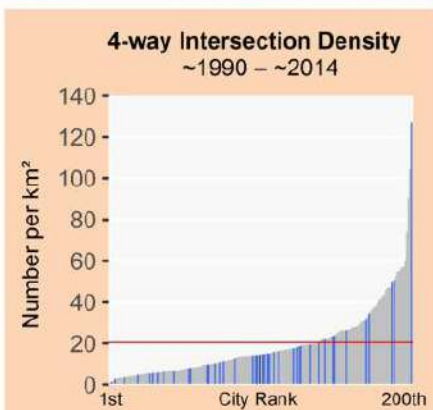
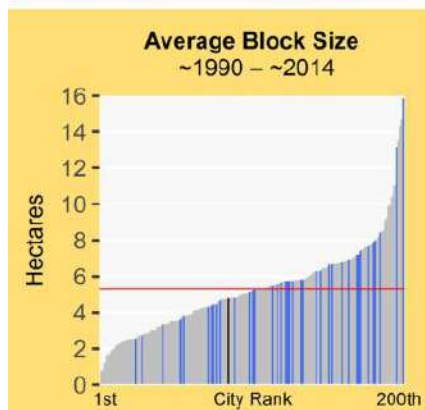
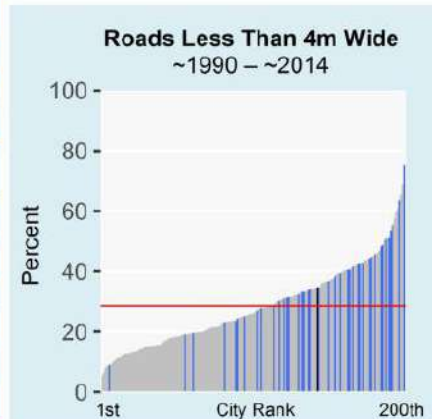
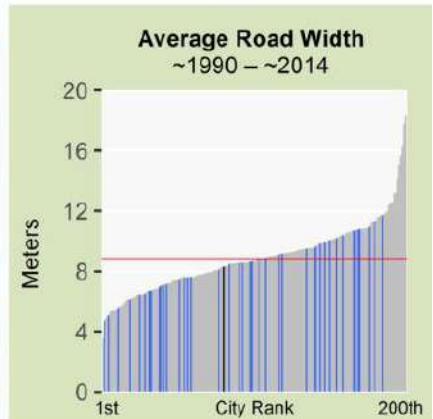
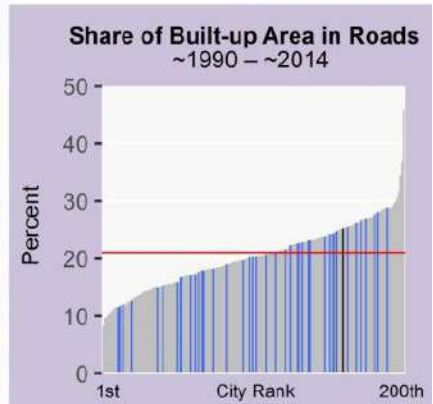
Arterial Roads



# Anqing, Anhui, China (East Asia and the Pacific)



Legend for Charts			
	Anqing	Other cities in region	Global average
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	23%		25%
Share of Built-Up Area that is Gridded or Partially Gridded	0%		2%
Average Road Width (m)	8.3		9.3
Share of Roads less than 4m Wide	24%		34%
Share of Roads more than 16m Wide	14%		14%
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	1.6		1.2
Average Beeline Distance to Arterial Roads (m)	251		336
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	91%		84%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	91%		86%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	8%		7%
Average Block Size (ha)	3.8		4.8
3-way Intersection Density (number per km <sup>2</sup> )	191		121
4-way Intersection Density (number per km <sup>2</sup> )	24		15
Walkability Ratio	1.8		1.5
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )			
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	46%		59%
Share of Residential Area Not Laid Out Before Occupation	39%		34%
Share of Residential Area Laid Out Before Occupation	60%		65%
Share of Residential Area in Informal Land Subdivisions	5%		13%
Share of Residential Area in Formal Land Subdivisions	22%		6%
Share of Residential Area in Housing Projects	32%		44%



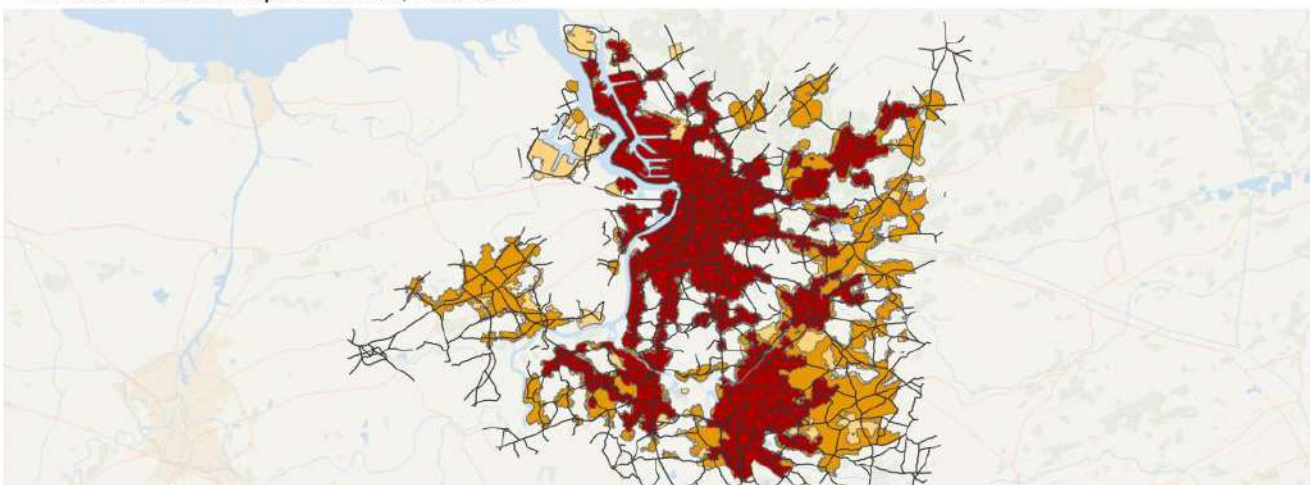
# Antwerp, Belgium (Europe and Japan)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013



**Antwerp, Belgium**  
1990-2013

0 8 16 24 32 km

N

- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2013
- Arterial Roads

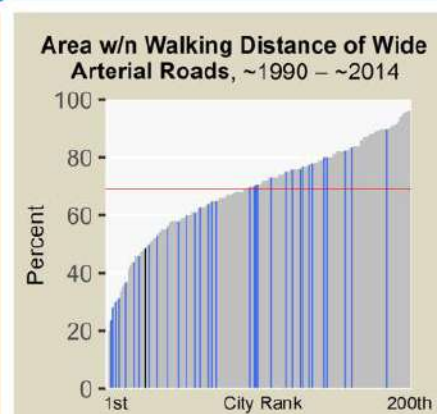
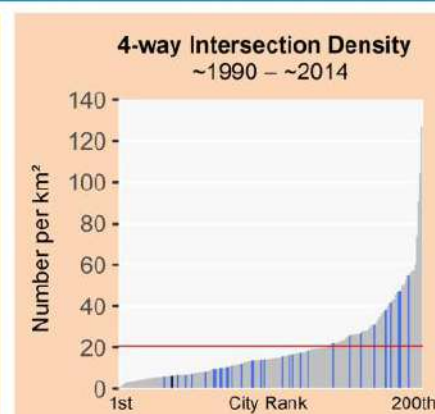
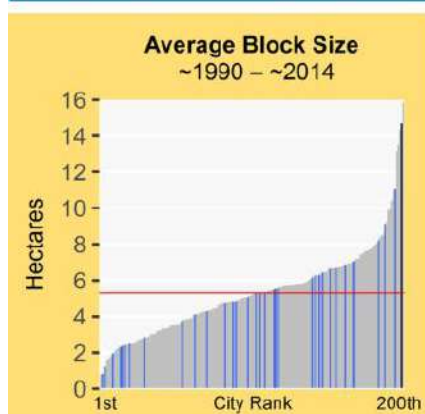
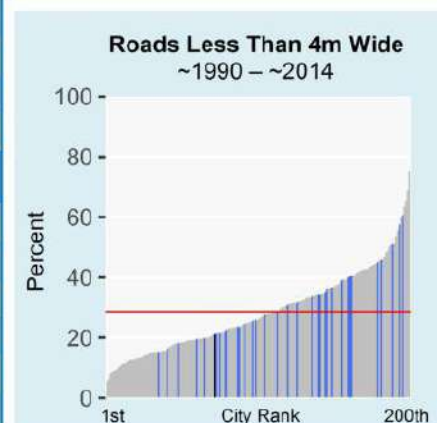
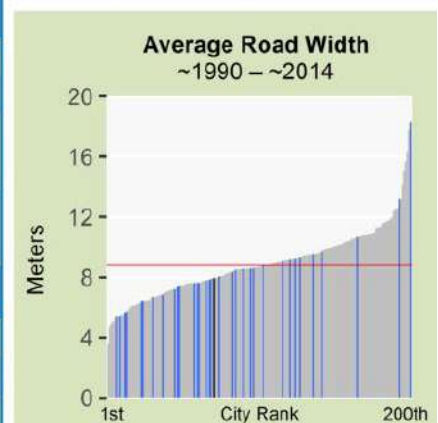
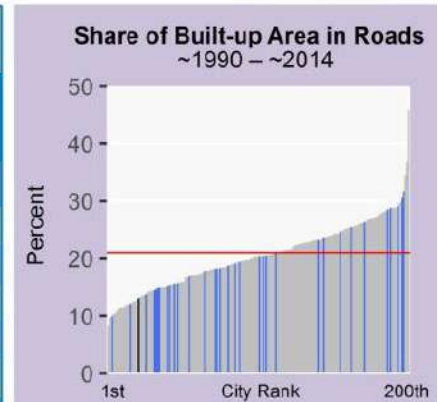
# Antwerp, Belgium (Europe and Japan)



**Legend for Charts**

Antwerp | Other cities in region | All other cities | Global average

Metrics	Pre-1990	1990-2013
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	13%	13%
Share of Built-Up Area that is Gridded or Partially Gridded		0%
Average Road Width (m)	7.9	7.1
Share of Roads less than 4m Wide	22%	20%
Share of Roads more than 16m Wide	5%	1%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.6	1.4
Average Beeline Distance to Arterial Roads (m)	228	248
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	92%	90%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	60%	48%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	8%	9%
Average Block Size (ha)	7.1	14.7
3-way Intersection Density (number per km <sup>2</sup> )	62	55
4-way Intersection Density (number per km <sup>2</sup> )	5	6
Walkability Ratio	1.8	1.4
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		1448
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	64%	70%
Share of Residential Area Not Laid Out Before Occupation	15%	85%
Share of Residential Area Laid Out Before Occupation	84%	14%
Share of Residential Area in Informal Land Subdivisions	0%	0%
Share of Residential Area in Formal Land Subdivisions	80%	13%
Share of Residential Area in Housing Projects	3%	0%



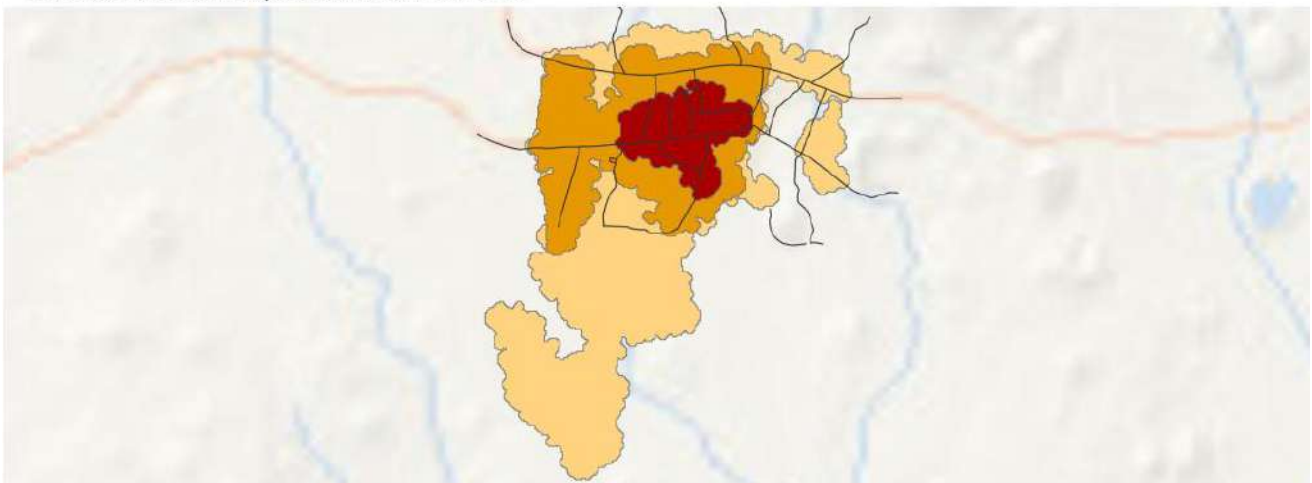
# Arusha, Tanzania (Sub-Saharan Africa)



Selected Locales in Area Developed Before 1988



Selected Locales in Expansion Area, 1988-2013



## Arusha, Tanzania 1988-2013



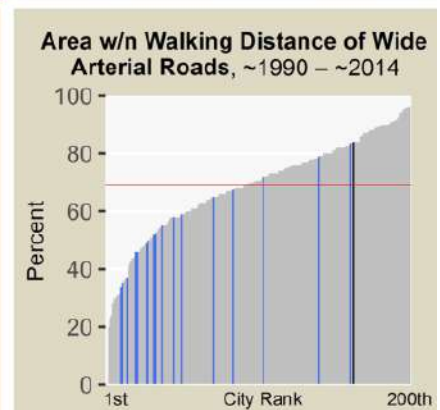
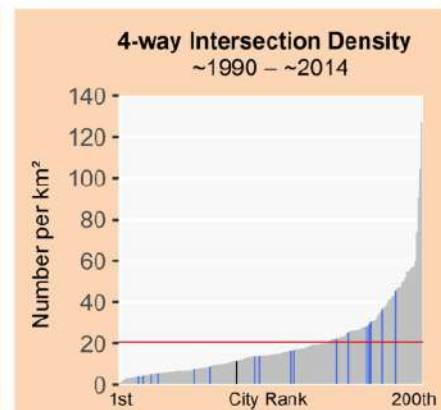
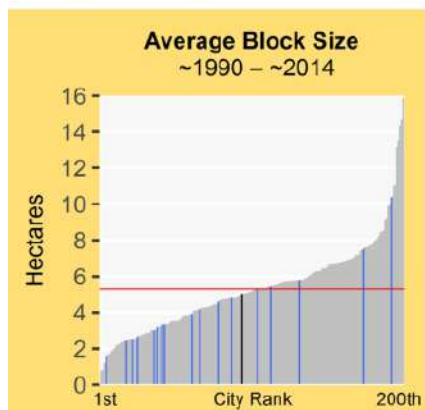
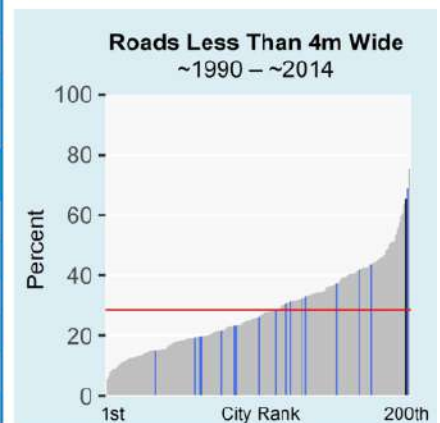
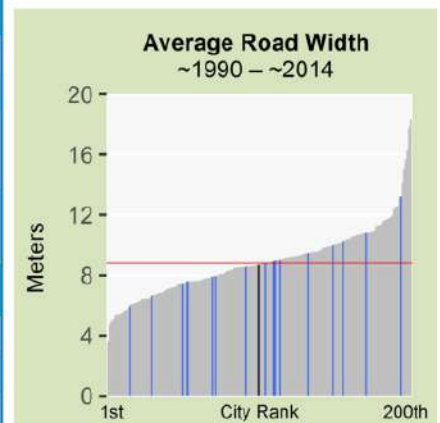
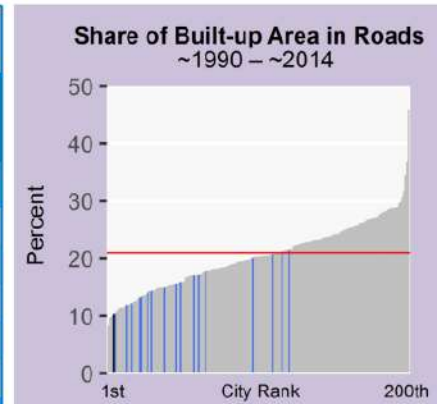
- Urban Extent in 1988
- Expansion, 1988 - 2000
- Expansion, 2000 - 2013

Arterial Roads

# Arusha, Tanzania (Sub-Saharan Africa)



Legend for Charts			
	Arusha	Other cities in region	All other cities
<b>Global average</b> —			
Metrics	Pre-1988	1988-2013	
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	20%	10%	
Share of Built-Up Area that is Gridded or Partially Gridded	17%	0%	
Average Road Width (m)	8.7	4.7	
Share of Roads less than 4m Wide	20%	65%	
Share of Roads more than 16m Wide	10%	5%	
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	2.9	1.0	
Average Beeline Distance to Arterial Roads (m)	104	219	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	100%	95%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	100%	84%	
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	14%	5%	
Average Block Size (ha)	4.8	5.0	
3-way Intersection Density (number per km <sup>2</sup> )	111	128	
4-way Intersection Density (number per km <sup>2</sup> )	18	11	
Walkability Ratio	1.6	1.6	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	553	369	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	456	654	
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	57%	79%	
Share of Residential Area Not Laid Out Before Occupation	35%	85%	
Share of Residential Area Laid Out Before Occupation	65%	14%	
Share of Residential Area in Informal Land Subdivisions	34%	12%	
Share of Residential Area in Formal Land Subdivisions	28%	1%	
Share of Residential Area in Housing Projects	1%	0%	



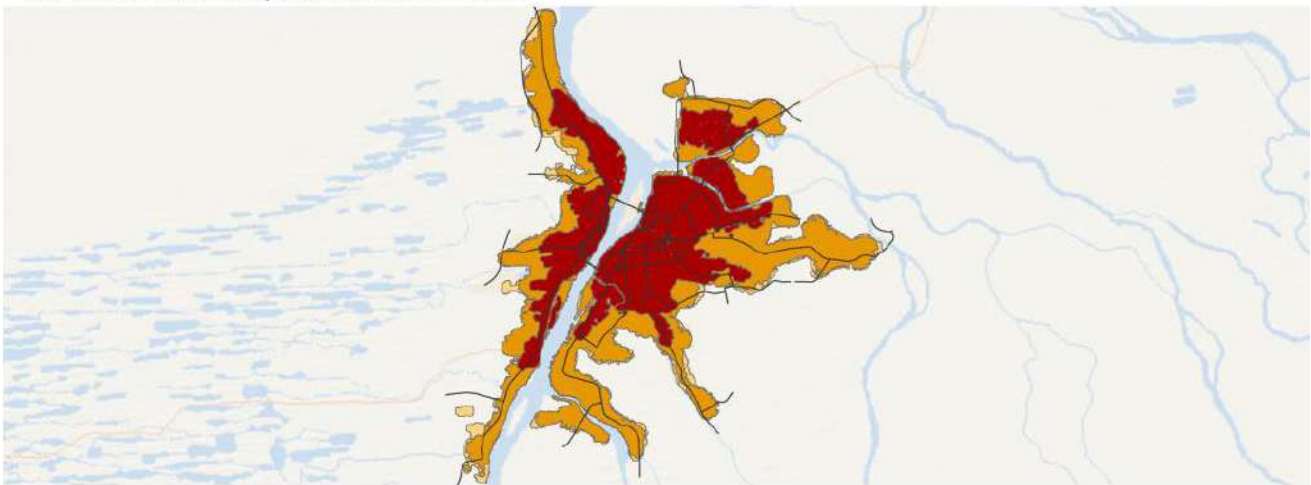
# Astrakhan, Russia (Europe and Japan)



Selected Locales in Area Developed Before 1988



Selected Locales in Expansion Area, 1988-2014



**Astrakhan, Russia**  
1988-2014

0 5 10 15 20 km

N

- Urban Extent in 1988
- Expansion, 1988 - 2003
- Expansion, 2003 - 2014
- Arterial Roads

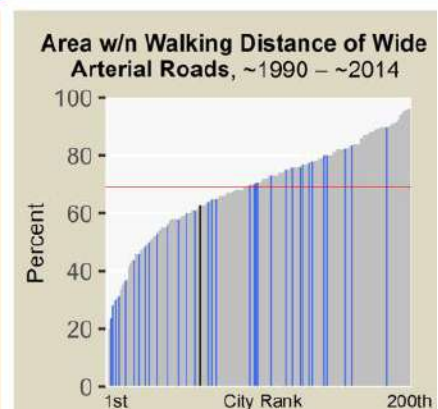
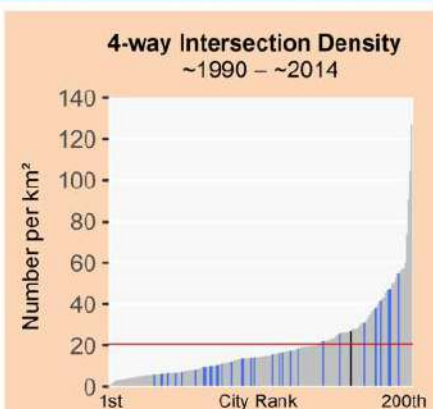
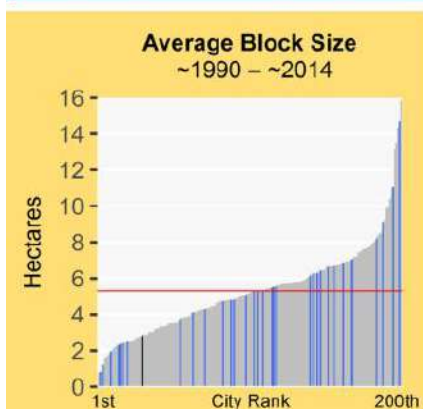
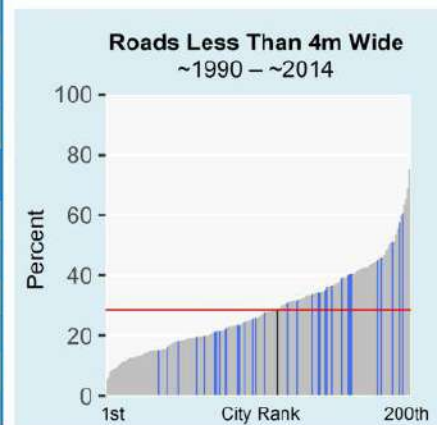
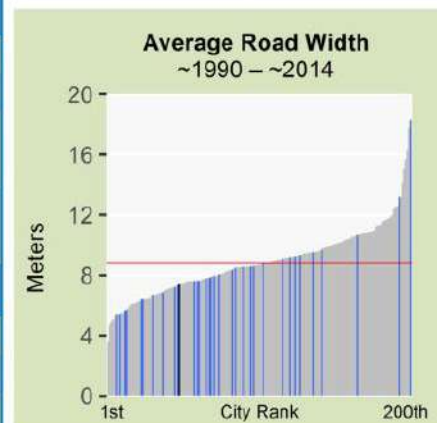
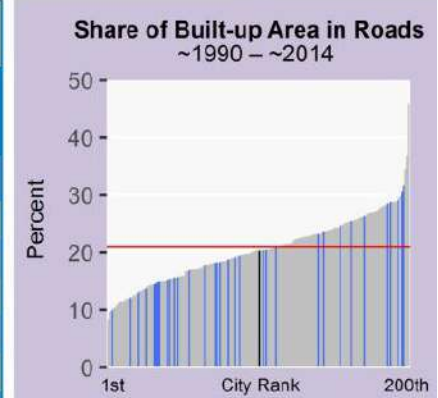
# Astrakhan, Russia (Europe and Japan)



### Legend for Charts

Astrakhan | Other cities in region | All other cities | Global average

Metrics	Pre-1988	1988-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	22%	20%
Share of Built-Up Area that is Gridded or Partially Gridded	2%	5%
Average Road Width (m)	7.4	5.3
Share of Roads less than 4m Wide	7%	28%
Share of Roads more than 16m Wide	3%	1%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.2	0.8
Average Beeline Distance to Arterial Roads (m)	334	371
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	84%	80%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	69%	63%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	10%	12%
Average Block Size (ha)	2.0	2.8
3-way Intersection Density (number per km <sup>2</sup> )	160	196
4-way Intersection Density (number per km <sup>2</sup> )	21	27
Walkability Ratio	1.8	1.6
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	473	991
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	59%	72%
Share of Residential Area Not Laid Out Before Occupation	2%	19%
Share of Residential Area Laid Out Before Occupation	97%	80%
Share of Residential Area in Informal Land Subdivisions	59%	80%
Share of Residential Area in Formal Land Subdivisions	19%	0%
Share of Residential Area in Housing Projects	19%	0%



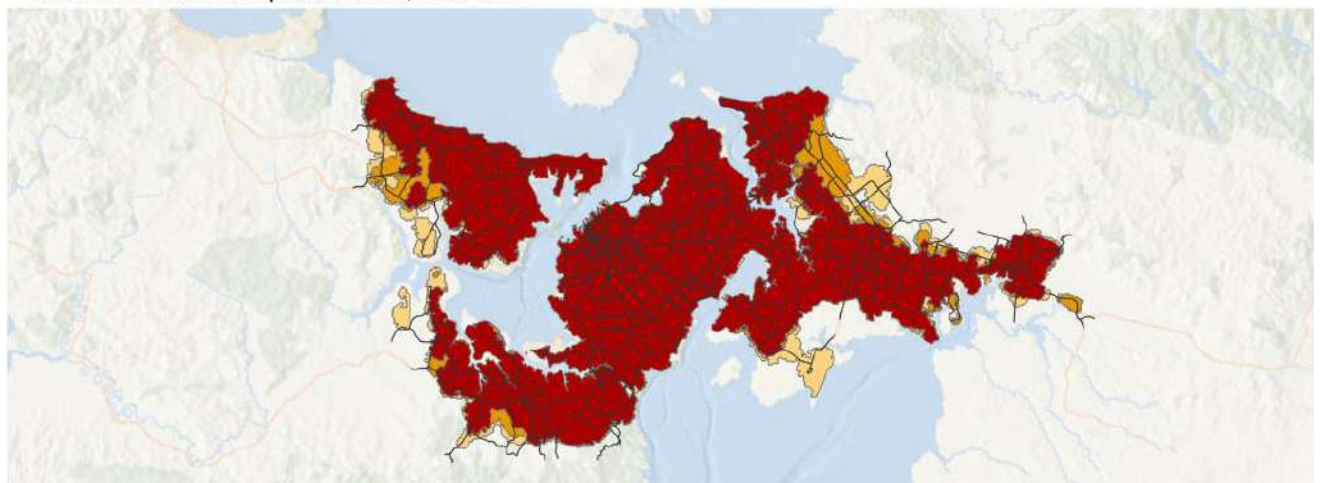
# Auckland, New Zealand (Land-Rich Developed Countries)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2014



**Auckland, New Zealand 1989-2014**

0 5 10 15 20 km

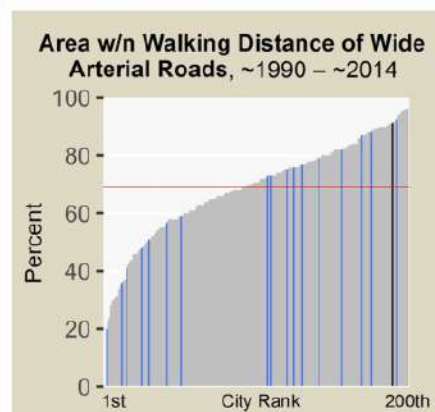
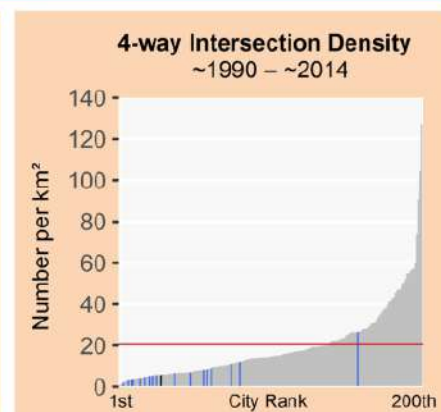
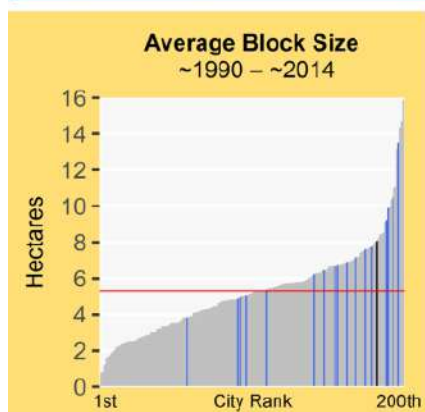
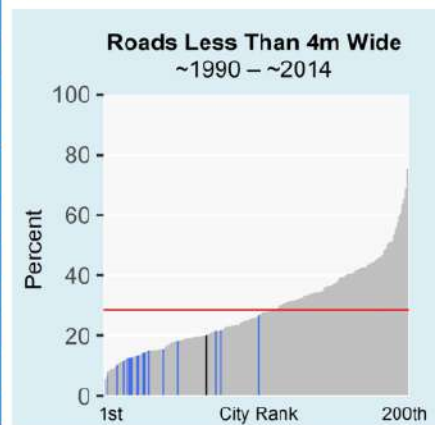
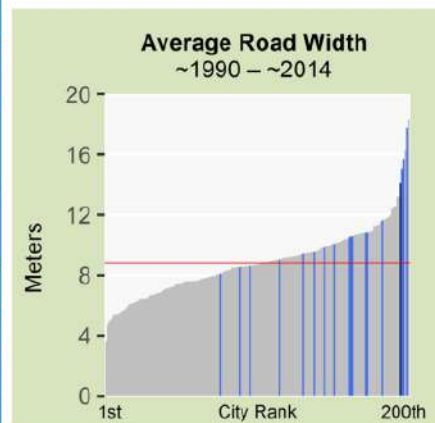
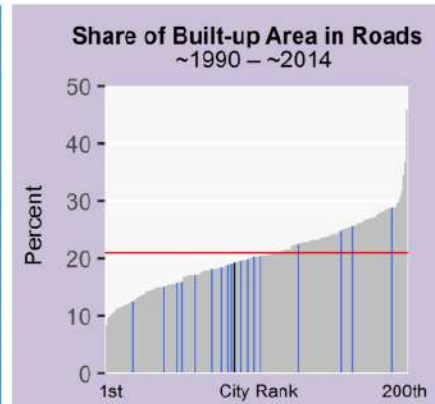
Urban Extent in 1989  
Expansion, 1989 - 2001  
Expansion, 2001 - 2014  
Arterial Roads



# Auckland, New Zealand (Land-Rich Developed Countries)



Legend for Charts				
	Auckland	Other cities in region	All other cities	Global average
<b>Roads</b>				
Share of Built-Up Area Occupied by Roads	17%			19%
Share of Built-Up Area that is Gridded or Partially Gridded	0%			0%
Average Road Width (m)	14.2			10.3
Share of Roads less than 4m Wide	7%			20%
Share of Roads more than 16m Wide	43%			19%
<b>Arterial Roads</b>				
Density of Arterial Roads (km/km <sup>2</sup> )	1.6			1.5
Average Beeline Distance to Arterial Roads (m)	233			244
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	92%			92%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	92%			91%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>				
Share of Intersections that are 4-way	6%			9%
Average Block Size (ha)	9.3			8.1
3-way Intersection Density (number per km <sup>2</sup> )	33			54
4-way Intersection Density (number per km <sup>2</sup> )	3			6
Walkability Ratio	1.6			1.6
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )				
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	580			454
<b>Stages in the Evolution of Residential Layouts</b>				
Share of Built-Up Area in Residential Use	81%			79%
Share of Residential Area Not Laid Out Before Occupation	0%			7%
Share of Residential Area Laid Out Before Occupation	99%			92%
Share of Residential Area in Informal Land Subdivisions	0%			0%
Share of Residential Area in Formal Land Subdivisions	96%			85%
Share of Residential Area in Housing Projects	3%			7%



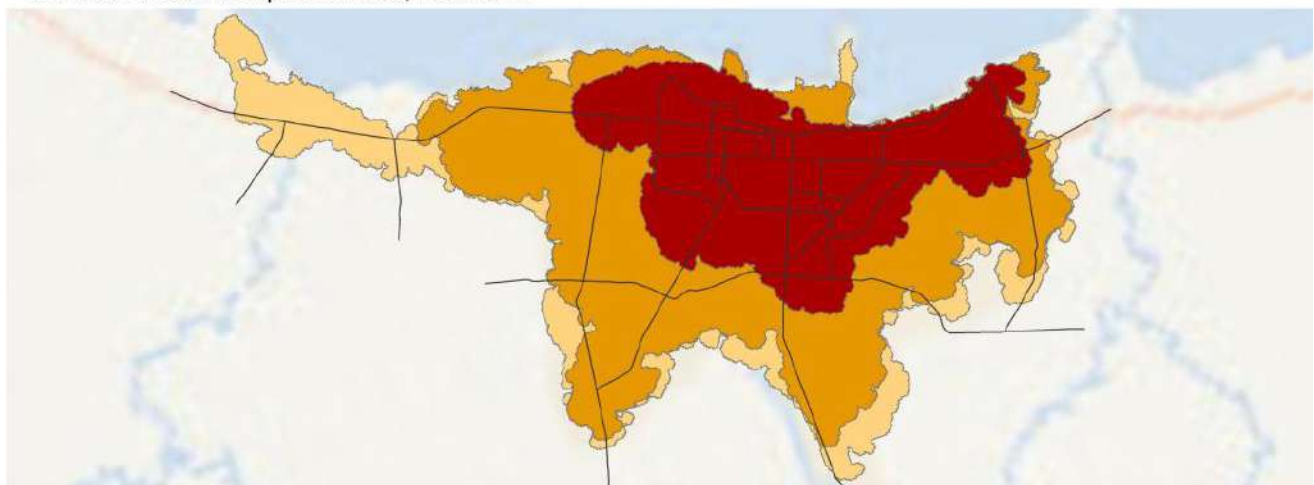
# Bacolod, Philippines (Southeast Asia)



Selected Locales in Area Developed Before 1992



Selected Locales in Expansion Area, 1992-2015



## Bacolod, Philippines 1992-2015



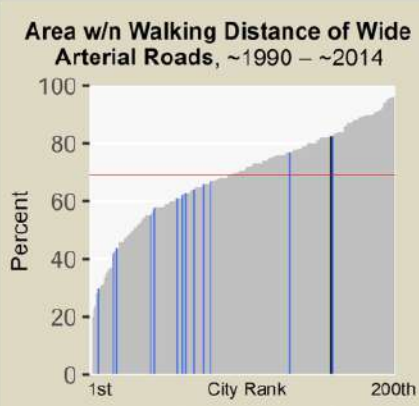
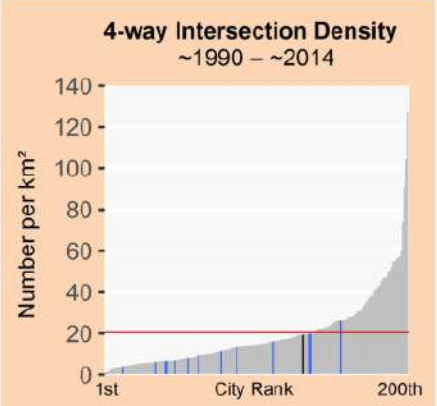
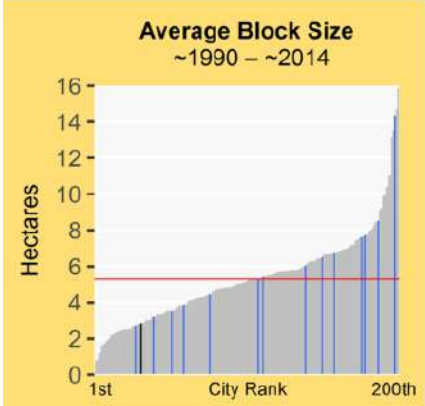
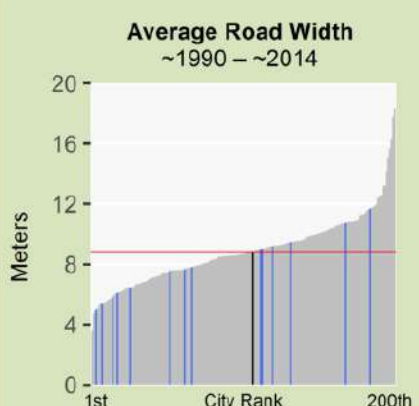
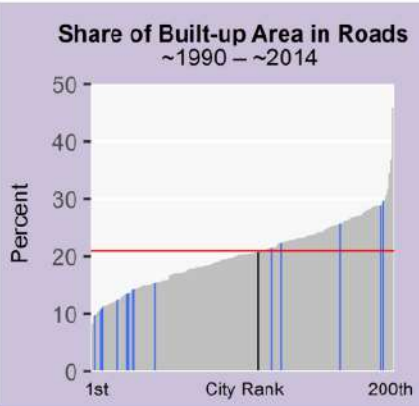
- Urban Extent in 1992
- Expansion, 1992 - 2000
- Expansion, 2000 - 2015

Arterial Roads

# Bacolod, Philippines (Southeast Asia)



Legend for Charts		
	Bacolod	Other cities in region   All other cities   Global average
Metrics		
	Pre-1992	1992-2015
Roads		
Share of Built-Up Area Occupied by Roads	26%	20%
Share of Built-Up Area that is Gridded or Partially Gridded	10%	7%
Average Road Width (m)	8.9	5.7
Share of Roads less than 4m Wide	23%	27%
Share of Roads more than 16m Wide	26%	1%
Arterial Roads		
Density of Arterial Roads (km/km <sup>2</sup> )	2.3	1.4
Average Beeline Distance to Arterial Roads (m)	160	264
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	98%	89%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	89%	82%
Block Size, Plot Size, Intersection Density, and Walkability		
Share of Intersections that are 4-way	41%	10%
Average Block Size (ha)	4.2	2.9
3-way Intersection Density (number per km <sup>2</sup> )	96	159
4-way Intersection Density (number per km <sup>2</sup> )	44	19
Walkability Ratio	2.1	2.2
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	23	383
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	363	409
Stages in the Evolution of Residential Layouts		
Share of Built-Up Area in Residential Use	97%	69%
Share of Residential Area Not Laid Out Before Occupation	42%	33%
Share of Residential Area Laid Out Before Occupation	78%	66%
Share of Residential Area in Informal Land Subdivisions	5%	44%
Share of Residential Area in Formal Land Subdivisions	64%	20%
Share of Residential Area in Housing Projects	8%	1%



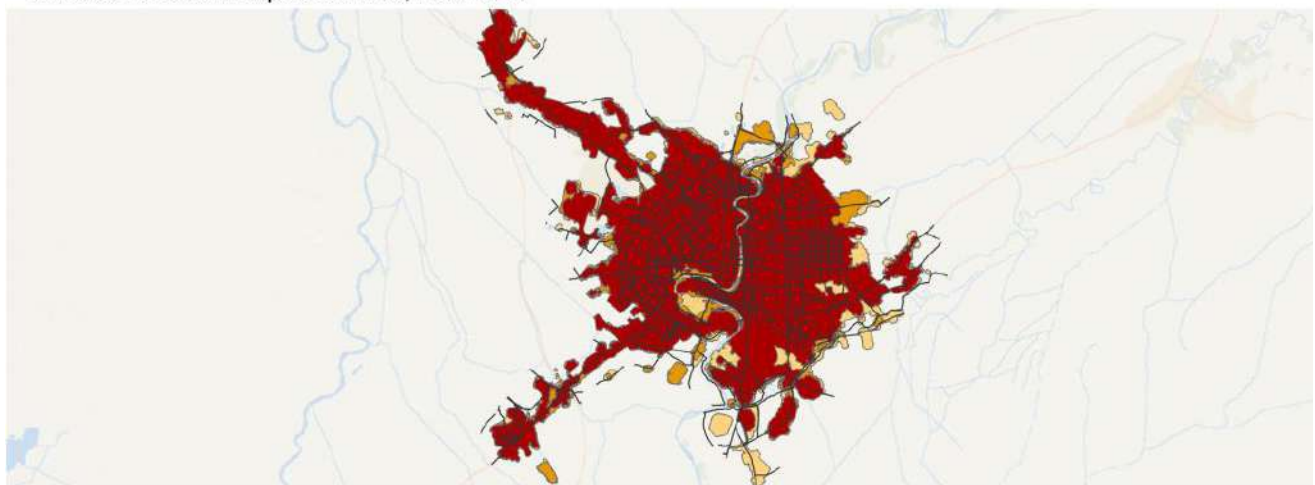
# Baghdad, Iraq (Western Asia and North Africa)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013



**Baghdad, Iraq**  
1990-2013

0 8 16 24 32 km

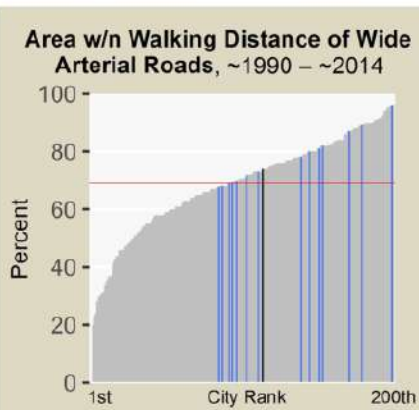
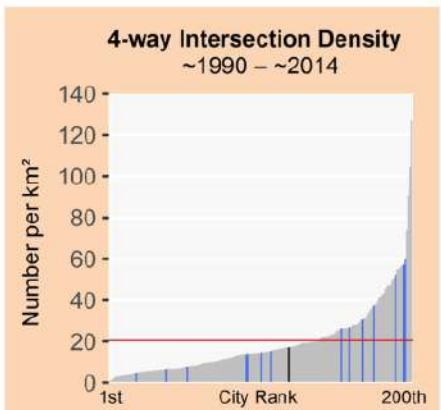
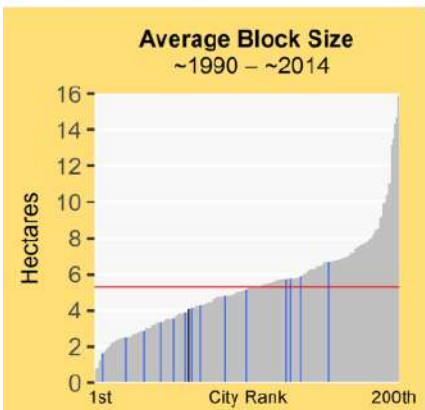
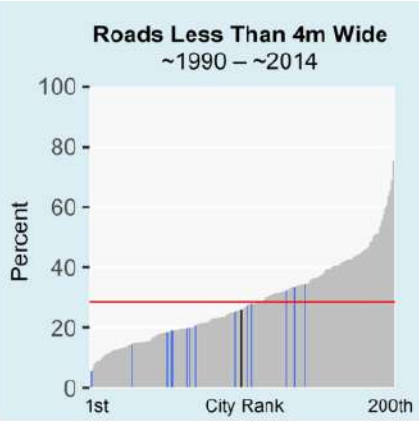
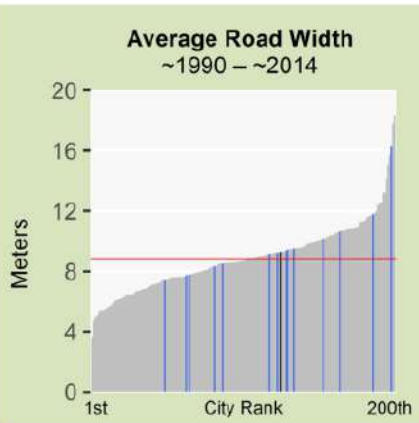
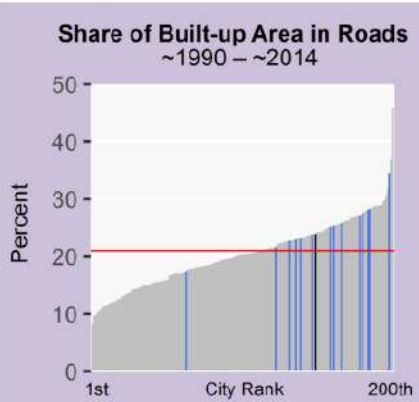
Urban Extent in 1990  
Expansion, 1990 - 2000  
Expansion, 2000 - 2013

Arterial Roads

# Baghdad, Iraq (Western Asia and North Africa)



Legend for Charts		
	Baghdad	Other cities in region   All other cities   Global average
Metrics		
	Pre-1990	1990-2013
Roads		
Share of Built-Up Area Occupied by Roads	24%	24%
Share of Built-Up Area that is Gridded or Partially Gridded	5%	0%
Average Road Width (m)	9.3	6.4
Share of Roads less than 4m Wide	9%	25%
Share of Roads more than 16m Wide	11%	3%
Arterial Roads		
Density of Arterial Roads (km/km <sup>2</sup> )	1.7	1.5
Average Beeline Distance to Arterial Roads (m)	313	349
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	86%	84%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	79%	74%
Block Size, Plot Size, Intersection Density, and Walkability		
Share of Intersections that are 4-way	11%	4%
Average Block Size (ha)	3.1	4.1
3-way Intersection Density (number per km <sup>2</sup> )	130	204
4-way Intersection Density (number per km <sup>2</sup> )	18	17
Walkability Ratio	1.7	1.9
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	125	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	300	
Stages in the Evolution of Residential Layouts		
Share of Built-Up Area in Residential Use	79%	79%
Share of Residential Area Not Laid Out Before Occupation	11%	54%
Share of Residential Area Laid Out Before Occupation	88%	45%
Share of Residential Area in Informal Land Subdivisions	30%	39%
Share of Residential Area in Formal Land Subdivisions	52%	4%
Share of Residential Area in Housing Projects	4%	0%



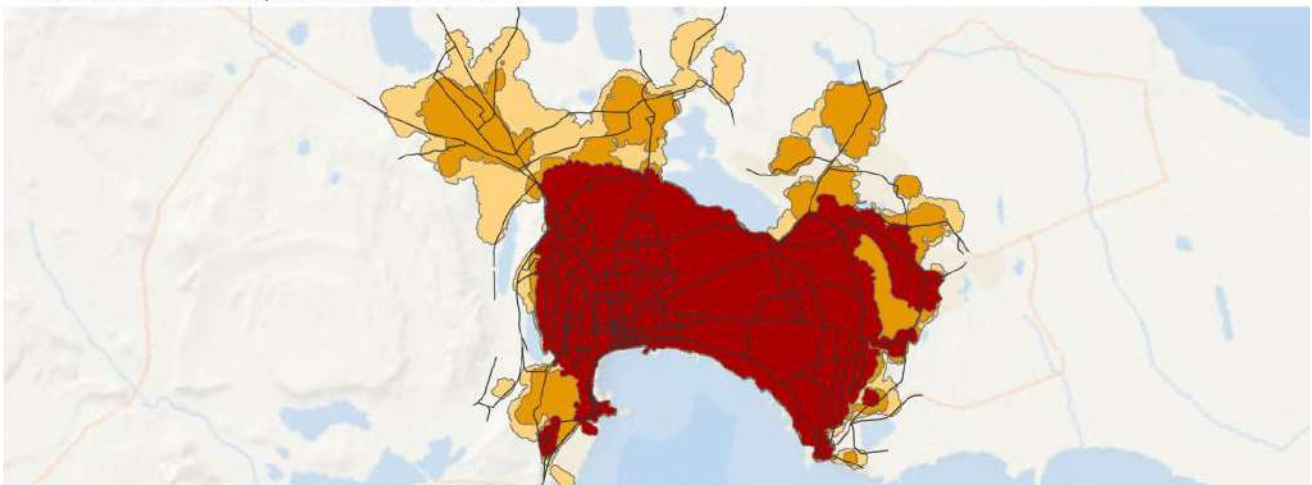
# Baku, Azerbaijan (Western Asia and North Africa)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2014




**Baku, Azerbaijan**  
1989-2014

0 4 8 12 16 km

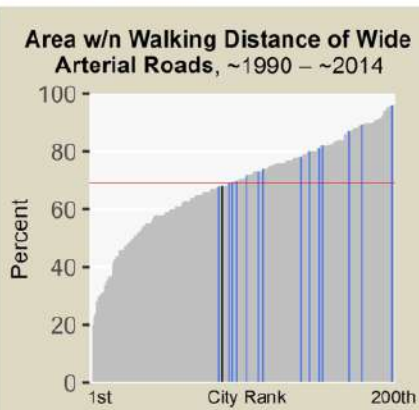
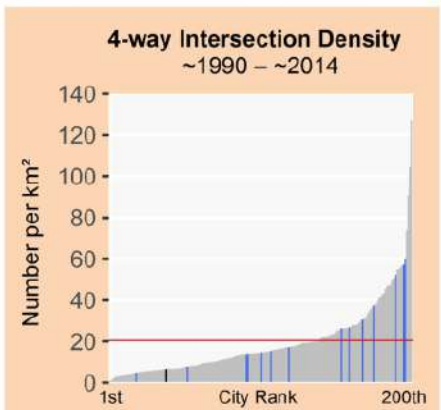
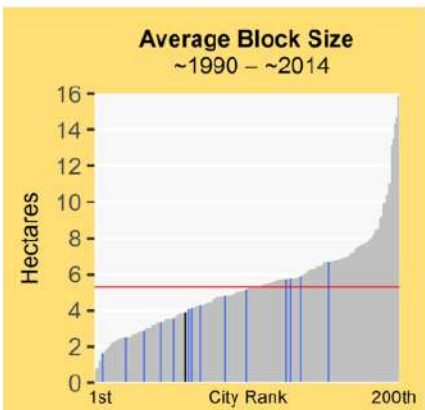
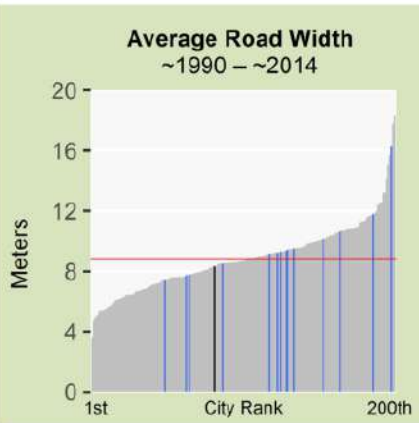
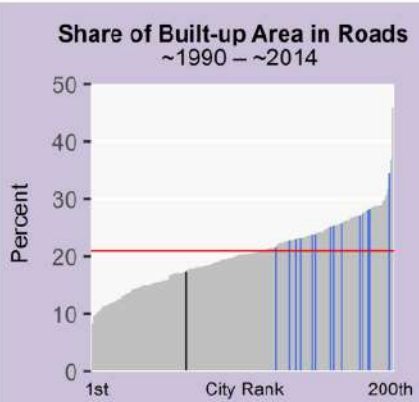
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- Urban Extent in 1989
- Expansion, 1989 - 2000
- Expansion, 2000 - 2014
- Arterial Roads

# Baku, Azerbaijan (Western Asia and North Africa)



Legend for Charts			
	Baku	Other cities in region	All other cities
<b>Global average</b> —			
Metrics	Pre-1989	1989-2014	
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	18%	17%	
Share of Built-Up Area that is Gridded or Partially Gridded	4%	2%	
Average Road Width (m)	8.3	6.7	
Share of Roads less than 4m Wide	17%	18%	
Share of Roads more than 16m Wide	11%	4%	
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	1.8	1.4	
Average Beeline Distance to Arterial Roads (m)	251	317	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	90%	84%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	81%	68%	
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	9%	5%	
Average Block Size (ha)	3.1	3.9	
3-way Intersection Density (number per km <sup>2</sup> )	107	117	
4-way Intersection Density (number per km <sup>2</sup> )	13	7	
Walkability Ratio	1.9	1.7	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		637	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	728		
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	57%	78%	
Share of Residential Area Not Laid Out Before Occupation	31%	44%	
Share of Residential Area Laid Out Before Occupation	68%	55%	
Share of Residential Area in Informal Land Subdivisions	23%	48%	
Share of Residential Area in Formal Land Subdivisions	26%	4%	
Share of Residential Area in Housing Projects	18%	2%	



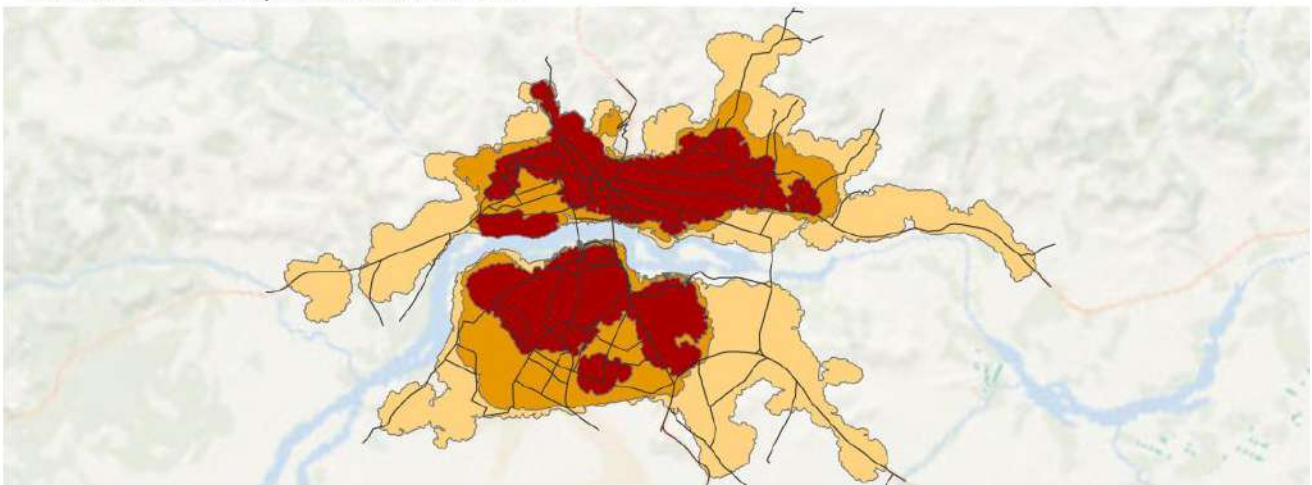
# Bamako, Mali (Sub-Saharan Africa)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013



**Bamako, Mali**  
1990-2013

0 4 8 12 16 km

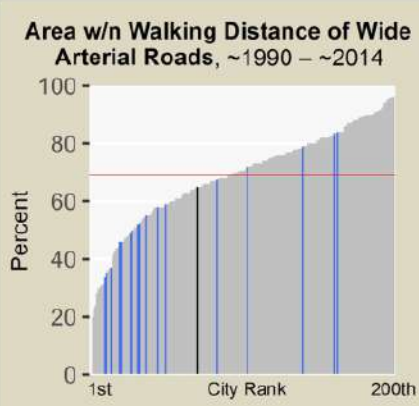
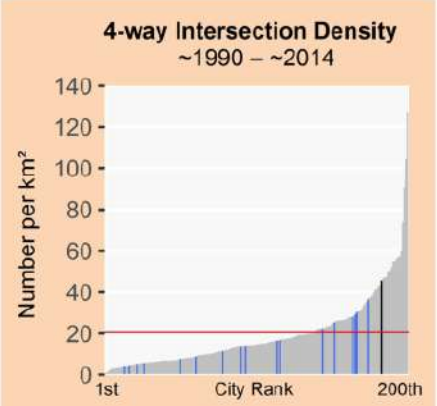
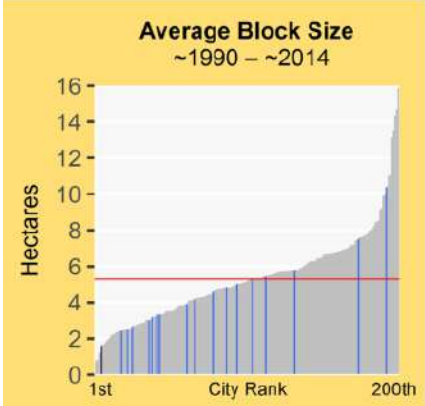
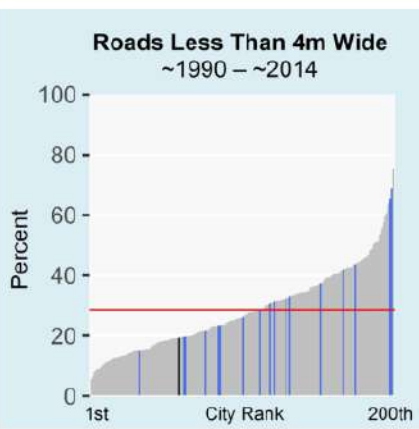
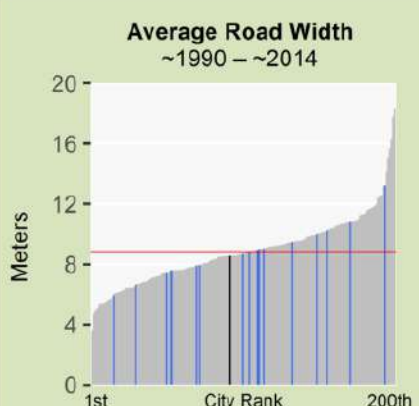
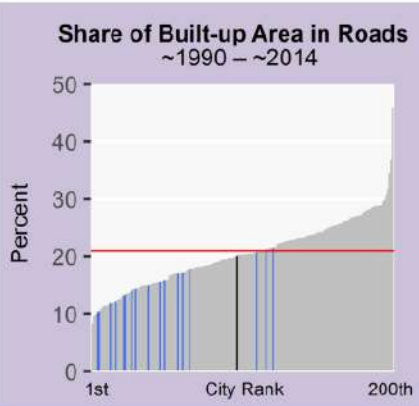
Urban Extent in 1990  
Expansion, 1990 - 2000  
Expansion, 2000 - 2013  
Arterial Roads



# Bamako, Mali (Sub-Saharan Africa)



Legend for Charts			
	Bamako	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1990	1990-2013	
Roads			
Share of Built-Up Area Occupied by Roads	18%	20%	
Share of Built-Up Area that is Gridded or Partially Gridded	32%	17%	
Average Road Width (m)	8.5	6.5	
Share of Roads less than 4m Wide	7%	19%	
Share of Roads more than 16m Wide	5%	2%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	1.9	1.0	
Average Beeline Distance to Arterial Roads (m)	178	376	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	98%	80%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	87%	65%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	28%	20%	
Average Block Size (ha)	2.2	1.6	
3-way Intersection Density (number per km <sup>2</sup> )	111	184	
4-way Intersection Density (number per km <sup>2</sup> )	44	46	
Walkability Ratio	1.6	1.5	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	651	467	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )			
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	66%	83%	
Share of Residential Area Not Laid Out Before Occupation	0%	21%	
Share of Residential Area Laid Out Before Occupation	99%	78%	
Share of Residential Area in Informal Land Subdivisions	99%	77%	
Share of Residential Area in Formal Land Subdivisions	0%	0%	
Share of Residential Area in Housing Projects	0%	0%	



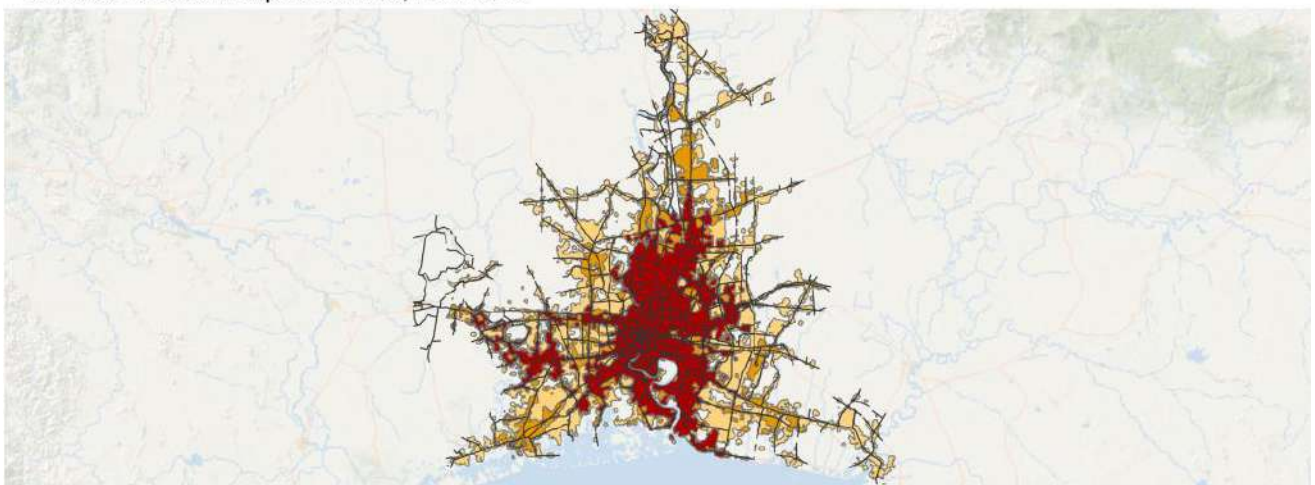
## Bangkok, Thailand (Southeast Asia)



Selected Locales in Area Developed Before 1988



Selected Locales in Expansion Area, 1988-2015



Bangkok, Thailand  
1988-2015



- Urban Extent in 1988
- Expansion, 1988 - 2002
- Expansion, 2002 - 2015

Arterial Roads

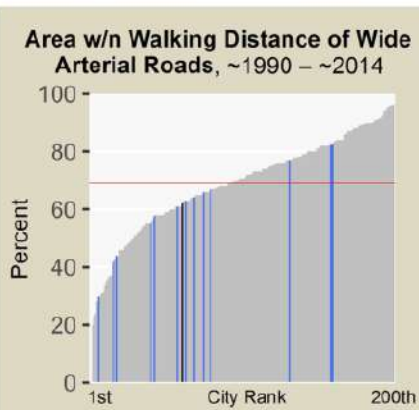
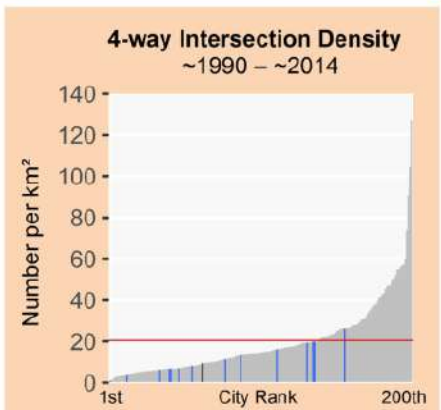
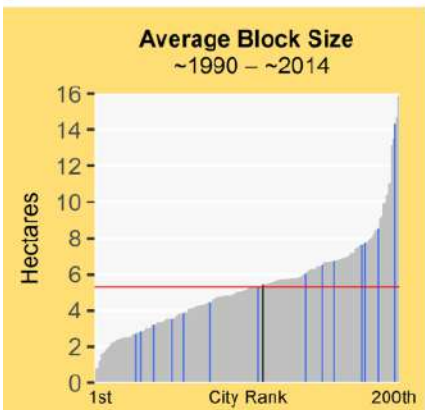
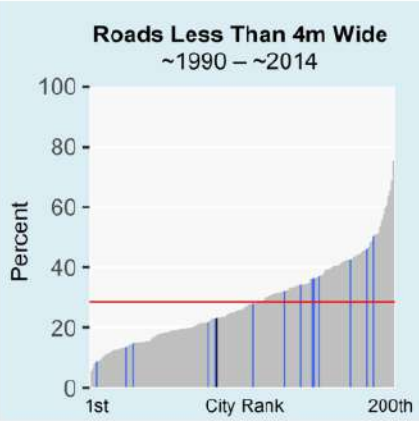
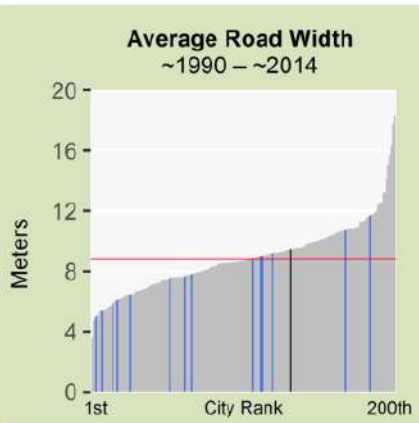
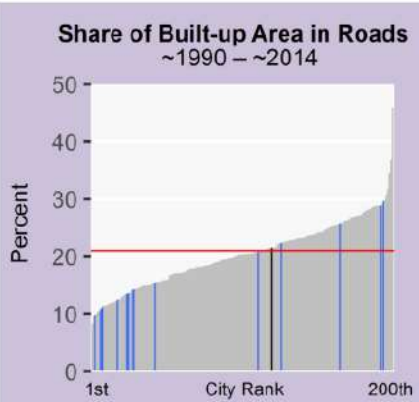
# Bangkok, Thailand (Southeast Asia)



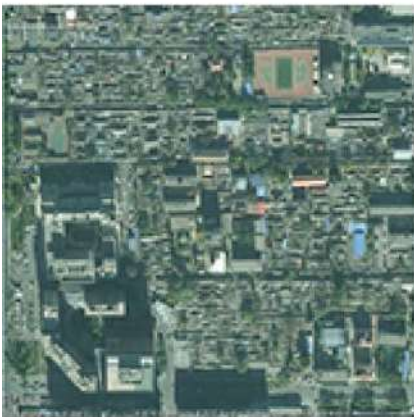
**Legend for Charts**

Bangkok | Other cities in region | All other cities | Global average

Metrics	Pre-1988	1988-2015
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	18%	21%
Share of Built-Up Area that is Gridded or Partially Gridded	4%	2%
Average Road Width (m)	9.5	7.0
Share of Roads less than 4m Wide	16%	23%
Share of Roads more than 16m Wide	12%	5%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.1	0.8
Average Beeline Distance to Arterial Roads (m)	353	520
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	83%	70%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	77%	62%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	10%	6%
Average Block Size (ha)	5.8	5.4
3-way Intersection Density (number per km <sup>2</sup> )	60	91
4-way Intersection Density (number per km <sup>2</sup> )	10	9
Walkability Ratio	1.7	2.2
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		279
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	224	196
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	55%	54%
Share of Residential Area Not Laid Out Before Occupation	73%	40%
Share of Residential Area Laid Out Before Occupation	22%	59%
Share of Residential Area in Informal Land Subdivisions	1%	15%
Share of Residential Area in Formal Land Subdivisions	19%	8%
Share of Residential Area in Housing Projects	4%	35%



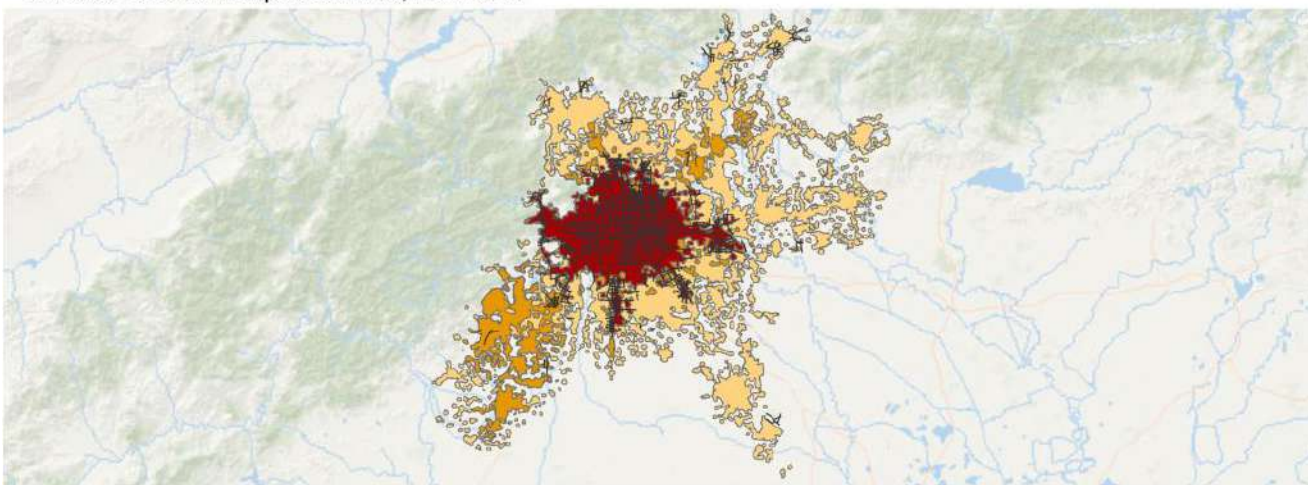
# Beijing, Beijing, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1988



Selected Locales in Expansion Area, 1988-2013



Beijing, Beijing, China  
1988-2013

0 25 50 75 100 km

N

- Urban Extent in 1988
- Expansion, 1988 - 1999
- Expansion, 1999 - 2013
- Arterial Roads

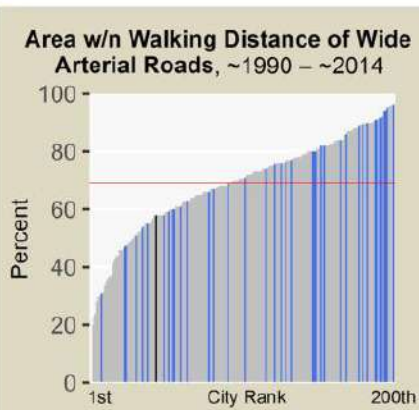
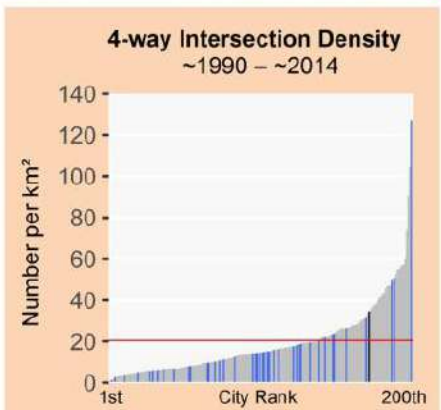
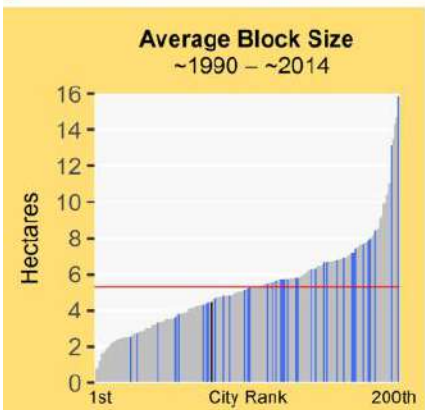
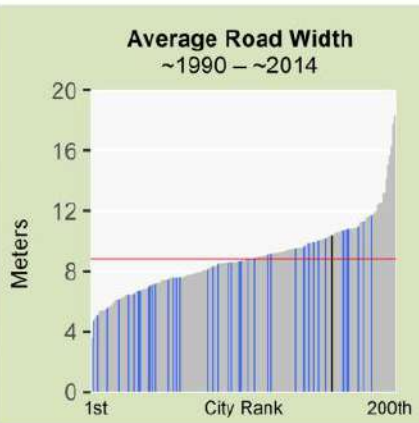
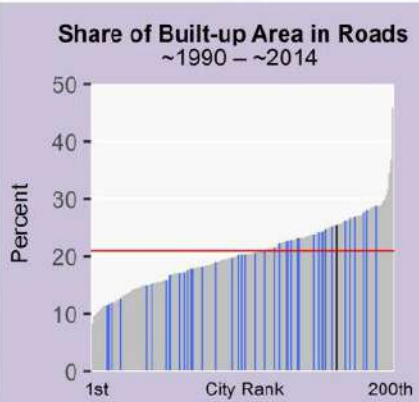
# Beijing, Beijing, China (East Asia and the Pacific)



**Legend for Charts**

Beijing | Other cities in region | All other cities | Global average

Metrics	Pre-1988	1988-2013
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	24%	25%
Share of Built-Up Area that is Gridded or Partially Gridded	2%	2%
Average Road Width (m)	10.4	7.3
Share of Roads less than 4m Wide	27%	42%
Share of Roads more than 16m Wide	19%	11%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.6	0.7
Average Beeline Distance to Arterial Roads (m)	271	573
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	89%	71%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	87%	57%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	10%	11%
Average Block Size (ha)	6.2	4.5
3-way Intersection Density (number per km <sup>2</sup> )	106	147
4-way Intersection Density (number per km <sup>2</sup> )	15	35
Walkability Ratio	1.6	1.8
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	21	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	421	
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	51%	53%
Share of Residential Area Not Laid Out Before Occupation	19%	10%
Share of Residential Area Laid Out Before Occupation	64%	89%
Share of Residential Area in Informal Land Subdivisions	8%	39%
Share of Residential Area in Formal Land Subdivisions	12%	19%
Share of Residential Area in Housing Projects	59%	29%



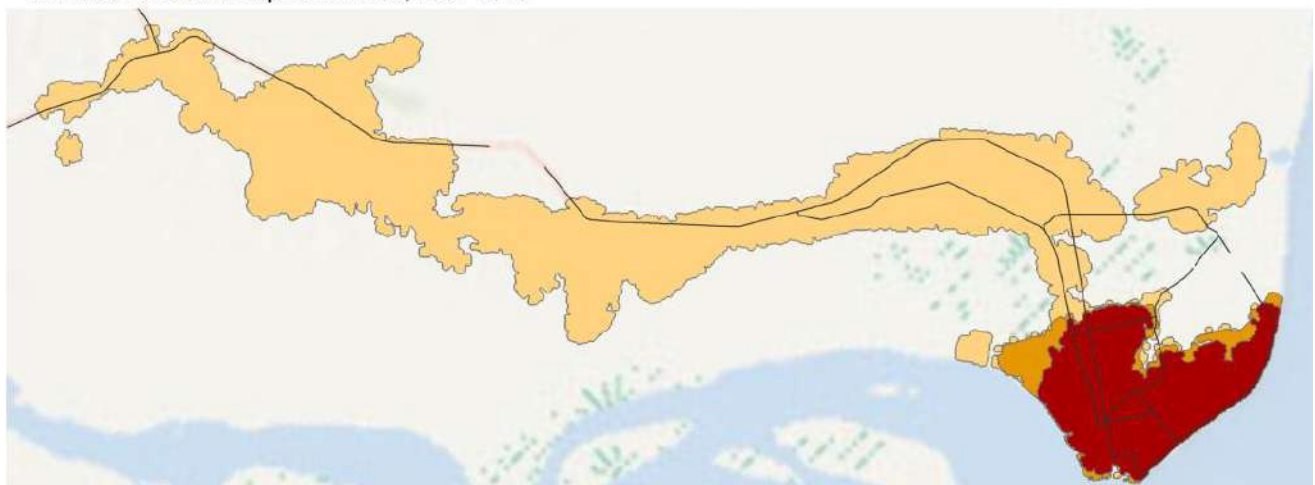
# Beira, Mozambique (Sub-Saharan Africa)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2013



**Beira, Mozambique**  
1991-2013

0 3 6 9 12 km

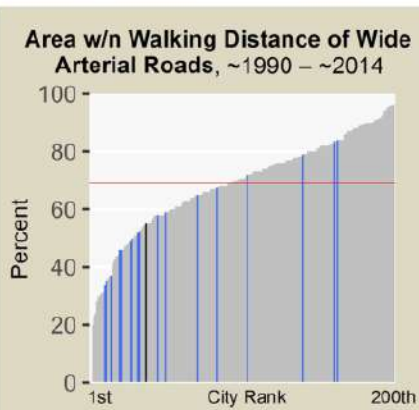
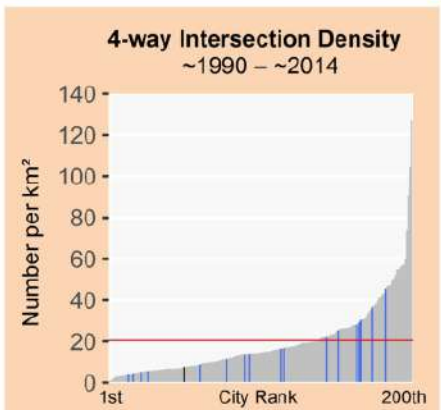
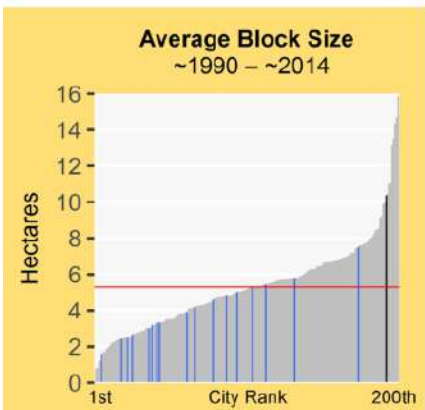
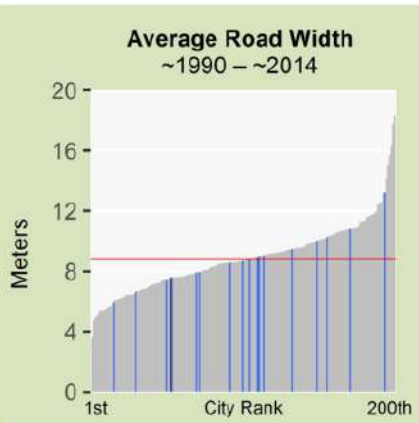
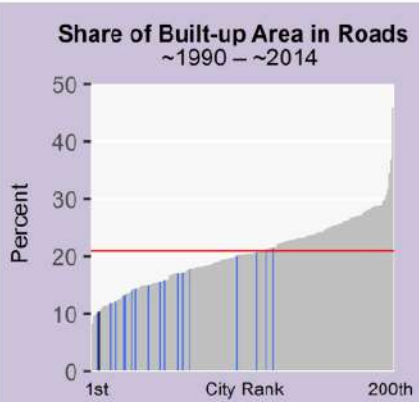
Urban Extent in 1991  
Expansion, 1991 - 2001  
Expansion, 2001 - 2013

Arterial Roads

# Beira, Mozambique (Sub-Saharan Africa)



Legend for Charts		
	Beira	Other cities in region
	All other cities	Global average
Metrics	Pre-1991	1991-2013
Roads		
Share of Built-Up Area Occupied by Roads	14%	10%
Share of Built-Up Area that is Gridded or Partially Gridded	13%	7%
Average Road Width (m)	7.6	6.5
Share of Roads less than 4m Wide	25%	28%
Share of Roads more than 16m Wide	8%	4%
Arterial Roads		
Density of Arterial Roads (km/km <sup>2</sup> )	1.1	0.6
Average Beeline Distance to Arterial Roads (m)	336	803
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	83%	57%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	77%	55%
Block Size, Plot Size, Intersection Density, and Walkability		
Share of Intersections that are 4-way	15%	10%
Average Block Size (ha)	5.2	10.4
3-way Intersection Density (number per km <sup>2</sup> )	58	42
4-way Intersection Density (number per km <sup>2</sup> )	17	8
Walkability Ratio	1.6	1.5
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	420	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	778	
Stages in the Evolution of Residential Layouts		
Share of Built-Up Area in Residential Use	78%	76%
Share of Residential Area Not Laid Out Before Occupation	66%	83%
Share of Residential Area Laid Out Before Occupation	33%	16%
Share of Residential Area in Informal Land Subdivisions	16%	16%
Share of Residential Area in Formal Land Subdivisions	10%	0%
Share of Residential Area in Housing Projects	6%	0%



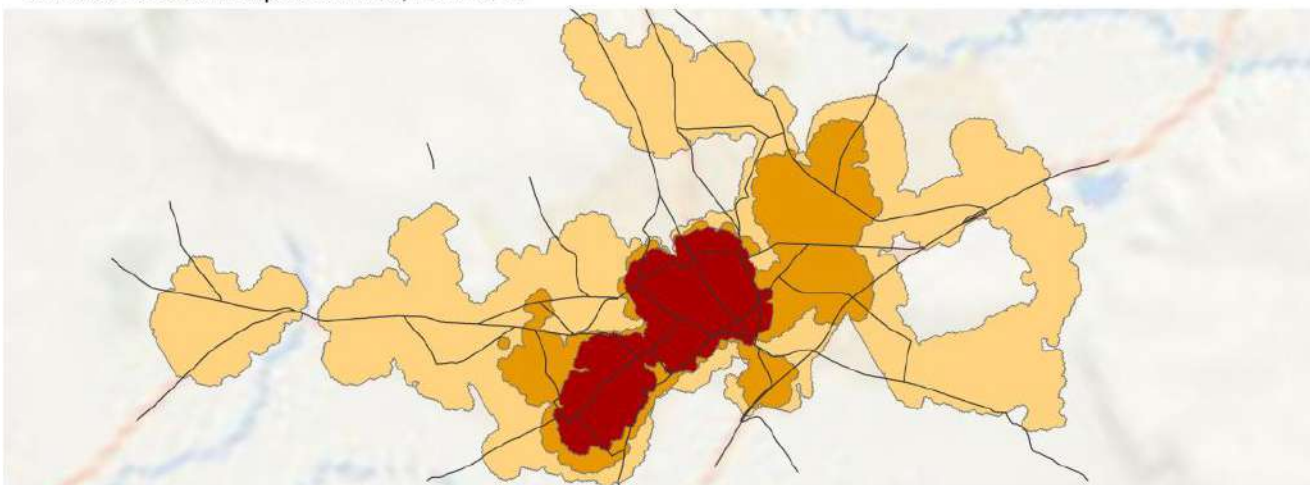
# Belgaum, India (South and Central Asia)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2014



**Belgaum, India**  
1989-2014

0 1 2 3 4 km

Urban Extent in 1989  
Expansion, 1989 - 2000  
Expansion, 2000 - 2014  
Arterial Roads



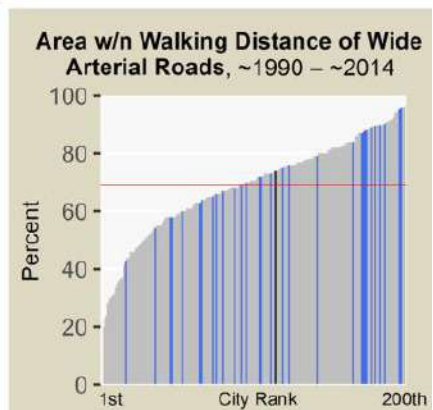
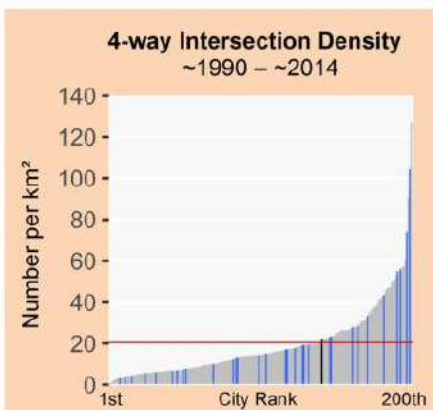
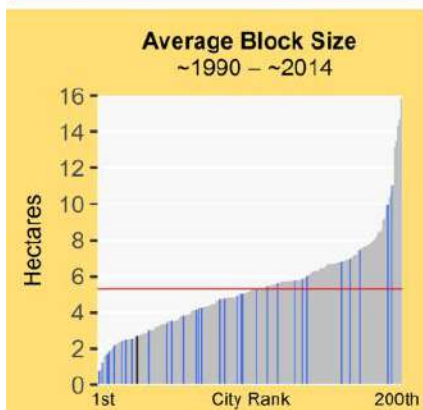
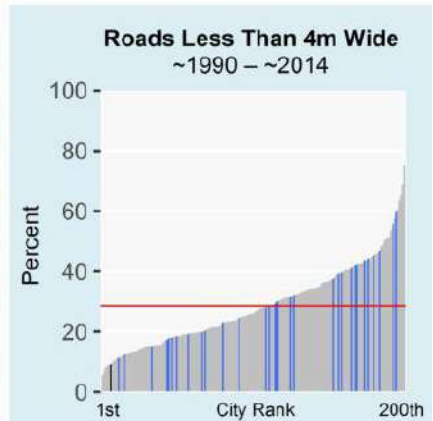
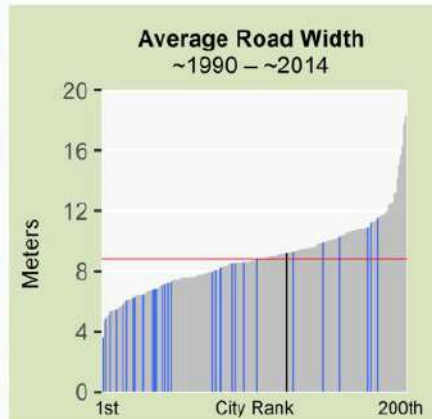
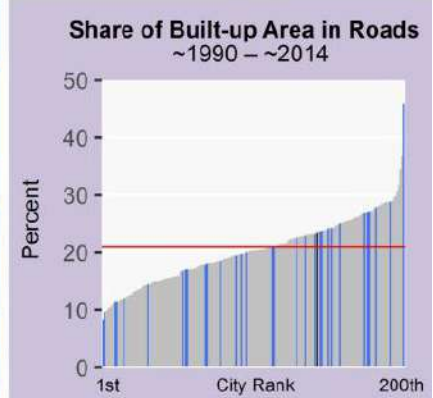
# Belgaum, India (South and Central Asia)



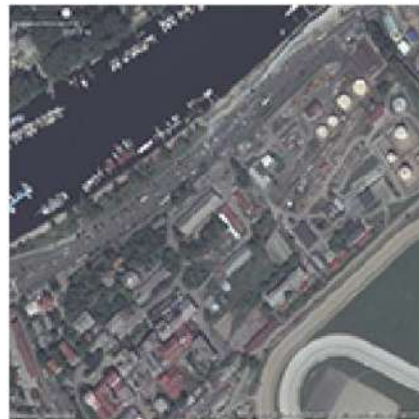
## Legend for Charts

Belgaum | Other cities in region | All other cities | Global average

Metrics	Pre-1989	1989-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	21%	23%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	2%
Average Road Width (m)	9.2	8.0
Share of Roads less than 4m Wide	8%	9%
Share of Roads more than 16m Wide	12%	6%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.6	1.5
Average Beeline Distance to Arterial Roads (m)	138	307
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	100%	87%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	97%	74%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	7%	10%
Average Block Size (ha)	2.6	2.7
3-way Intersection Density (number per km <sup>2</sup> )	113	152
4-way Intersection Density (number per km <sup>2</sup> )	12	22
Walkability Ratio	1.7	1.6
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		177
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		405
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	72%	78%
Share of Residential Area Not Laid Out Before Occupation	50%	23%
Share of Residential Area Laid Out Before Occupation	49%	76%
Share of Residential Area in Informal Land Subdivisions	38%	51%
Share of Residential Area in Formal Land Subdivisions	3%	25%
Share of Residential Area in Housing Projects	7%	0%



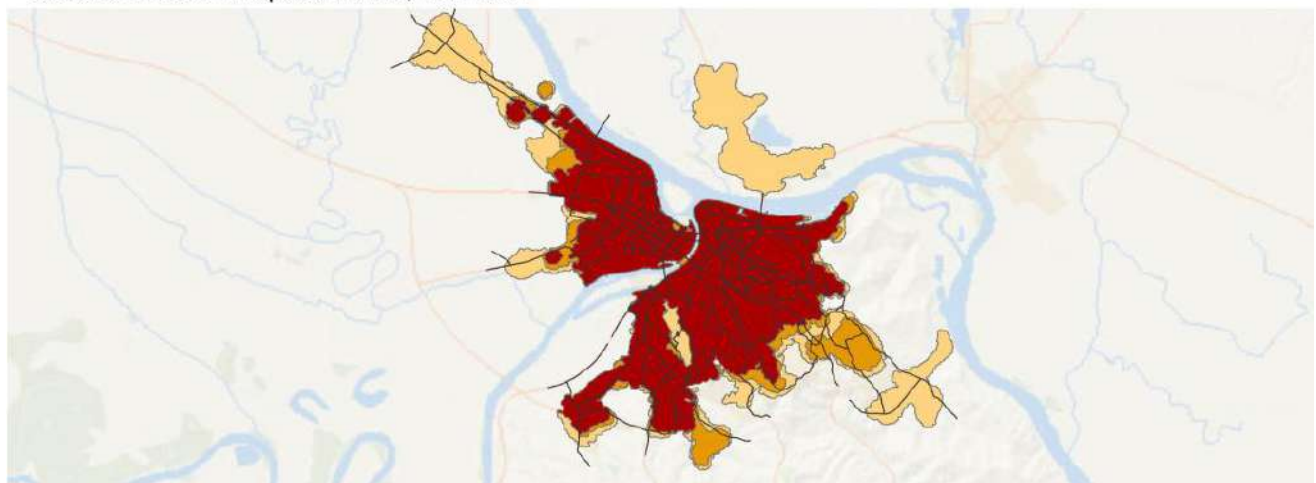
# Belgrade, Serbia (Europe and Japan)



Selected Locales in Area Developed Before 1988



Selected Locales in Expansion Area, 1988-2014



**Belgrade, Serbia**  
1988-2014

0 5 10 15 20 km

N

- Urban Extent in 1988
- Expansion, 1988 - 2000
- Expansion, 2000 - 2014
- Arterial Roads

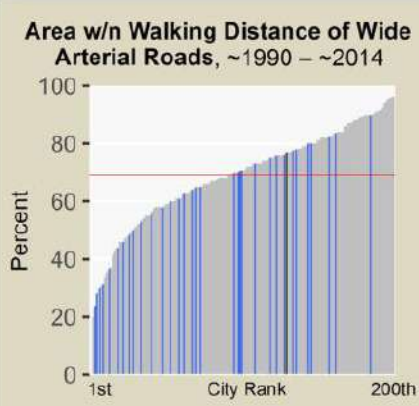
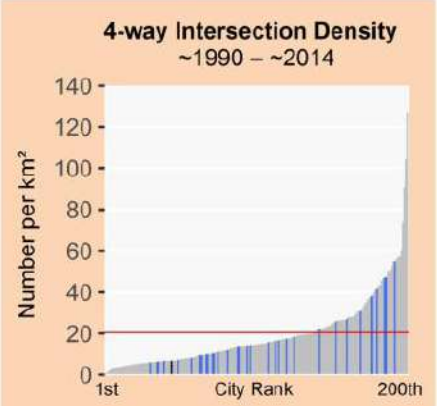
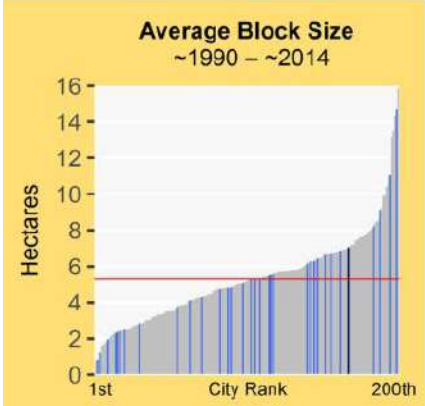
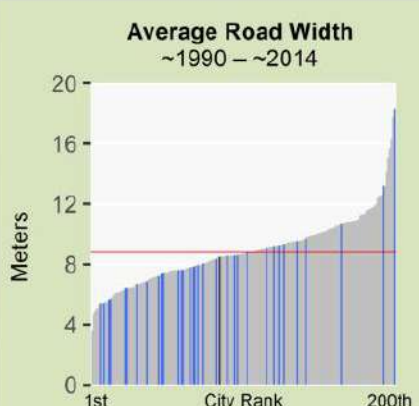
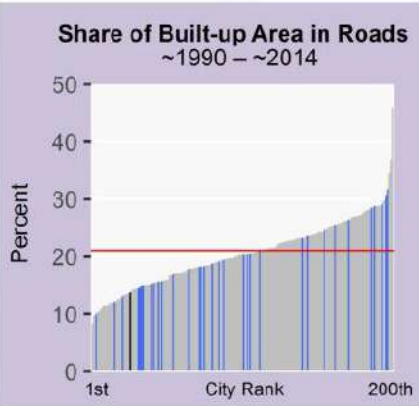
# Belgrade, Serbia (Europe and Japan)



**Legend for Charts**

Belgrade | Other cities in region | All other cities | Global average

Metrics	Pre-1988	1988-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	22%	13%
Share of Built-Up Area that is Gridded or Partially Gridded	2%	2%
Average Road Width (m)	8.5	5.7
Share of Roads less than 4m Wide	21%	36%
Share of Roads more than 16m Wide	10%	3%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.0	1.6
Average Beeline Distance to Arterial Roads (m)	182	245
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	97%	93%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	83%	77%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	11%	7%
Average Block Size (ha)	3.1	7.1
3-way Intersection Density (number per km <sup>2</sup> )	120	69
4-way Intersection Density (number per km <sup>2</sup> )	17	7
Walkability Ratio	1.8	1.6
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	52%	81%
Share of Residential Area Not Laid Out Before Occupation	18%	35%
Share of Residential Area Laid Out Before Occupation	81%	64%
Share of Residential Area in Informal Land Subdivisions	0%	27%
Share of Residential Area in Formal Land Subdivisions	59%	33%
Share of Residential Area in Housing Projects	21%	3%



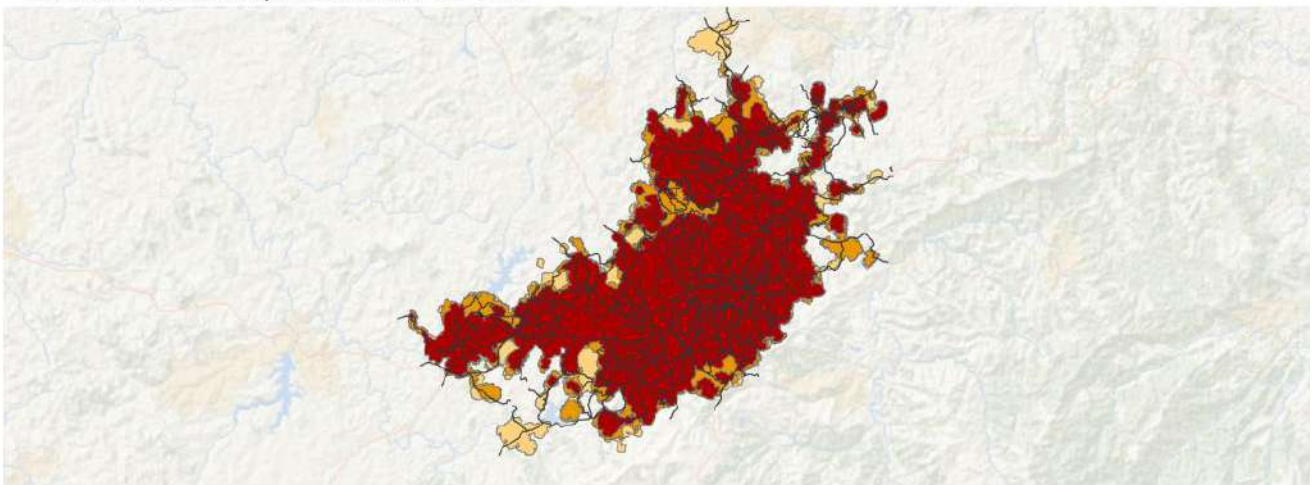
# Belo Horizonte, Brazil (Latin America and the Caribbean)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2013



**Belo Horizonte, Brazil**  
1989-2013

0 8 16 24 32 km

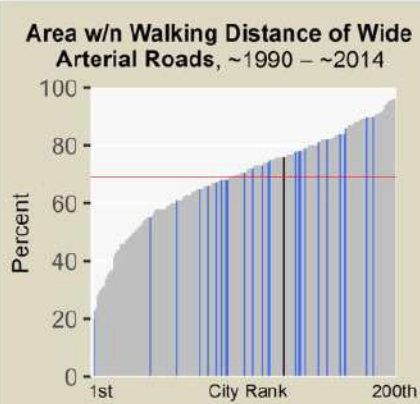
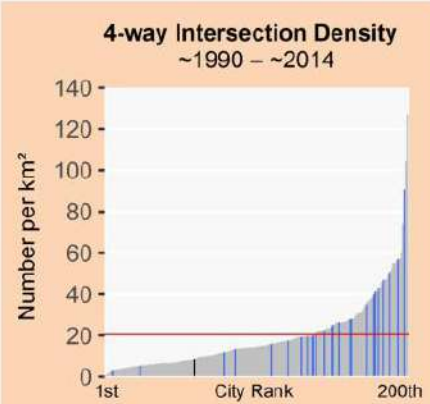
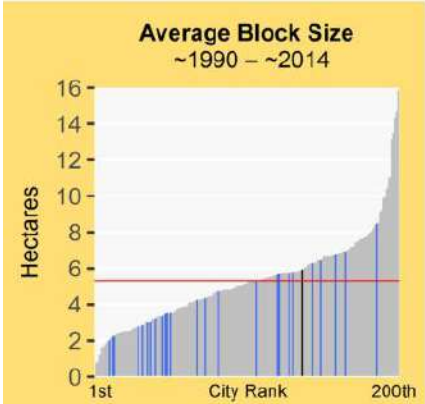
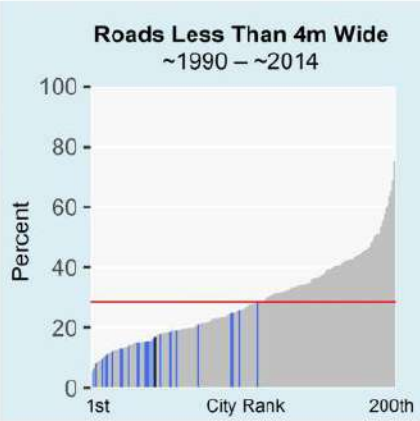
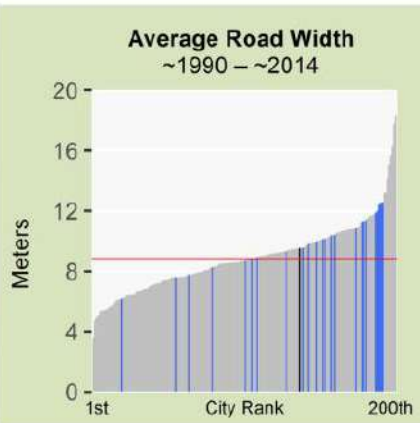
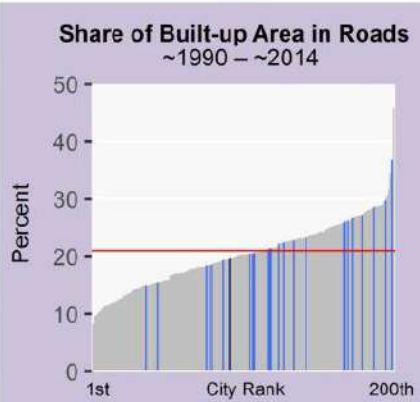
N

- Urban Extent in 1989
- Expansion, 1989 - 2000
- Expansion, 2000 - 2013
- Arterial Roads

# Belo Horizonte, Brazil (Latin America and the Caribbean)



Legend for Charts			
	Belo Horizonte	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1989	1989-2013	
Roads			
Share of Built-Up Area Occupied by Roads	22%	19%	
Share of Built-Up Area that is Gridded or Partially Gridded	10%	2%	
Average Road Width (m)	9.5	7.3	
Share of Roads less than 4m Wide	11%	17%	
Share of Roads more than 16m Wide	9%	2%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	2.0	1.7	
Average Beeline Distance to Arterial Roads (m)	204	242	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	95%	92%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	83%	76%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	20%	13%	
Average Block Size (ha)	3.0	5.9	
3-way Intersection Density (number per km <sup>2</sup> )	95	78	
4-way Intersection Density (number per km <sup>2</sup> )	23	9	
Walkability Ratio	1.7	1.8	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	182		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	388	194	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	80%	84%	
Share of Residential Area Not Laid Out Before Occupation	14%	10%	
Share of Residential Area Laid Out Before Occupation	85%	89%	
Share of Residential Area in Informal Land Subdivisions	9%	18%	
Share of Residential Area in Formal Land Subdivisions	74%	69%	
Share of Residential Area in Housing Projects	1%	0%	



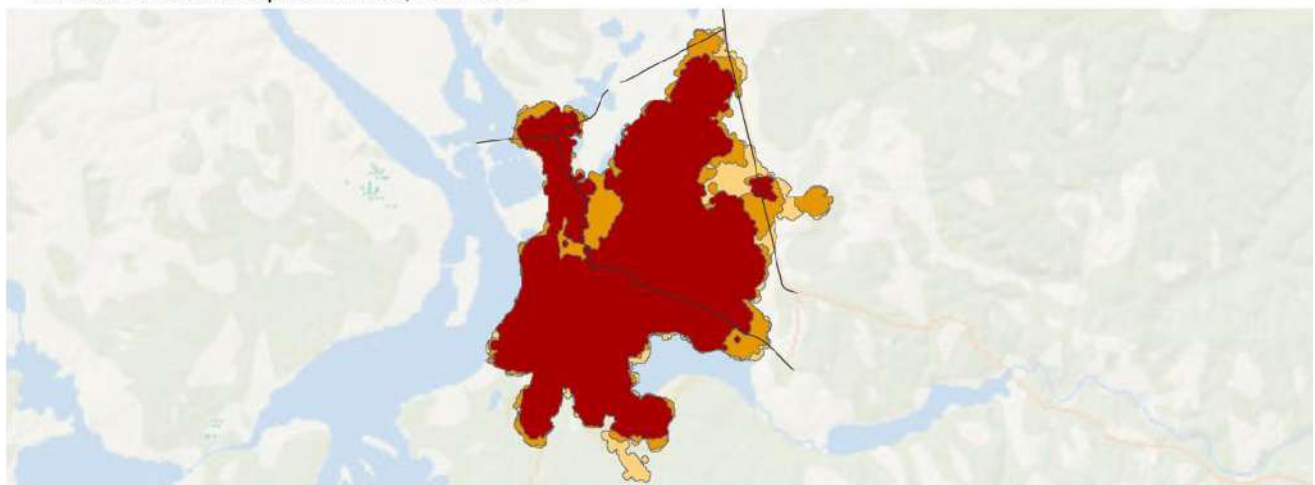
# Berezniki, Russia (Europe and Japan)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2010



**Berezniki, Russia  
1989-2010**

0 3 6 9 12 km

N

- Urban Extent in 1989
- Expansion, 1989 - 2000
- Expansion, 2000 - 2010
- Arterial Roads

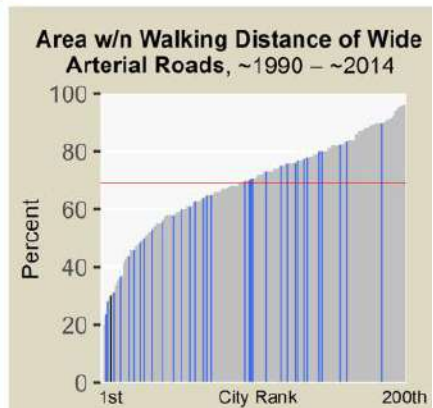
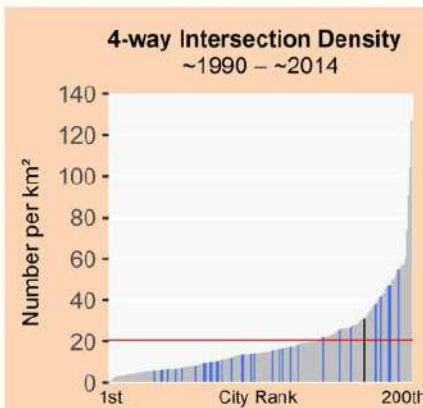
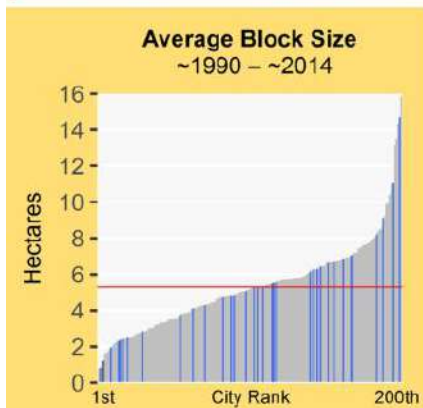
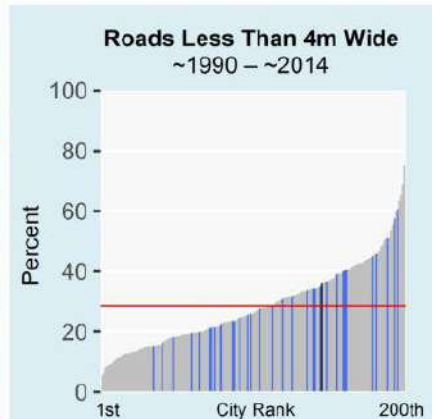
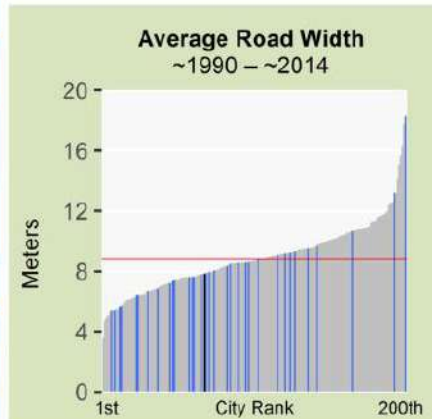
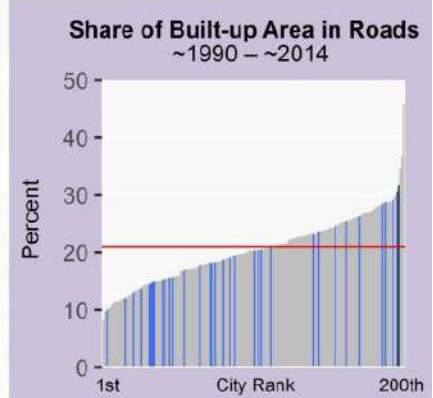
# Berezniki, Russia (Europe and Japan)



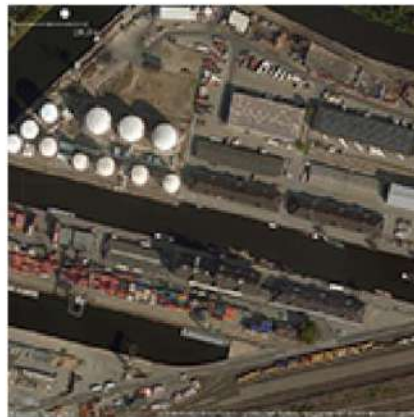
### Legend for Charts

Berezniki | Other cities in region | All other cities | Global average

Metrics	Pre-1989	1989-2010
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	23%	31%
Share of Built-Up Area that is Gridded or Partially Gridded	2%	0%
Average Road Width (m)	7.8	6.0
Share of Roads less than 4m Wide	17%	36%
Share of Roads more than 16m Wide	5%	1%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	0.3	0.3
Average Beeline Distance to Arterial Roads (m)	1129	1000
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	30%	37%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	32%	30%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	6%	5%
Average Block Size (ha)	4.4	1.2
3-way Intersection Density (number per km <sup>2</sup> )	115	328
4-way Intersection Density (number per km <sup>2</sup> )	11	31
Walkability Ratio	1.9	1.7
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	796	365
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	1040	
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	63%	72%
Share of Residential Area Not Laid Out Before Occupation	3%	0%
Share of Residential Area Laid Out Before Occupation	96%	100%
Share of Residential Area in Informal Land Subdivisions	59%	50%
Share of Residential Area in Formal Land Subdivisions	29%	0%
Share of Residential Area in Housing Projects	7%	50%



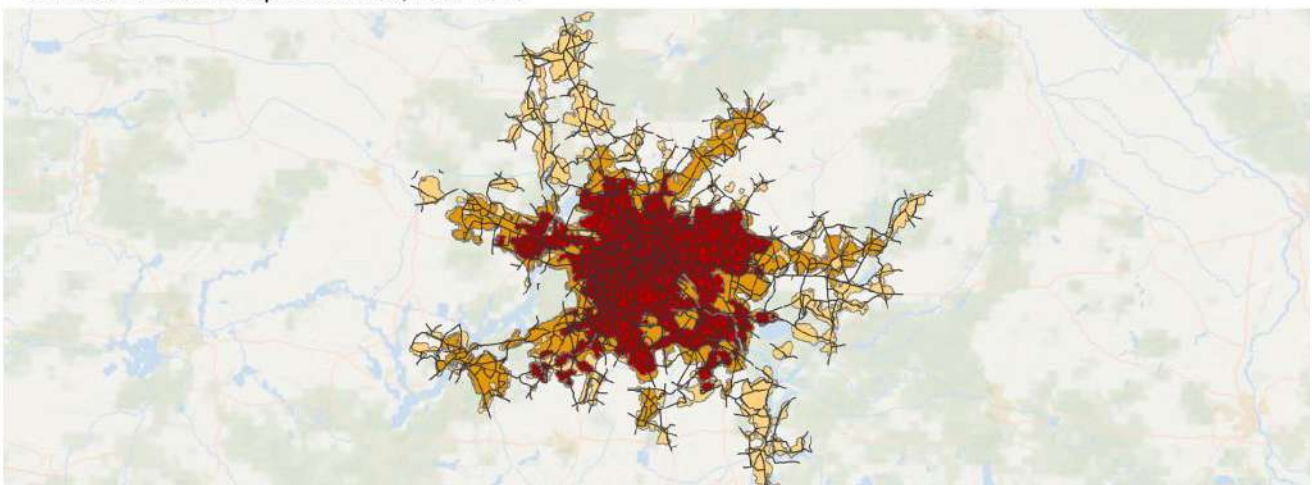
# Berlin, Germany (Europe and Japan)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013



**Berlin, Germany**  
1990-2013

0 10 20 30 40 km

N

- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2013
- Arterial Roads



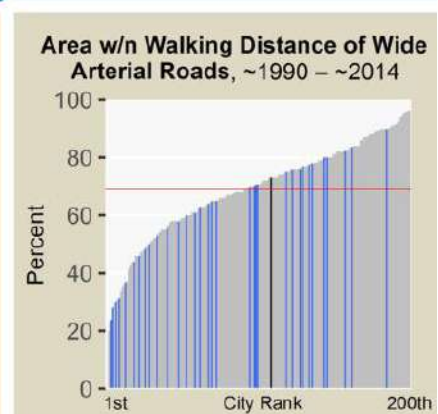
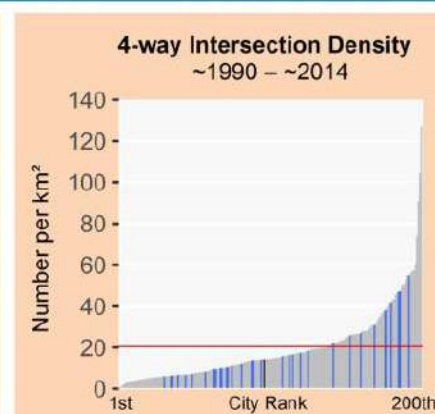
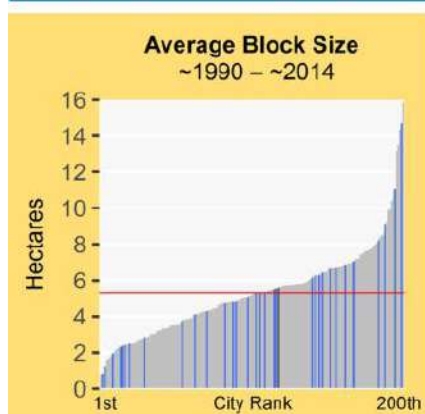
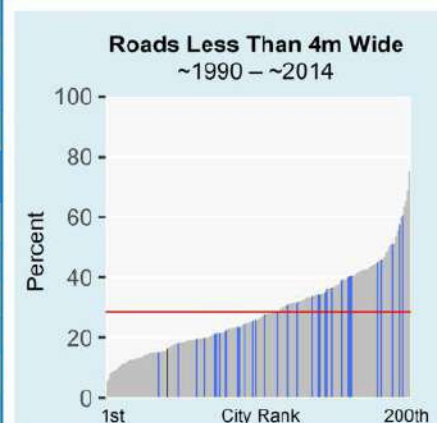
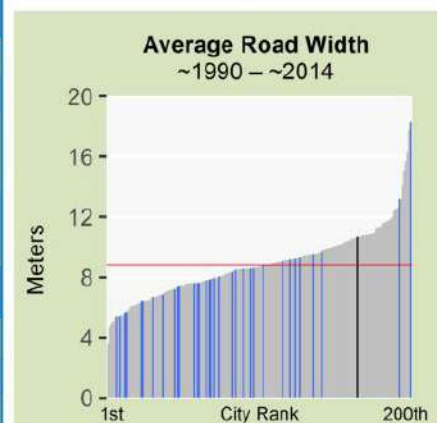
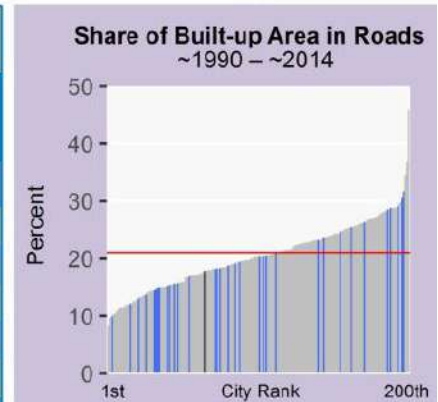
# Berlin, Germany (Europe and Japan)



**Legend for Charts**

Berlin | Other cities in region | All other cities | Global average

Metrics	Pre-1990	1990-2013
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	25%	17%
Share of Built-Up Area that is Gridded or Partially Gridded	12%	0%
Average Road Width (m)	10.7	8.8
Share of Roads less than 4m Wide	13%	16%
Share of Roads more than 16m Wide	17%	11%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.2	1.7
Average Beeline Distance to Arterial Roads (m)	150	207
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	98%	95%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	95%	73%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	23%	17%
Average Block Size (ha)	3.4	5.6
3-way Intersection Density (number per km <sup>2</sup> )	97	84
4-way Intersection Density (number per km <sup>2</sup> )	23	14
Walkability Ratio	1.9	1.9
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	309	278
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	454	909
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	74%	76%
Share of Residential Area Not Laid Out Before Occupation	0%	2%
Share of Residential Area Laid Out Before Occupation	99%	97%
Share of Residential Area in Informal Land Subdivisions	7%	11%
Share of Residential Area in Formal Land Subdivisions	71%	71%
Share of Residential Area in Housing Projects	20%	14%



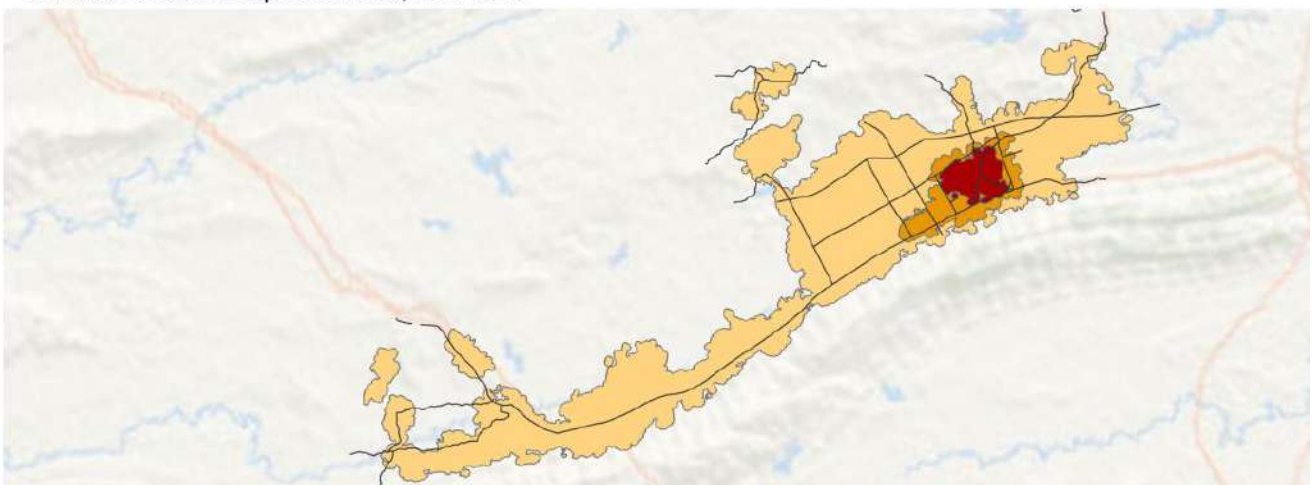
# Bicheng, Chongqing, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1988



Selected Locales in Expansion Area, 1988-2013



## Bicheng, Chongqing, China 1988-2013



- Urban Extent in 1988
- Expansion, 1988 - 2000
- Expansion, 2000 - 2013

Arterial Roads

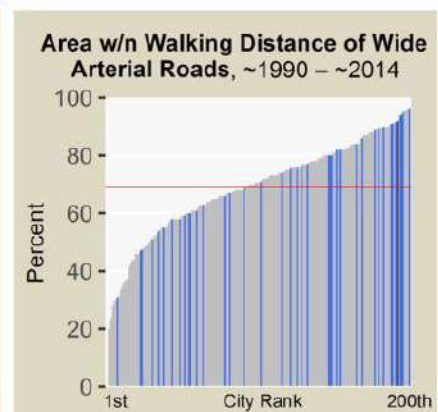
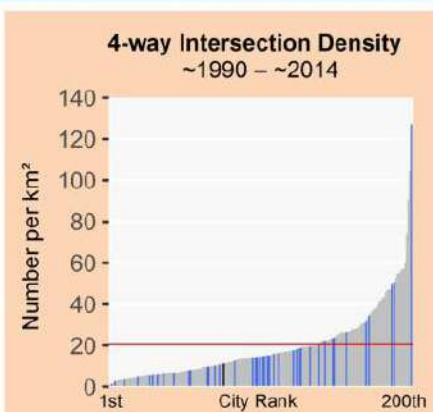
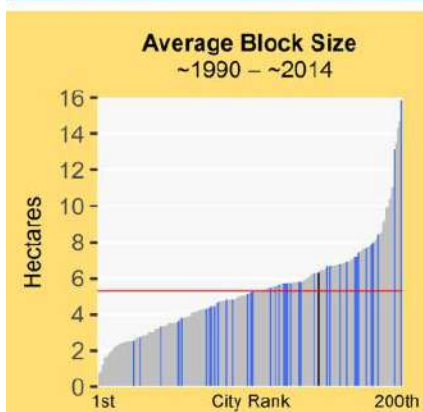
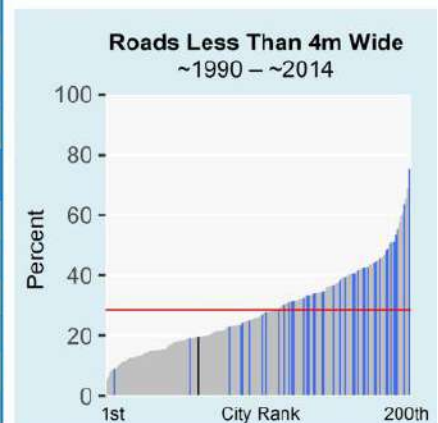
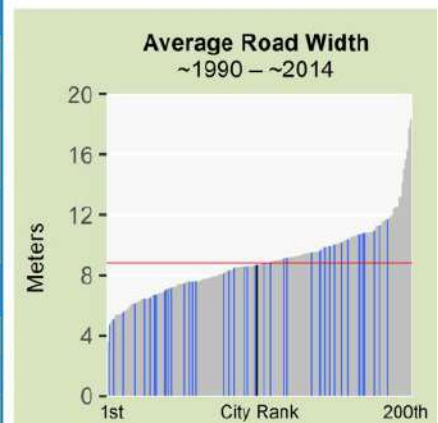
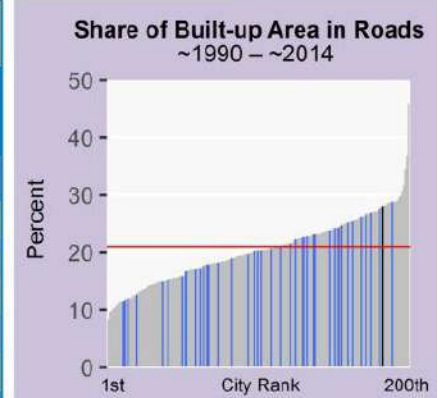
# Bicheng, Chongqing, China (East Asia and the Pacific)



### Legend for Charts

Bicheng | Other cities in region | All other cities | Global average

Metrics	Pre-1988	1988-2013
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	33%	28%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	8.7	10.2
Share of Roads less than 4m Wide	20%	19%
Share of Roads more than 16m Wide	13%	18%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.4	1.1
Average Beeline Distance to Arterial Roads (m)	148	229
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	100%	93%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	100%	92%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	25%	7%
Average Block Size (ha)	0.9	6.3
3-way Intersection Density (number per km <sup>2</sup> )	248	105
4-way Intersection Density (number per km <sup>2</sup> )	86	11
Walkability Ratio	1.4	1.9
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	92%	38%
Share of Residential Area Not Laid Out Before Occupation	1%	26%
Share of Residential Area Laid Out Before Occupation	99%	73%
Share of Residential Area in Informal Land Subdivisions	0%	3%
Share of Residential Area in Formal Land Subdivisions	83%	32%
Share of Residential Area in Housing Projects	16%	37%



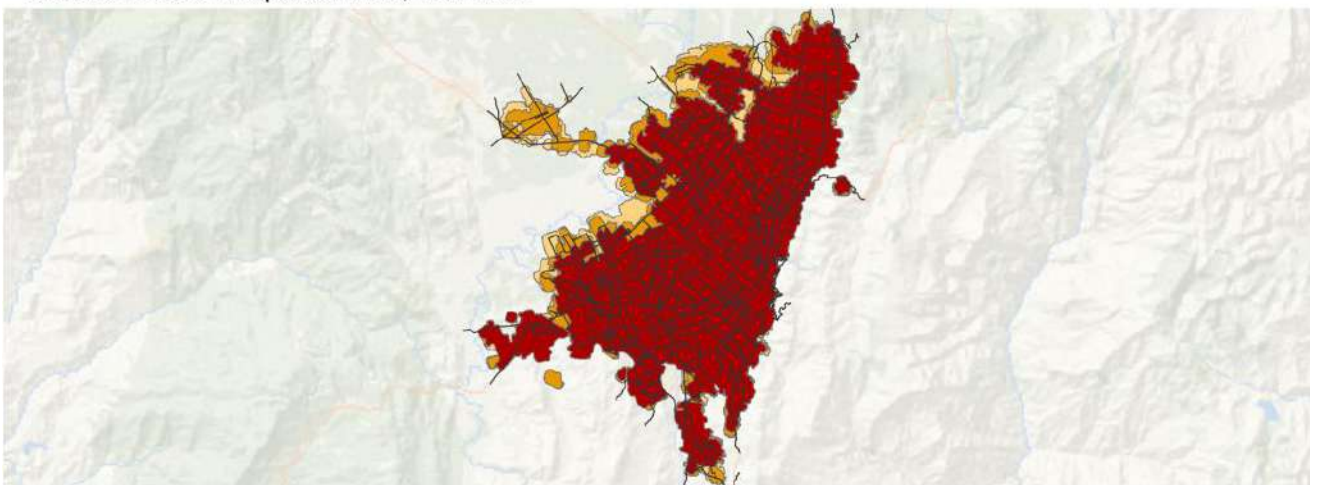
# Bogota, Colombia (Latin America and the Caribbean)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2010



## Bogota, Colombia 1989-2010



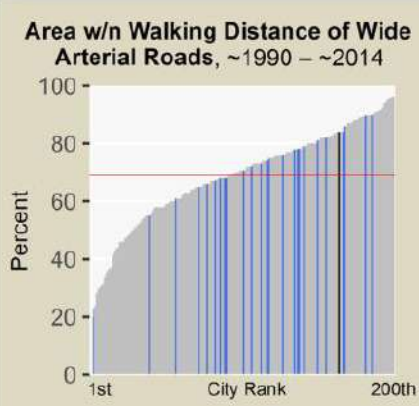
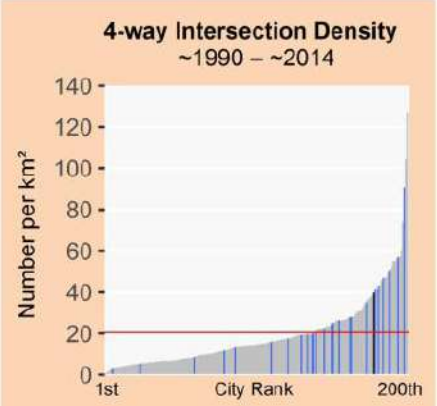
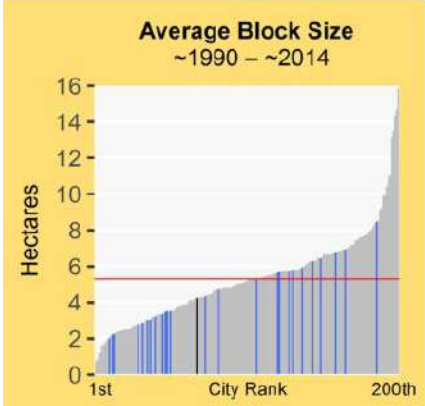
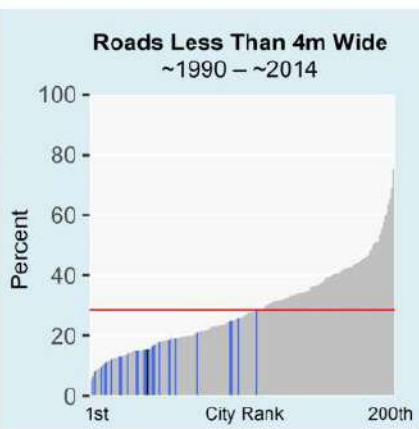
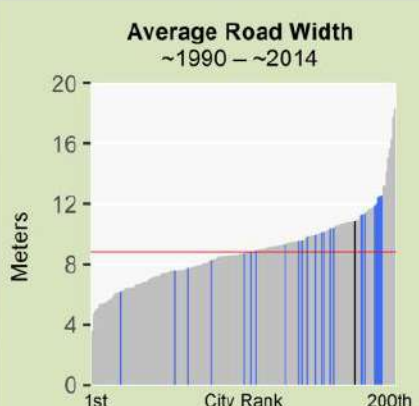
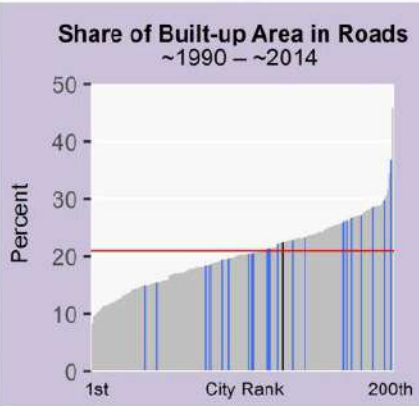
- Urban Extent in 1989
- Expansion, 1989 - 2001
- Expansion, 2001 - 2010

Arterial Roads

# Bogota, Colombia (Latin America and the Caribbean)



Legend for Charts		
	Bogota	Other cities in region   All other cities   Global average
Metrics		
	Pre-1989	1989-2010
Roads		
Share of Built-Up Area Occupied by Roads	25%	22%
Share of Built-Up Area that is Gridded or Partially Gridded	22%	10%
Average Road Width (m)	10.9	8.8
Share of Roads less than 4m Wide	14%	15%
Share of Roads more than 16m Wide	17%	11%
Arterial Roads		
Density of Arterial Roads (km/km <sup>2</sup> )	2.7	2.4
Average Beeline Distance to Arterial Roads (m)	145	176
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	98%	96%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	87%	84%
Block Size, Plot Size, Intersection Density, and Walkability		
Share of Intersections that are 4-way	18%	13%
Average Block Size (ha)	1.9	4.2
3-way Intersection Density (number per km <sup>2</sup> )	167	155
4-way Intersection Density (number per km <sup>2</sup> )	38	40
Walkability Ratio	1.7	1.9
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	130	
Stages in the Evolution of Residential Layouts		
Share of Built-Up Area in Residential Use	63%	75%
Share of Residential Area Not Laid Out Before Occupation	0%	4%
Share of Residential Area Laid Out Before Occupation	99%	95%
Share of Residential Area in Informal Land Subdivisions	8%	26%
Share of Residential Area in Formal Land Subdivisions	63%	17%
Share of Residential Area in Housing Projects	26%	51%



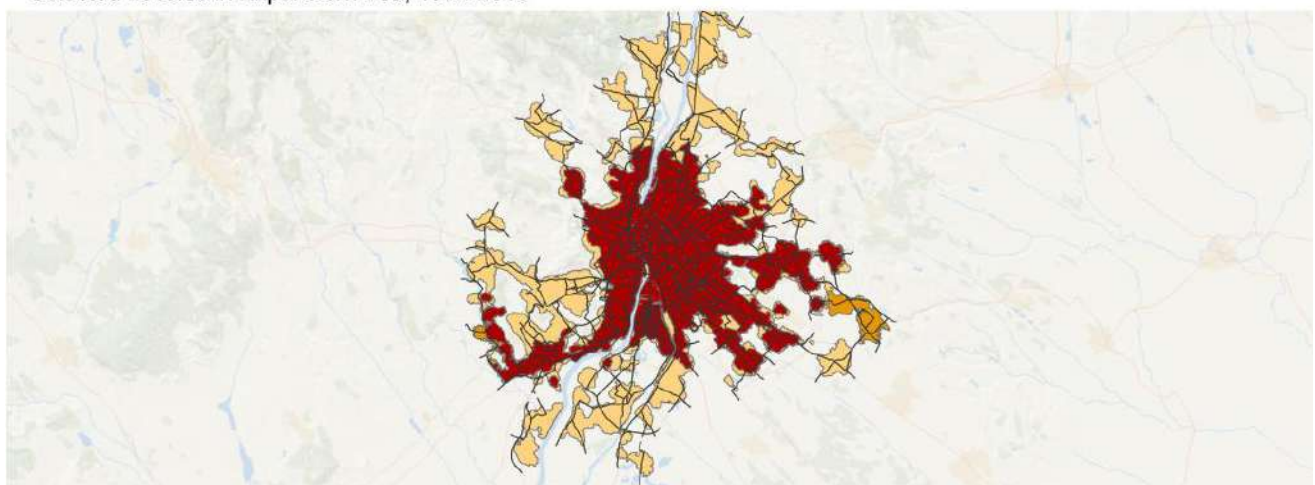
# Budapest, Hungary (Europe and Japan)



Selected Locales in Area Developed Before 1992



Selected Locales in Expansion Area, 1992-2013



## Budapest, Hungary 1992-2013



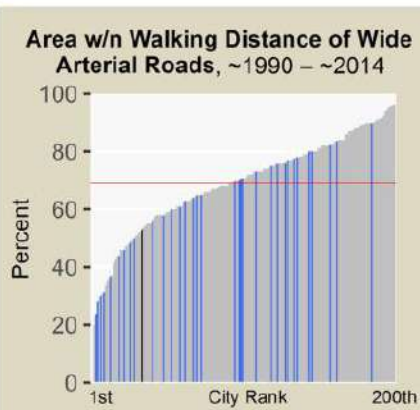
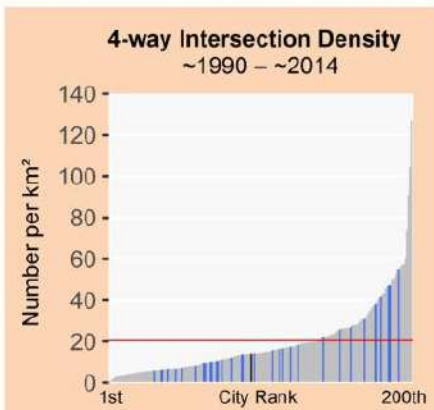
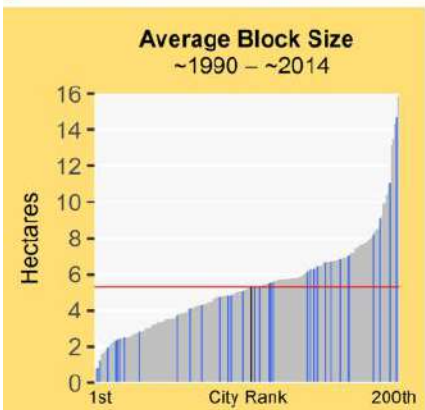
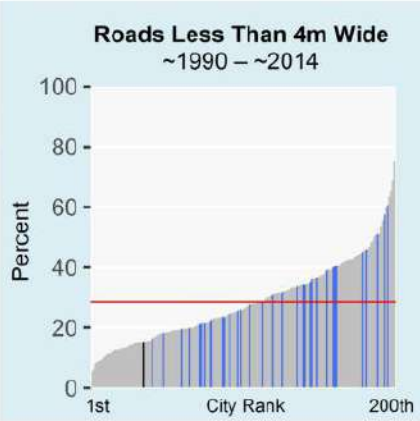
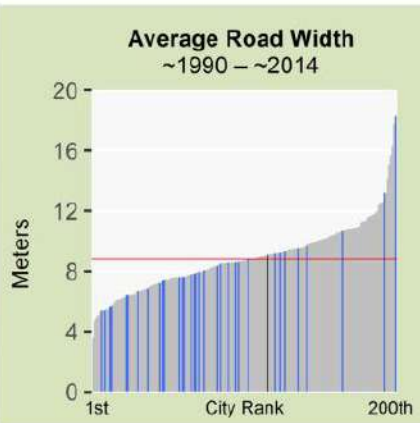
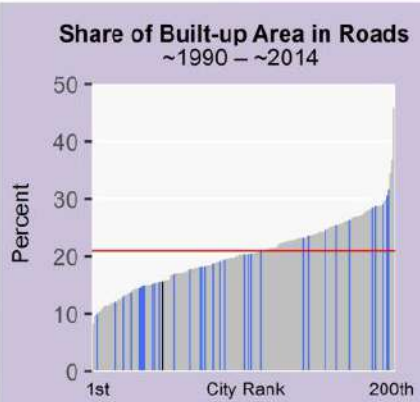
- Urban Extent in 1992
- Expansion, 1992 - 2002
- Expansion, 2002 - 2013

Arterial Roads

# Budapest, Hungary (Europe and Japan)



Legend for Charts			
	Budapest	Other cities in region	All other cities
<b>Global average</b> —			
Metrics	Pre-1992	1992-2013	
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	20%	15%	
Share of Built-Up Area that is Gridded or Partially Gridded	7%	15%	
Average Road Width (m)	9.1	7.7	
Share of Roads less than 4m Wide	7%	15%	
Share of Roads more than 16m Wide	5%	2%	
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	1.8	1.4	
Average Beeline Distance to Arterial Roads (m)	205	267	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	96%	90%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	69%	53%	
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	19%	26%	
Average Block Size (ha)	3.5	5.3	
3-way Intersection Density (number per km <sup>2</sup> )	93	71	
4-way Intersection Density (number per km <sup>2</sup> )	19	14	
Walkability Ratio	1.7	1.5	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		868	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	644	719	
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	79%	90%	
Share of Residential Area Not Laid Out Before Occupation	3%	11%	
Share of Residential Area Laid Out Before Occupation	96%	88%	
Share of Residential Area in Informal Land Subdivisions	6%	26%	
Share of Residential Area in Formal Land Subdivisions	84%	62%	
Share of Residential Area in Housing Projects	6%	0%	



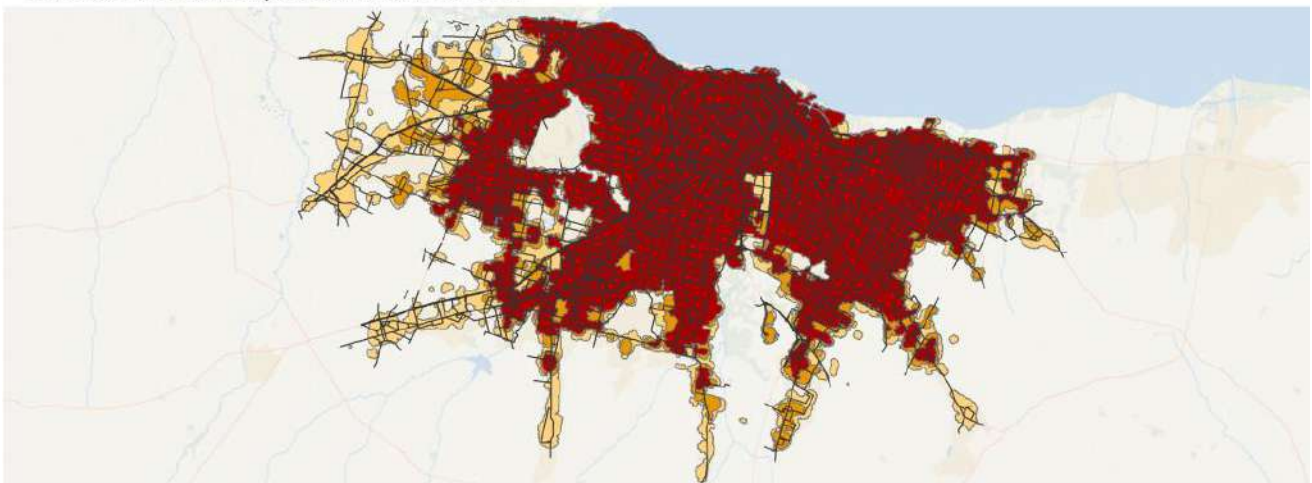
# Buenos Aires, Argentina (Latin America and the Caribbean)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2014



## Buenos Aires, Argentina 1989-2014



- Urban Extent in 1989
- Expansion, 1989 - 2001
- Expansion, 2001 - 2014

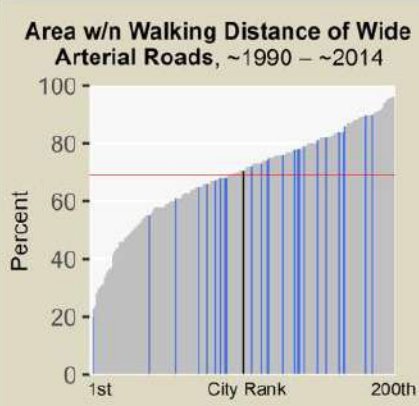
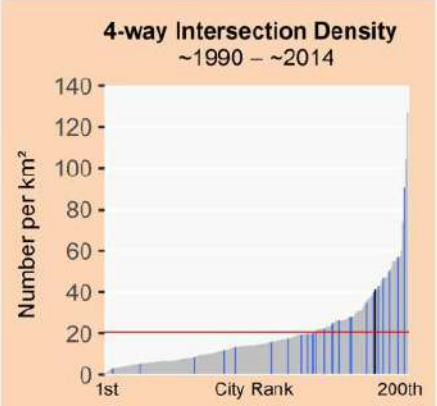
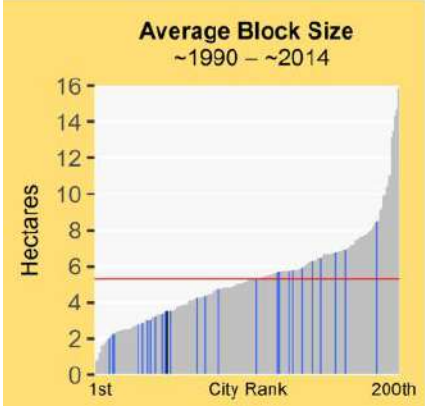
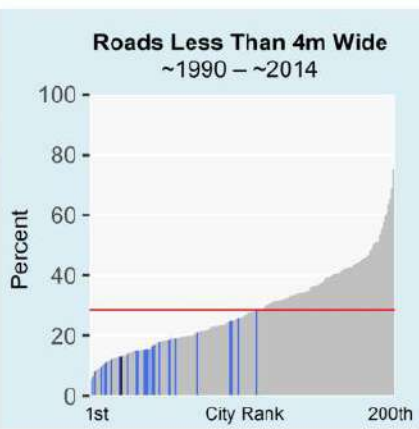
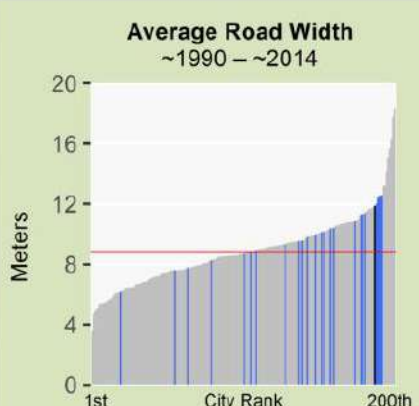
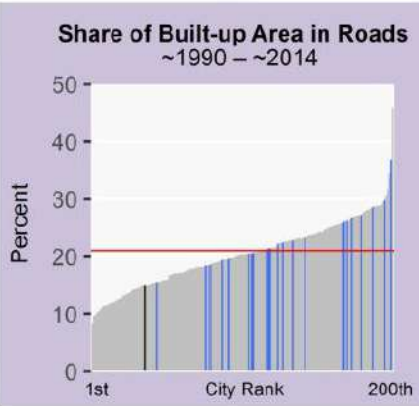
Arterial Roads



# Buenos Aires, Argentina (Latin America and the Caribbean)



Legend for Charts			
	Buenos Aires	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1989	1989-2014	
Roads			
Share of Built-Up Area Occupied by Roads	25%	15%	
Share of Built-Up Area that is Gridded or Partially Gridded	87%	72%	
Average Road Width (m)	11.9	5.9	
Share of Roads less than 4m Wide	3%	13%	
Share of Roads more than 16m Wide	18%	1%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	2.6	2.1	
Average Beeline Distance to Arterial Roads (m)	147	194	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	98%	94%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	78%	70%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	57%	37%	
Average Block Size (ha)	2.4	3.5	
3-way Intersection Density (number per km <sup>2</sup> )	83	68	
4-way Intersection Density (number per km <sup>2</sup> )	29	42	
Walkability Ratio	1.4	1.6	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	168	372	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	254	484	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	80%	82%	
Share of Residential Area Not Laid Out Before Occupation	1%	3%	
Share of Residential Area Laid Out Before Occupation	93%	96%	
Share of Residential Area in Informal Land Subdivisions	27%	87%	
Share of Residential Area in Formal Land Subdivisions	69%	4%	
Share of Residential Area in Housing Projects	1%	4%	



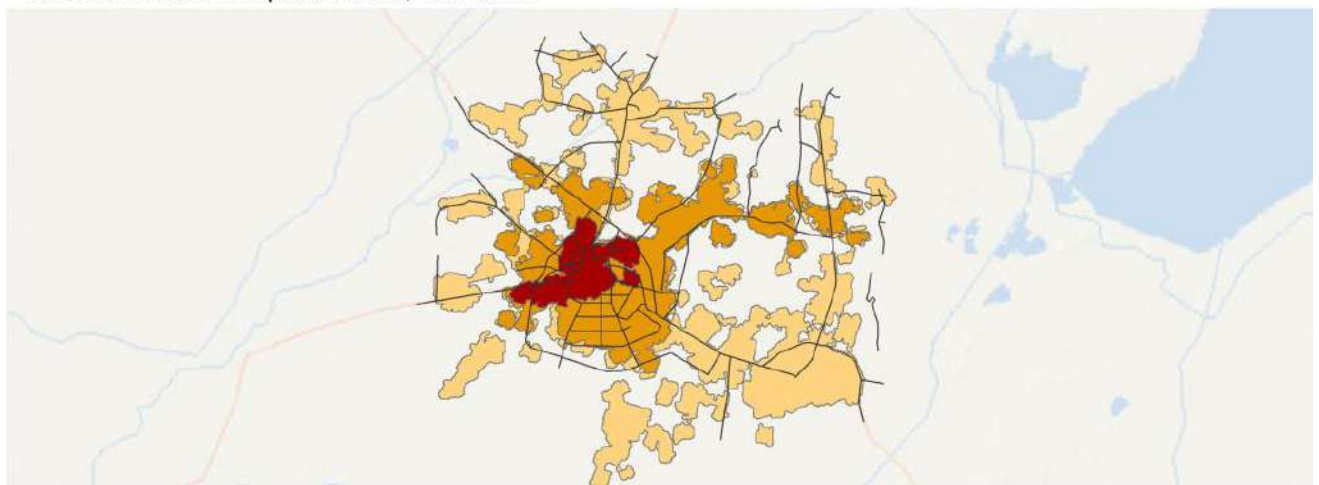
# Bukhara, Uzbekistan (South and Central Asia)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2013



**Bukhara, Uzbekistan**  
1991-2013

0 5 10 15 20 km

N

- Urban Extent in 1991
- Expansion, 1991 - 2000
- Expansion, 2000 - 2013
- Arterial Roads

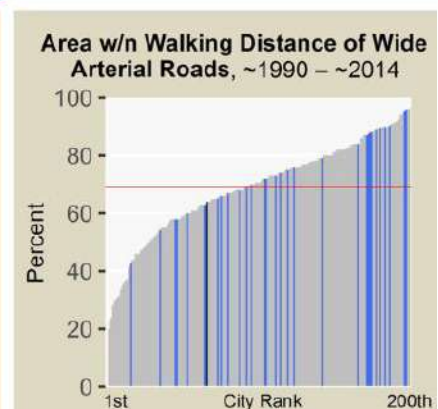
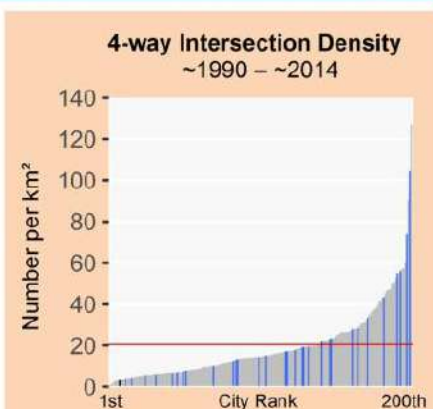
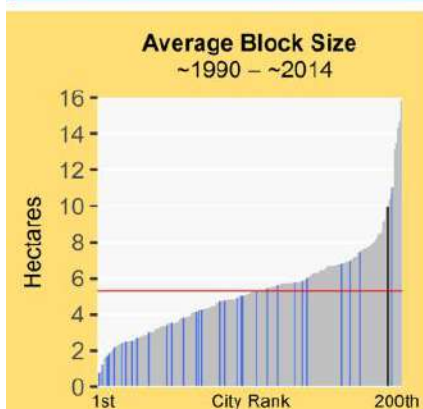
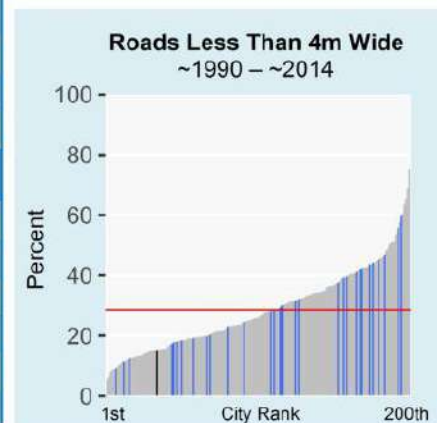
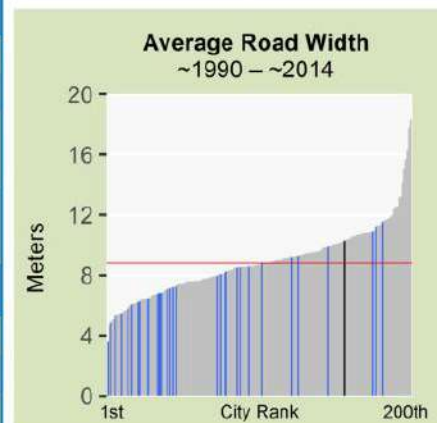
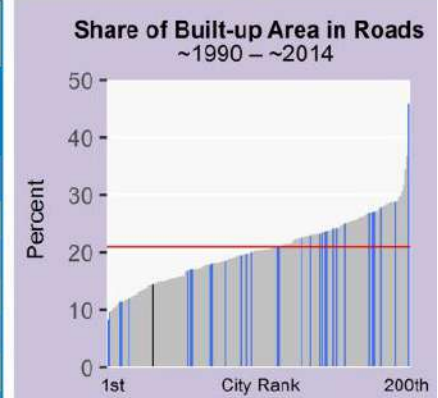
# Bukhara, Uzbekistan (South and Central Asia)



### Legend for Charts

Bukhara | Other cities in region | All other cities | Global average

Metrics	Pre-1991	1991-2013
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	18%	14%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	10.3	8.6
Share of Roads less than 4m Wide	11%	15%
Share of Roads more than 16m Wide	15%	9%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.6	0.8
Average Beeline Distance to Arterial Roads (m)	291	579
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	89%	69%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	86%	63%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	7%	4%
Average Block Size (ha)	4.0	10.0
3-way Intersection Density (number per km <sup>2</sup> )	73	55
4-way Intersection Density (number per km <sup>2</sup> )	6	3
Walkability Ratio	1.6	1.7
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	1499	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	565	2653
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	73%	77%
Share of Residential Area Not Laid Out Before Occupation	16%	7%
Share of Residential Area Laid Out Before Occupation	83%	92%
Share of Residential Area in Informal Land Subdivisions	40%	57%
Share of Residential Area in Formal Land Subdivisions	41%	23%
Share of Residential Area in Housing Projects	1%	12%



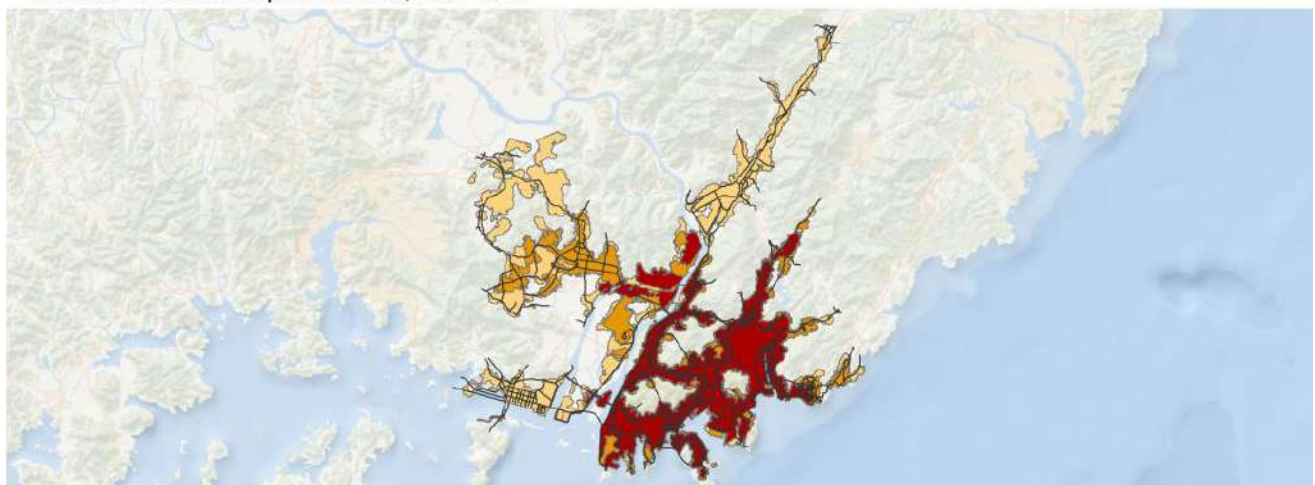
# Busan, Korea Rep. (East Asia and the Pacific)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2013



**Busan, Korea Rep. 1991-2013**

0 9 18 27 36 km

Urban Extent in 1991  
Expansion, 1991 - 2000  
Expansion, 2000 - 2013  
Arterial Roads

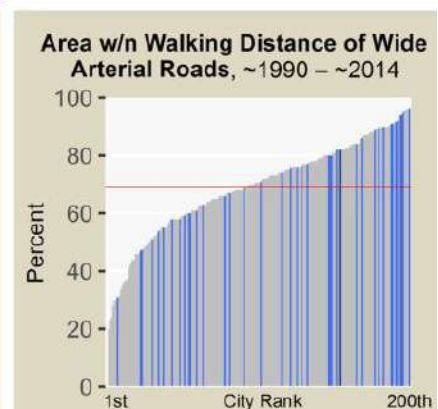
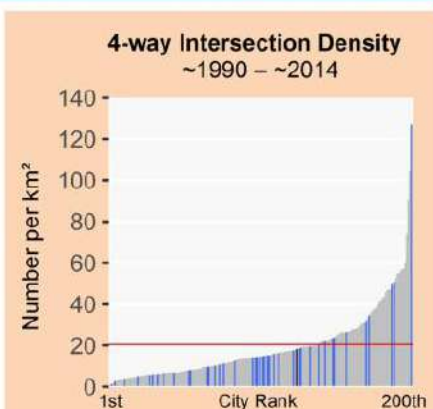
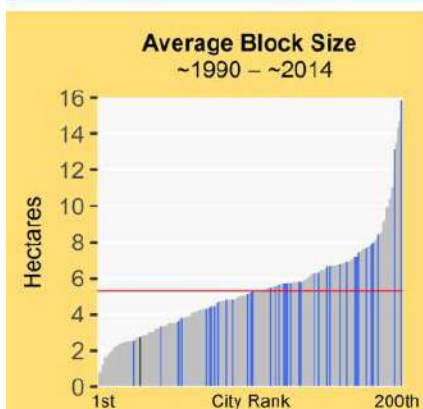
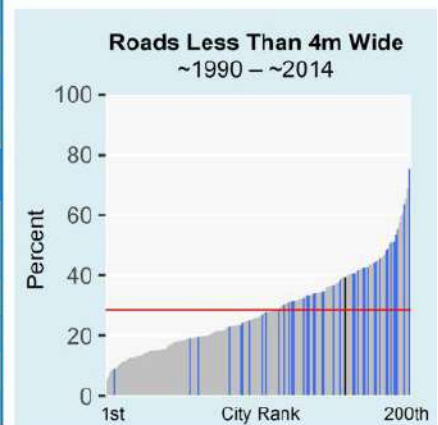
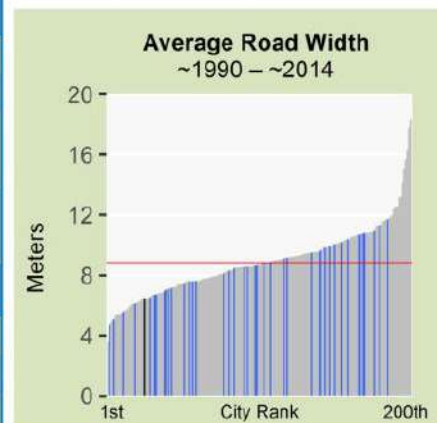
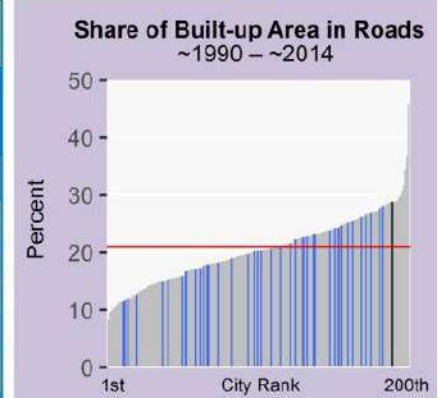
# Busan, Korea Rep. (East Asia and the Pacific)



### Legend for Charts

Busan | Other cities in region | All other cities | Global average

Metrics	Pre-1991	1991-2013
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	21%	28%
Share of Built-Up Area that is Gridded or Partially Gridded	7%	0%
Average Road Width (m)	6.5	6.9
Share of Roads less than 4m Wide	36%	39%
Share of Roads more than 16m Wide	6%	8%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.9	2.1
Average Beeline Distance to Arterial Roads (m)	213	289
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	91%	87%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	87%	82%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	13%	10%
Average Block Size (ha)	2.5	2.8
3-way Intersection Density (number per km <sup>2</sup> )	162	185
4-way Intersection Density (number per km <sup>2</sup> )	33	18
Walkability Ratio	1.7	1.7
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	166	228
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	60%	39%
Share of Residential Area Not Laid Out Before Occupation	27%	50%
Share of Residential Area Laid Out Before Occupation	72%	49%
Share of Residential Area in Informal Land Subdivisions	1%	0%
Share of Residential Area in Formal Land Subdivisions	44%	24%
Share of Residential Area in Housing Projects	26%	24%



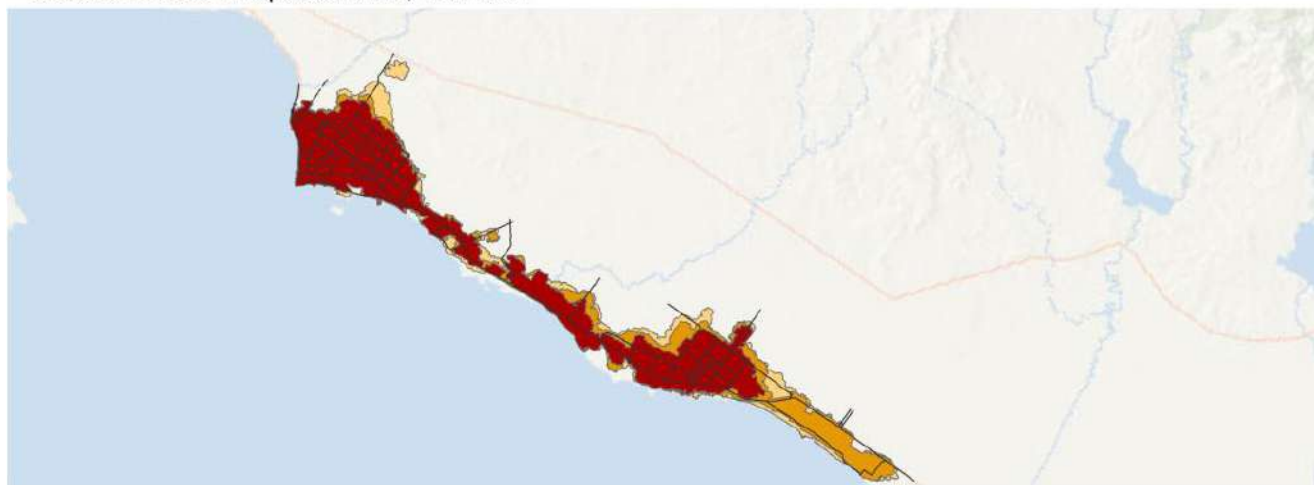
# Cabimas, Venezuela (Latin America and the Caribbean)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2014



**Cabimas, Venezuela**  
1989-2014

0 5 10 15 20 km

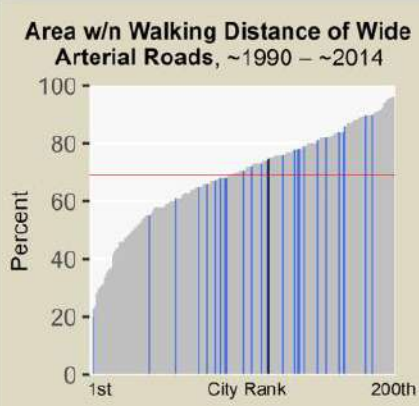
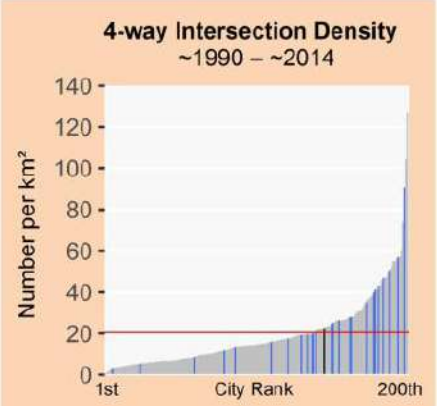
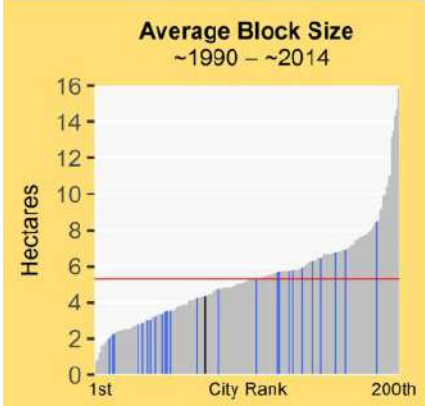
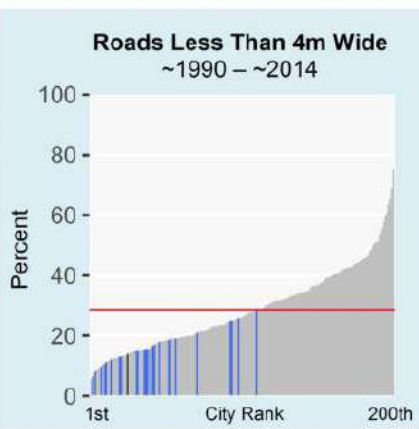
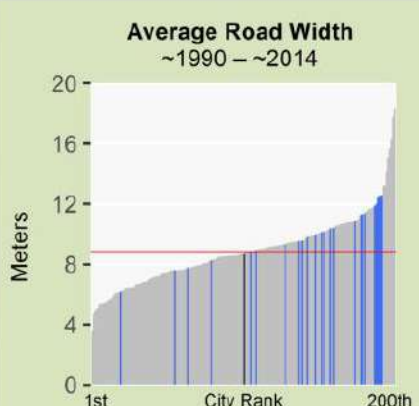
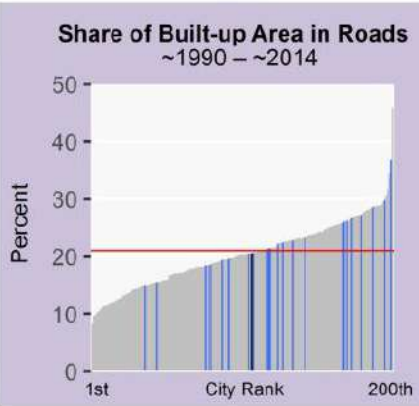
N

- Urban Extent in 1989
- Expansion, 1989 - 2000
- Expansion, 2000 - 2014
- Arterial Roads

# Cabimas, Venezuela (Latin America and the Caribbean)



Legend for Charts			
	Cabimas	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1989	1989-2014	
Roads			
Share of Built-Up Area Occupied by Roads	16%	20%	
Share of Built-Up Area that is Gridded or Partially Gridded	2%	7%	
Average Road Width (m)	8.7	7.1	
Share of Roads less than 4m Wide	4%	13%	
Share of Roads more than 16m Wide	5%	4%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	1.8	1.4	
Average Beeline Distance to Arterial Roads (m)	179	241	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	97%	92%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	82%	74%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	14%	16%	
Average Block Size (ha)	3.7	4.4	
3-way Intersection Density (number per km <sup>2</sup> )	82	106	
4-way Intersection Density (number per km <sup>2</sup> )	12	22	
Walkability Ratio	1.6	1.7	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	906	456	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	79%	82%	
Share of Residential Area Not Laid Out Before Occupation	0%	28%	
Share of Residential Area Laid Out Before Occupation	100%	71%	
Share of Residential Area in Informal Land Subdivisions	15%	43%	
Share of Residential Area in Formal Land Subdivisions	81%	18%	
Share of Residential Area in Housing Projects	2%	8%	



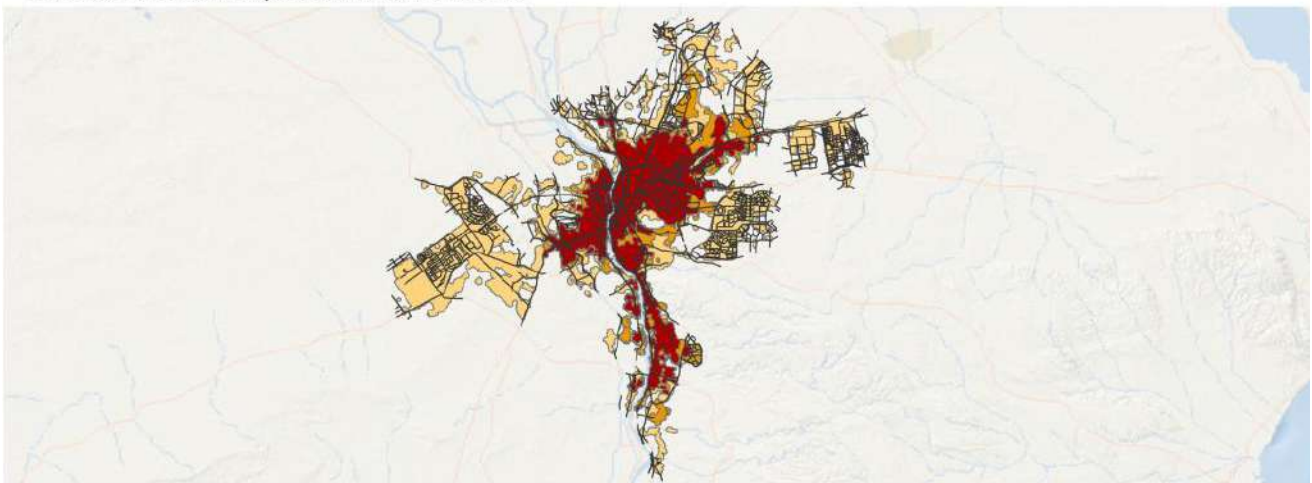
# Cairo, Egypt (Western Asia and North Africa)



Selected Locales in Area Developed Before 1992



Selected Locales in Expansion Area, 1992-2013



**Cairo, Egypt**  
1992-2013

0 10 20 30 40 km

N

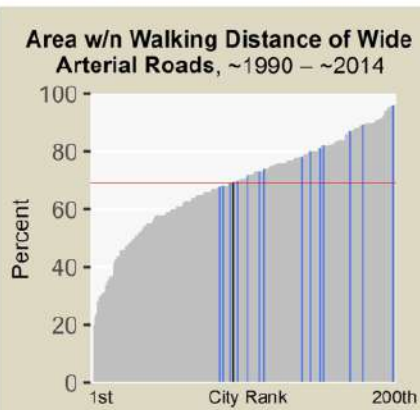
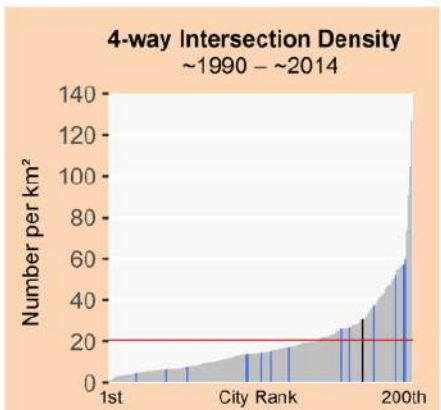
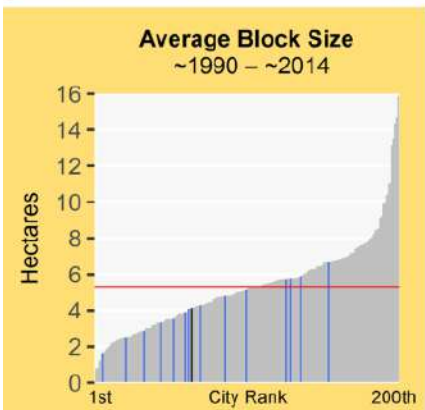
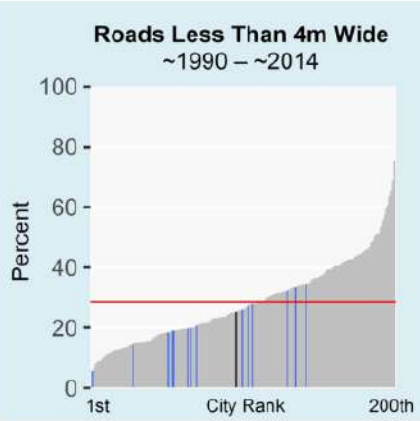
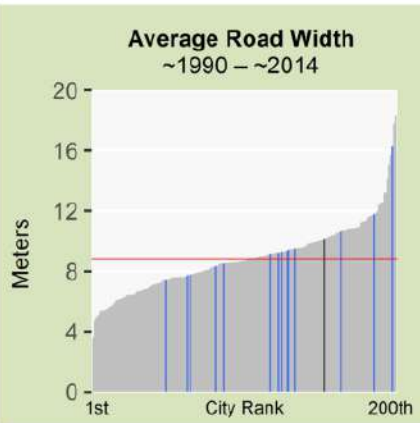
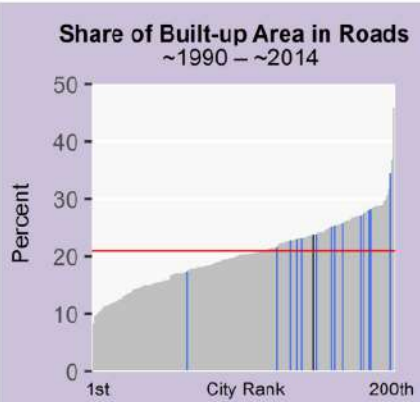
- Urban Extent in 1992
- Expansion, 1992 - 2013
- Expansion, 2003 - 2013
- Arterial Roads



# Cairo, Egypt (Western Asia and North Africa)



Legend for Charts		
Cairo	Other cities in region	All other cities
		Global average
Metrics		
	Pre-1992	1992-2013
Roads		
Share of Built-Up Area Occupied by Roads	25%	23%
Share of Built-Up Area that is Gridded or Partially Gridded	13%	7%
Average Road Width (m)	10.2	9.5
Share of Roads less than 4m Wide	18%	25%
Share of Roads more than 16m Wide	20%	16%
Arterial Roads		
Density of Arterial Roads (km/km <sup>2</sup> )	1.5	1.5
Average Beeline Distance to Arterial Roads (m)	328	406
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	83%	77%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	81%	69%
Block Size, Plot Size, Intersection Density, and Walkability		
Share of Intersections that are 4-way	20%	12%
Average Block Size (ha)	2.5	4.1
3-way Intersection Density (number per km <sup>2</sup> )	102	144
4-way Intersection Density (number per km <sup>2</sup> )	32	30
Walkability Ratio	1.6	1.8
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	82	595
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	525	473
Stages in the Evolution of Residential Layouts		
Share of Built-Up Area in Residential Use	69%	75%
Share of Residential Area Not Laid Out Before Occupation	22%	43%
Share of Residential Area Laid Out Before Occupation	68%	56%
Share of Residential Area in Informal Land Subdivisions	16%	17%
Share of Residential Area in Formal Land Subdivisions	58%	13%
Share of Residential Area in Housing Projects	2%	25%



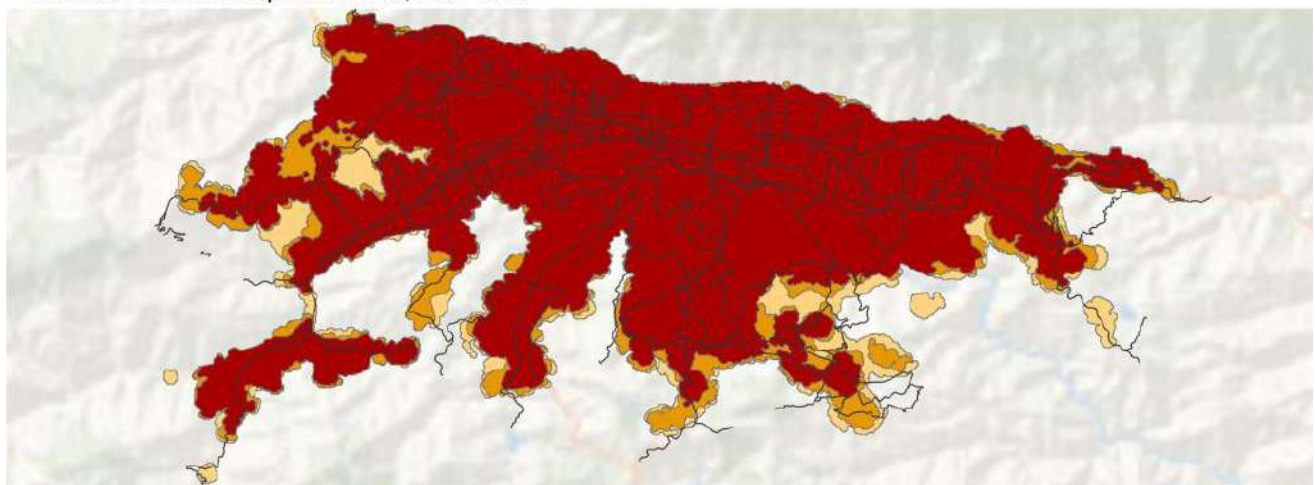
# Caracas, Venezuela (Latin America and the Caribbean)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2014



**Caracas, Venezuela**  
1991-2014

0 3 6 9 12 km

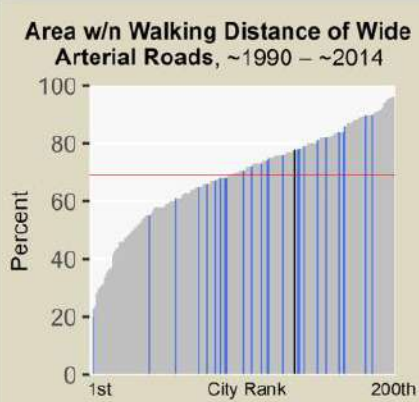
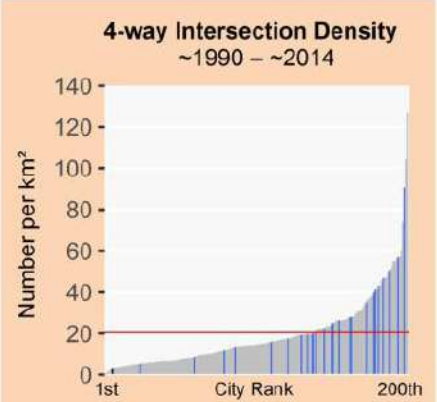
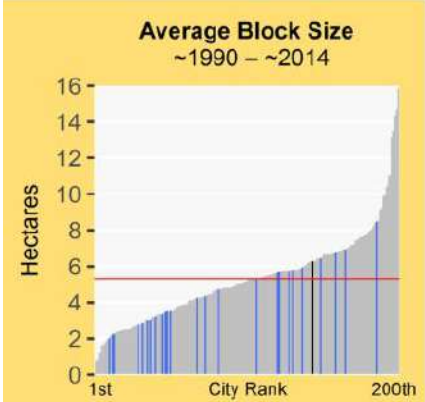
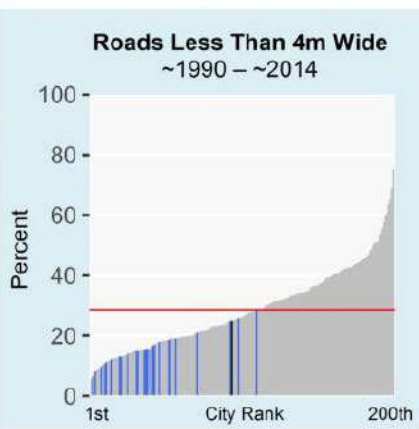
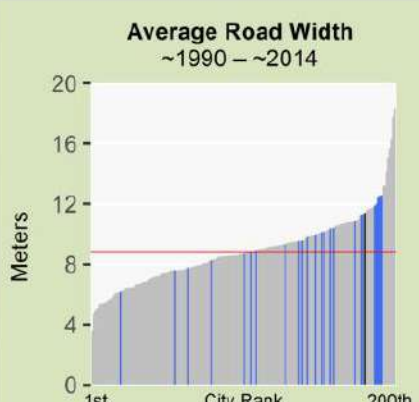
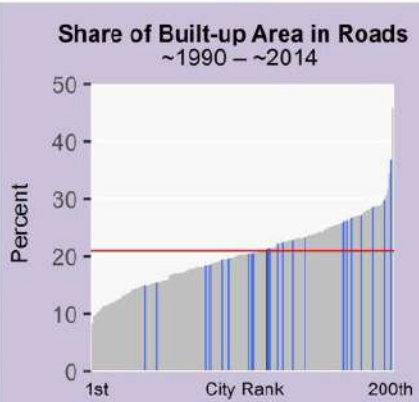
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- Urban Extent in 1991
- Expansion, 1991 - 2001
- Expansion, 2001 - 2014
- Arterial Roads

# Caracas, Venezuela (Latin America and the Caribbean)



Legend for Charts			
	Caracas	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1991	1991-2014	
Roads			
Share of Built-Up Area Occupied by Roads	20%	21%	
Share of Built-Up Area that is Gridded or Partially Gridded	2%	0%	
Average Road Width (m)	11.4	6.5	
Share of Roads less than 4m Wide	8%	24%	
Share of Roads more than 16m Wide	18%	3%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	2.1	1.9	
Average Beeline Distance to Arterial Roads (m)	227	255	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	92%	90%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	82%	78%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	12%	1%	
Average Block Size (ha)	4.6	6.3	
3-way Intersection Density (number per km <sup>2</sup> )	40	48	
4-way Intersection Density (number per km <sup>2</sup> )	8	3	
Walkability Ratio	1.9	1.8	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	550		
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	73%	74%	
Share of Residential Area Not Laid Out Before Occupation	36%	51%	
Share of Residential Area Laid Out Before Occupation	63%	48%	
Share of Residential Area in Informal Land Subdivisions	6%	4%	
Share of Residential Area in Formal Land Subdivisions	51%	24%	
Share of Residential Area in Housing Projects	5%	19%	



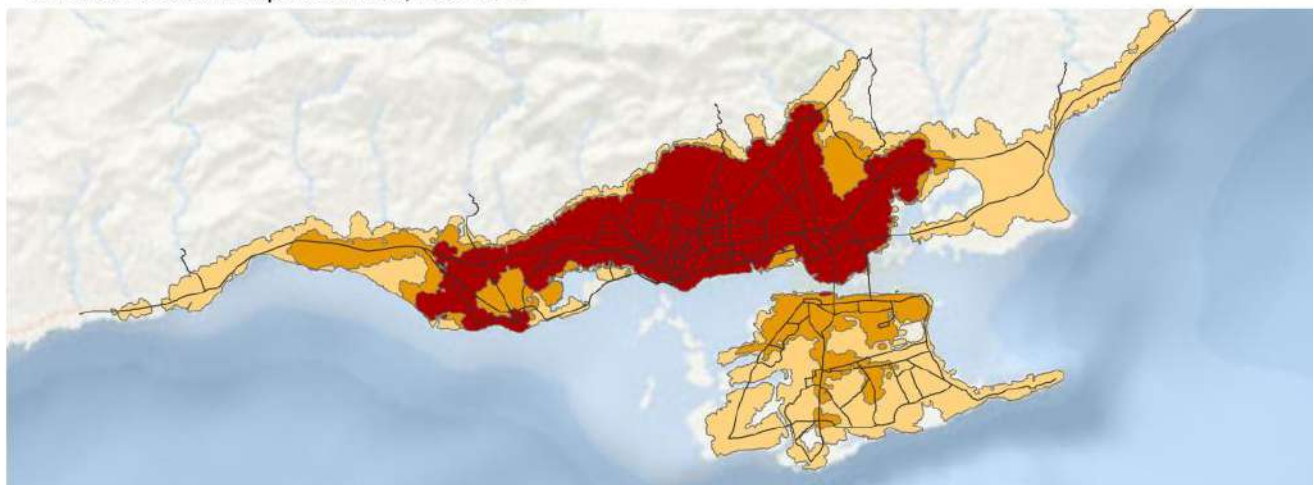
# Cebu City, Philippines (Southeast Asia)



Selected Locales in Area Developed Before 1993



Selected Locales in Expansion Area, 1993-2014



## Cebu City, Philippines 1993-2014



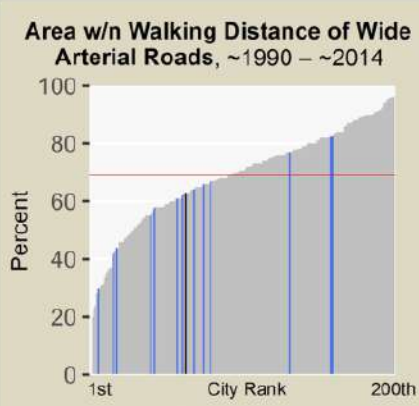
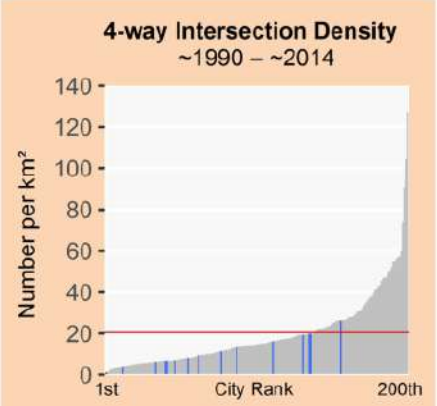
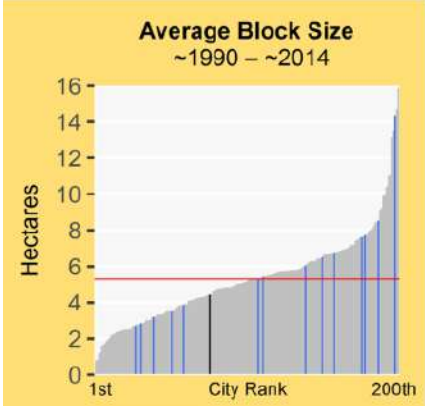
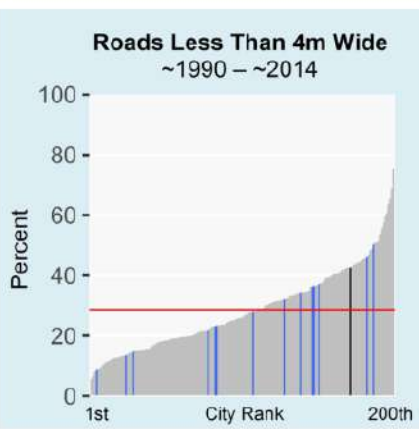
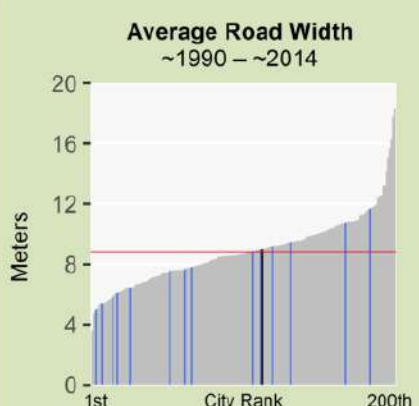
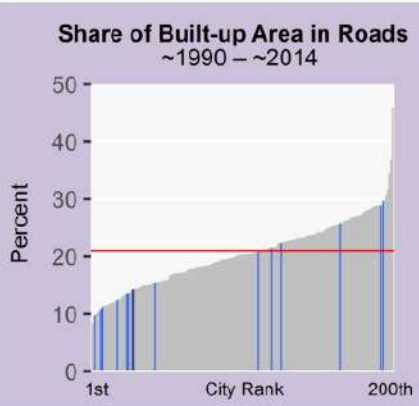
- Urban Extent in 1993
- Expansion, 1993 - 2000
- Expansion, 2000 - 2014

Arterial Roads

# Cebu City, Philippines (Southeast Asia)



Legend for Charts			
	Cebu City	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1993	1993-2014	
Roads			
Share of Built-Up Area Occupied by Roads	13%	14%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%	
Average Road Width (m)	9.0	5.2	
Share of Roads less than 4m Wide	20%	42%	
Share of Roads more than 16m Wide	8%	3%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	1.7	1.3	
Average Beeline Distance to Arterial Roads (m)	237	295	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	91%	86%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	78%	63%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	7%	0%	
Average Block Size (ha)	6.5	4.4	
3-way Intersection Density (number per km <sup>2</sup> )	79	115	
4-way Intersection Density (number per km <sup>2</sup> )	7	1	
Walkability Ratio	2.1	2.2	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	243		
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	61%	78%	
Share of Residential Area Not Laid Out Before Occupation	63%	79%	
Share of Residential Area Laid Out Before Occupation	36%	20%	
Share of Residential Area in Informal Land Subdivisions	25%	15%	
Share of Residential Area in Formal Land Subdivisions	11%	0%	
Share of Residential Area in Housing Projects	0%	3%	



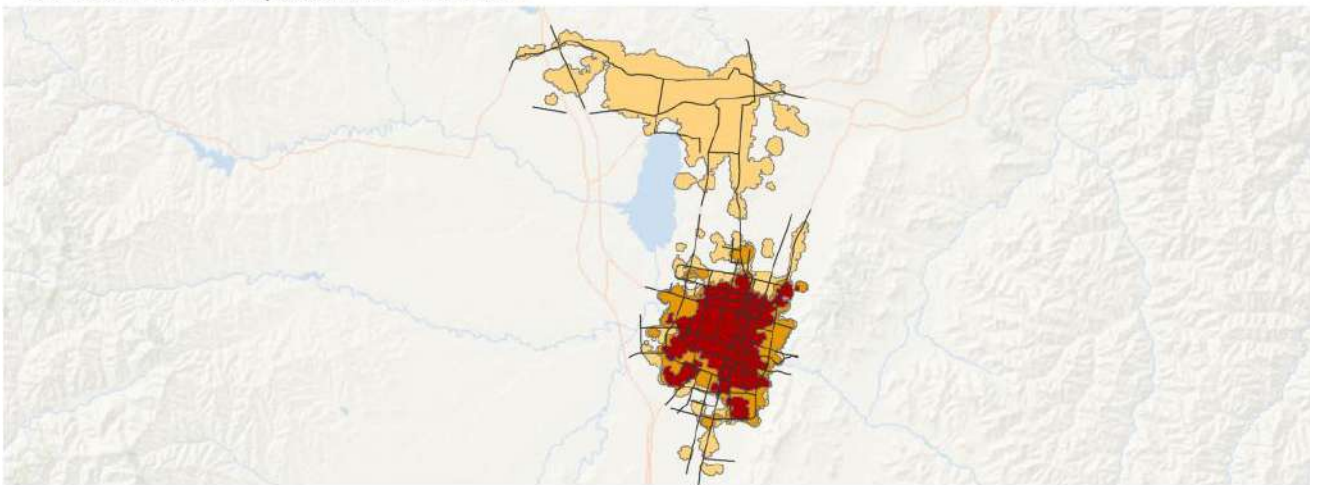
# Changzhi, Hunan, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1992



Selected Locales in Expansion Area, 1992-2014



**Changzhi, Hunan, China**  
1992-2014

0 5 10 15 20 km

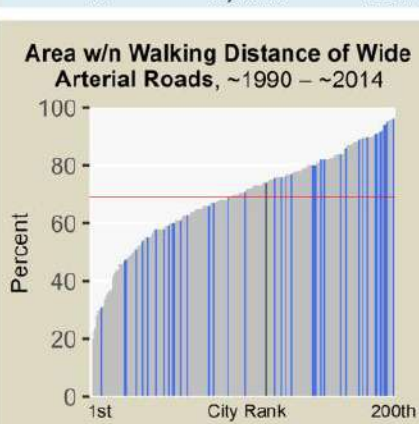
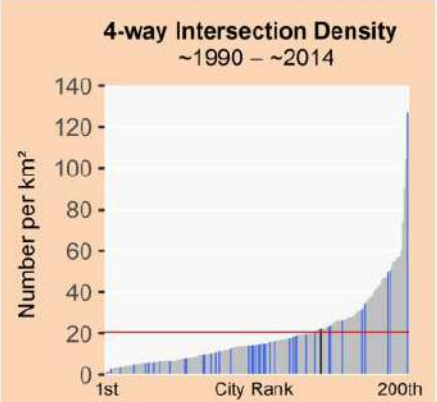
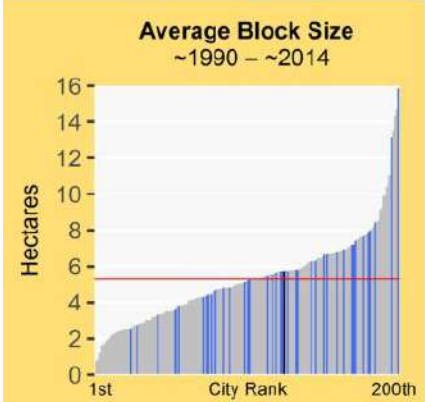
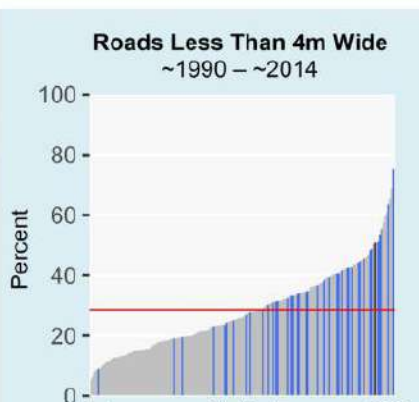
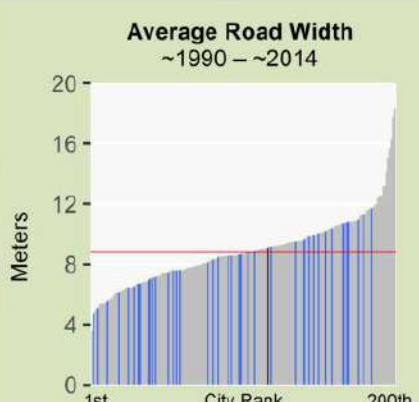
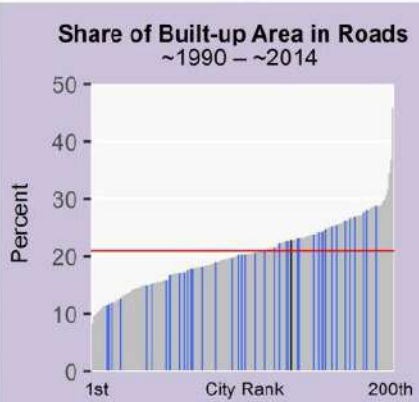
N

- Urban Extent in 1992
- Expansion, 1992 - 2000
- Expansion, 2000 - 2014
- Arterial Roads

# Changzhi, Hunan, China (East Asia and the Pacific)



Legend for Charts			
	Changzhi	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1992	1992-2014	
Roads			
Share of Built-Up Area Occupied by Roads	24%	22%	
Share of Built-Up Area that is Gridded or Partially Gridded	2%	2%	
Average Road Width (m)	9.1	6.8	
Share of Roads less than 4m Wide	37%	50%	
Share of Roads more than 16m Wide	17%	10%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	2.1	1.3	
Average Beeline Distance to Arterial Roads (m)	178	317	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	98%	86%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	98%	74%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	13%	10%	
Average Block Size (ha)	4.4	5.7	
3-way Intersection Density (number per km <sup>2</sup> )	153	140	
4-way Intersection Density (number per km <sup>2</sup> )	38	22	
Walkability Ratio	1.8	1.7	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		561	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	269	394	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	52%	45%	
Share of Residential Area Not Laid Out Before Occupation	6%	0%	
Share of Residential Area Laid Out Before Occupation	93%	99%	
Share of Residential Area in Informal Land Subdivisions	4%	26%	
Share of Residential Area in Formal Land Subdivisions	76%	59%	
Share of Residential Area in Housing Projects	12%	13%	



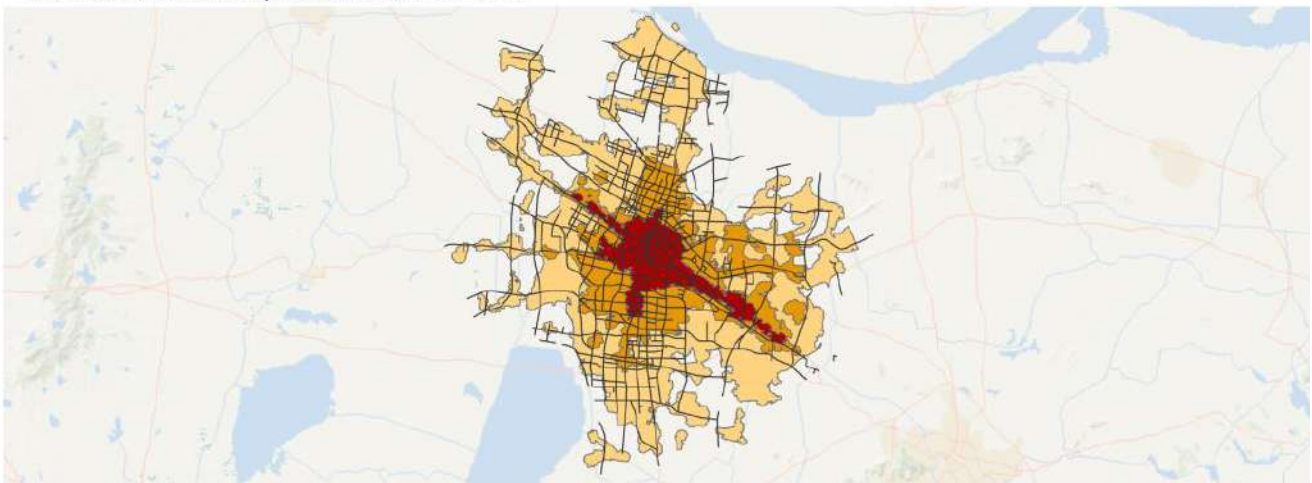
# Changzhou, Jingsu, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2014



Changzhou, Jingsu, China  
1989-2014

0 9 18 27 36 km

Urban Extent in 1989  
Expansion, 1989 - 2000  
Expansion, 2000 - 2014  
Arterial Roads



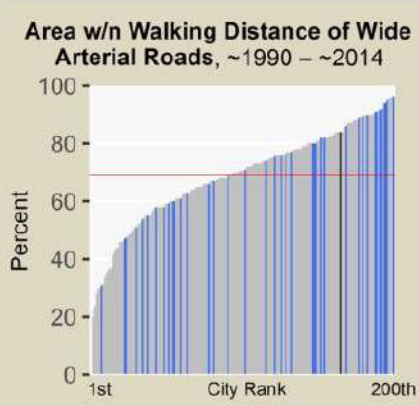
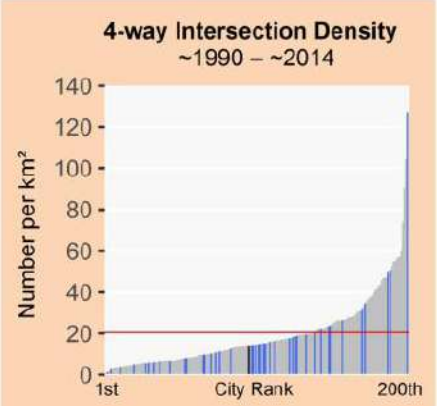
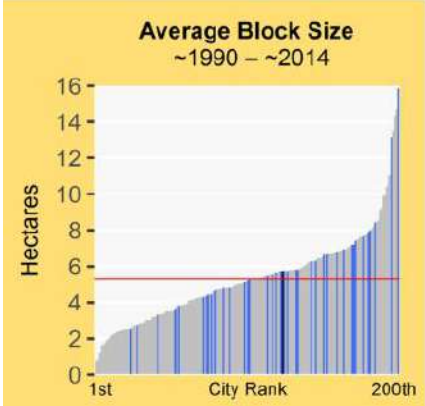
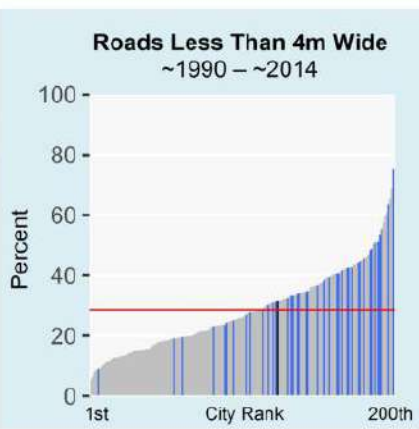
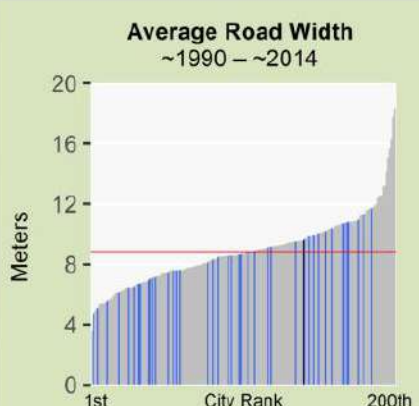
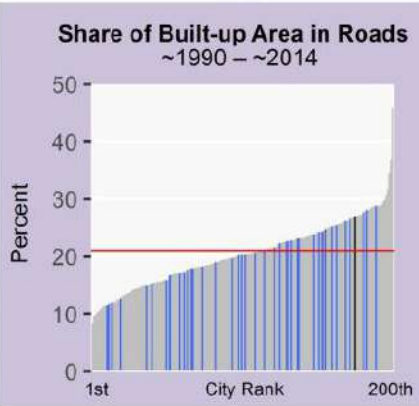
# Changzhou, Jingsu, China (East Asia and the Pacific)



**Legend for Charts**

Changzhou | Other cities in region | All other cities | Global average

Metrics	Pre-1989	1989-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	22%	26%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	9.6	10.4
Share of Roads less than 4m Wide	32%	31%
Share of Roads more than 16m Wide	19%	18%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.2	1.4
Average Beeline Distance to Arterial Roads (m)	154	313
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	99%	86%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	99%	84%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	9%	11%
Average Block Size (ha)	4.3	5.7
3-way Intersection Density (number per km <sup>2</sup> )	96	131
4-way Intersection Density (number per km <sup>2</sup> )	14	14
Walkability Ratio	1.5	1.8
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	44%	42%
Share of Residential Area Not Laid Out Before Occupation	24%	68%
Share of Residential Area Laid Out Before Occupation	76%	31%
Share of Residential Area in Informal Land Subdivisions	0%	5%
Share of Residential Area in Formal Land Subdivisions	40%	1%
Share of Residential Area in Housing Projects	35%	25%



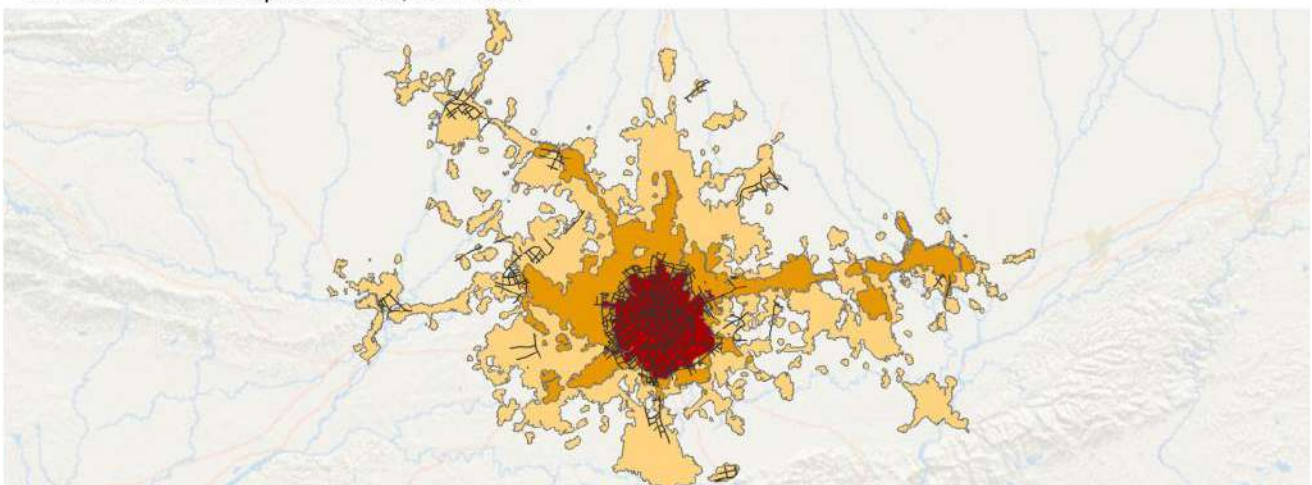
# Chengdu, Sichuan, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1988



Selected Locales in Expansion Area, 1988-2009



Chengdu, Sichuan, China  
1988-2009

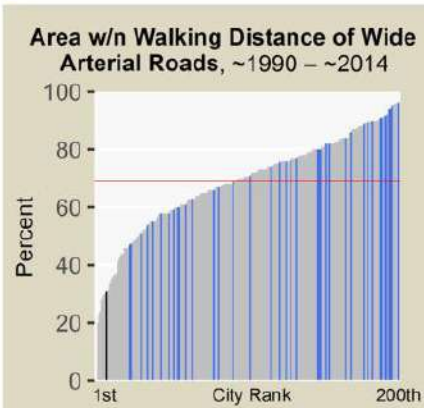
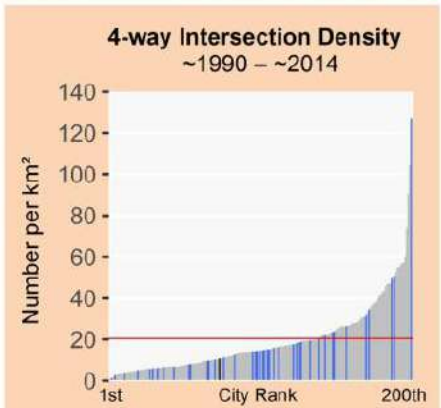
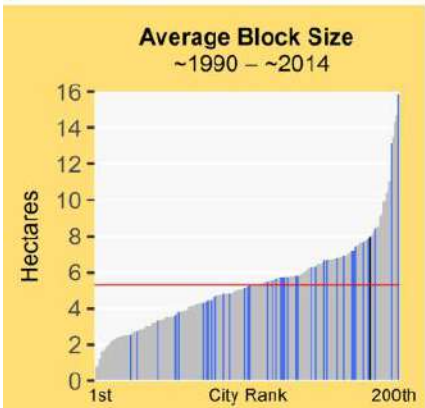
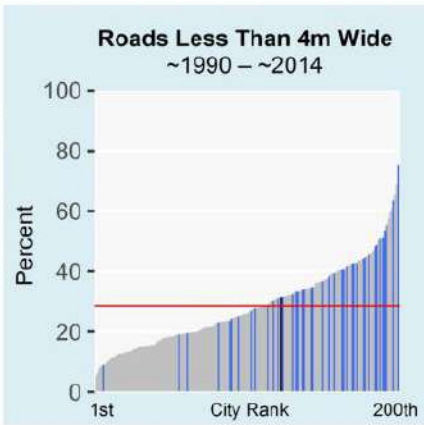
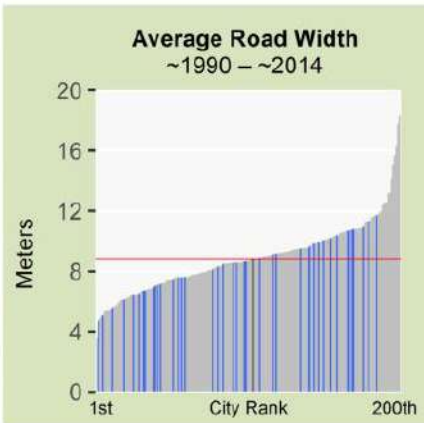
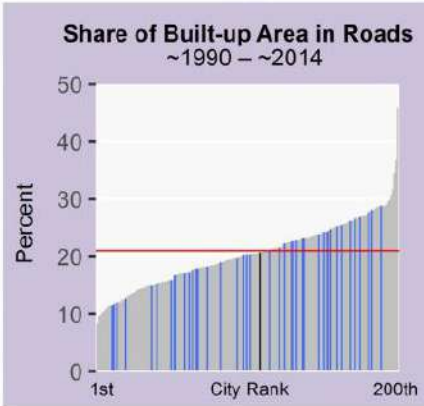
0 10 20 30 40 km

Urban Extent in 1988  
Expansion, 1988 - 2000  
Expansion, 2000 - 2009  
Arterial Roads

# Chengdu, Sichuan, China (East Asia and the Pacific)



Legend for Charts		
Chengdu	Other cities in region	All other cities
		Global average
Metrics		
	Pre-1988	1988-2009
Roads		
Share of Built-Up Area Occupied by Roads	25%	20%
Share of Built-Up Area that is Gridded or Partially Gridded	2%	2%
Average Road Width (m)	8.9	9.4
Share of Roads less than 4m Wide	28%	31%
Share of Roads more than 16m Wide	16%	17%
Arterial Roads		
Density of Arterial Roads (km/km <sup>2</sup> )	2.5	0.4
Average Beeline Distance to Arterial Roads (m)	151	3004
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	98%	31%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	98%	31%
Block Size, Plot Size, Intersection Density, and Walkability		
Share of Intersections that are 4-way	12%	7%
Average Block Size (ha)	3.4	8.0
3-way Intersection Density (number per km <sup>2</sup> )	174	64
4-way Intersection Density (number per km <sup>2</sup> )	21	11
Walkability Ratio	1.8	1.9
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		
Stages in the Evolution of Residential Layouts		
Share of Built-Up Area in Residential Use	47%	50%
Share of Residential Area Not Laid Out Before Occupation	7%	39%
Share of Residential Area Laid Out Before Occupation	92%	60%
Share of Residential Area in Informal Land Subdivisions	0%	9%
Share of Residential Area in Formal Land Subdivisions	70%	23%
Share of Residential Area in Housing Projects	21%	27%



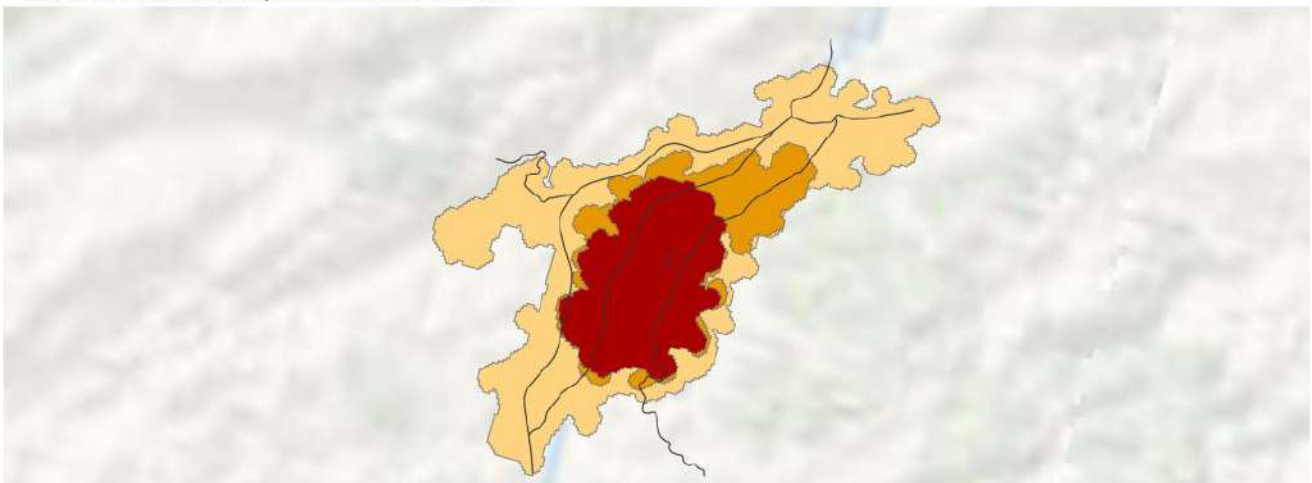
# Chengguan, Guizhou, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013




Chengguan, Guizhou, China  
1990-2013

0 1 2 3 4 km

Urban Extent in 1990  
Expansion, 1990 - 2000  
Expansion, 2000 - 2013  
Arterial Roads

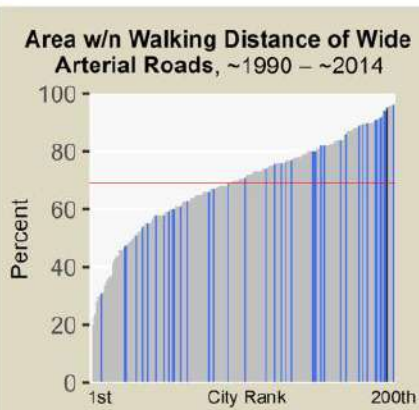
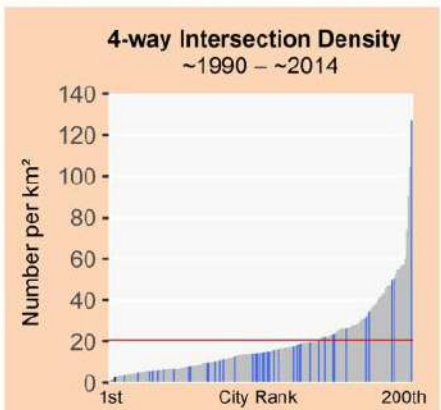
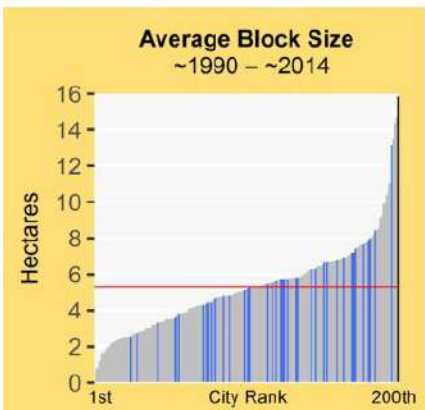
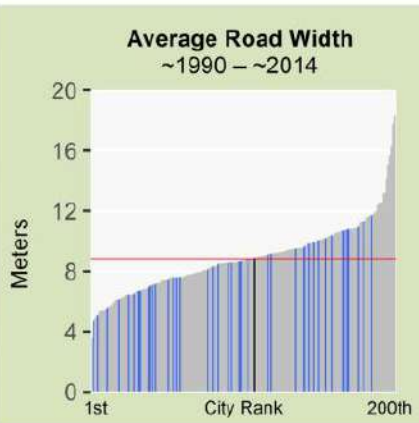
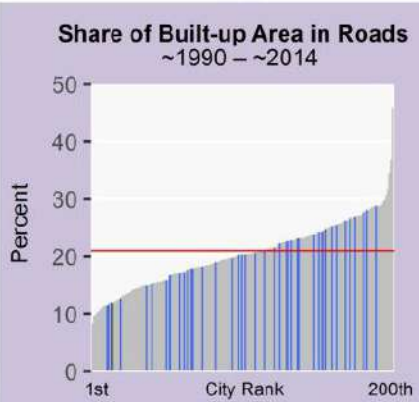
# Chengguan, Guizhou, China (East Asia and the Pacific)



**Legend for Charts**

Chengguan | Other cities in region | All other cities | Global average —

Metrics	Pre-1990	1990-2013
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	16%	11%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	8.9	7.9
Share of Roads less than 4m Wide	22%	27%
Share of Roads more than 16m Wide	17%	3%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.0	1.9
Average Beeline Distance to Arterial Roads (m)	114	139
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	100%	100%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	96%	95%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	10%	3%
Average Block Size (ha)	5.5	15.9
3-way Intersection Density (number per km <sup>2</sup> )	67	20
4-way Intersection Density (number per km <sup>2</sup> )	12	3
Walkability Ratio	1.8	1.6
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	78%	69%
Share of Residential Area Not Laid Out Before Occupation	74%	79%
Share of Residential Area Laid Out Before Occupation	25%	20%
Share of Residential Area in Informal Land Subdivisions	0%	0%
Share of Residential Area in Formal Land Subdivisions	24%	3%
Share of Residential Area in Housing Projects	1%	16%



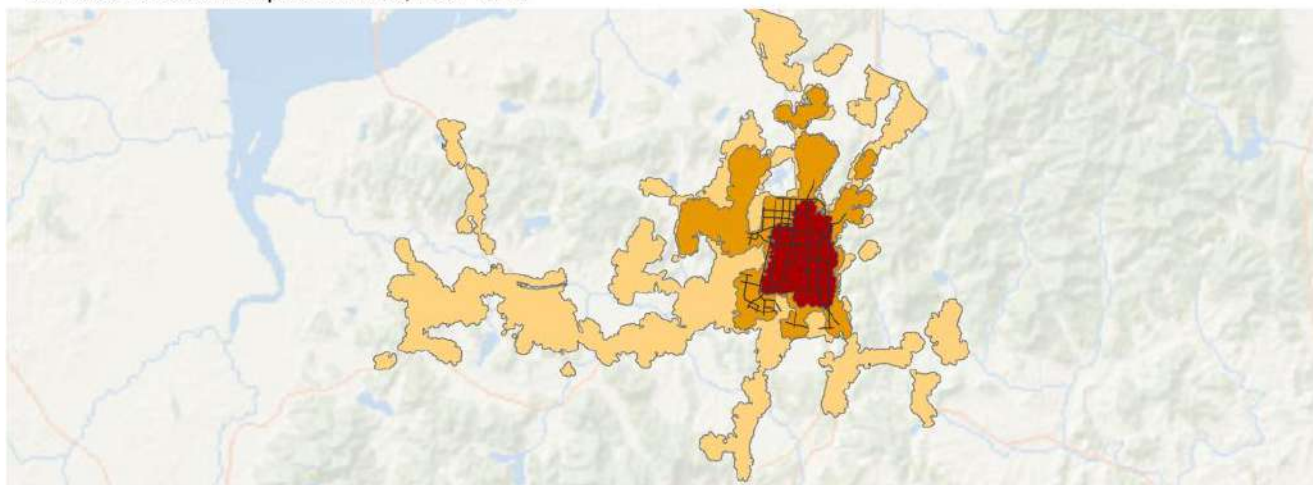
# Cheonan, Korea Rep. (East Asia and the Pacific)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2014



**Cheonan, Korea Rep. 1991-2014**

0 4 8 12 16 km

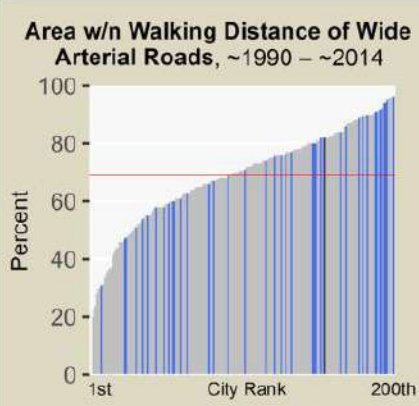
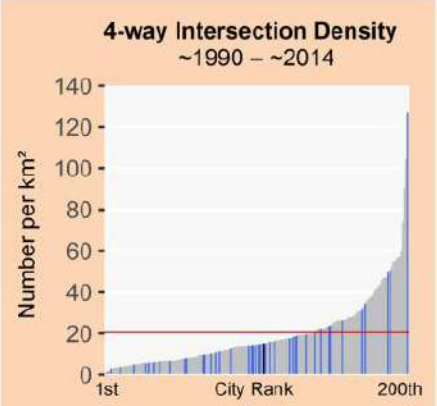
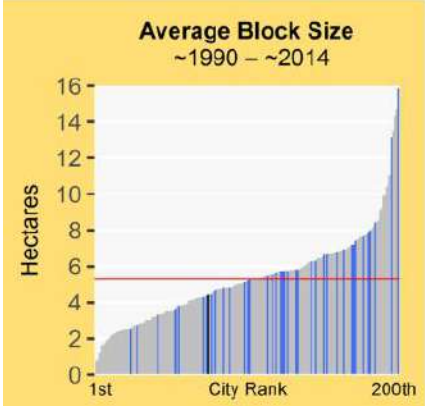
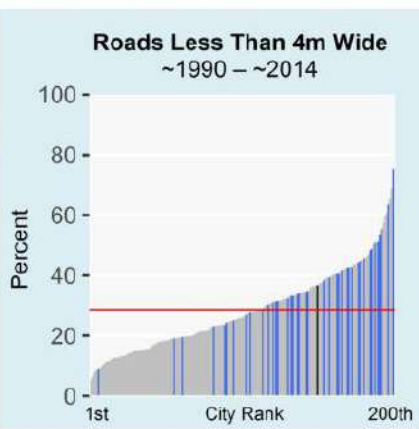
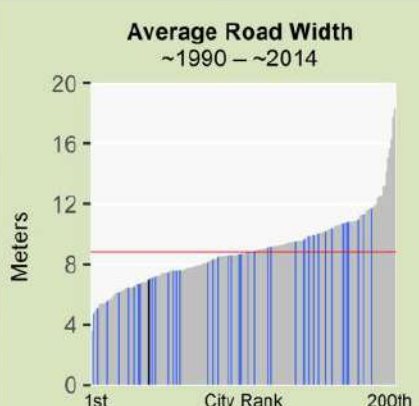
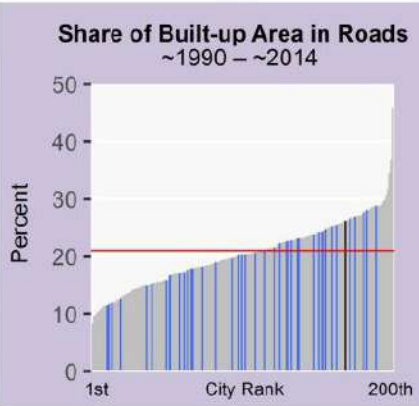
N

- Urban Extent in 1991
- Expansion, 1991 - 2000
- Expansion, 2000 - 2014
- Arterial Roads

# Cheonan, Korea Rep. (East Asia and the Pacific)



Legend for Charts			
	Cheonan	Other cities in region	All other cities
			Global average —
Metrics			
	Pre-1991	1991-2014	
Roads			
Share of Built-Up Area Occupied by Roads	22%	26%	
Share of Built-Up Area that is Gridded or Partially Gridded	17%	0%	
Average Road Width (m)	7.0	6.7	
Share of Roads less than 4m Wide	25%	36%	
Share of Roads more than 16m Wide	7%	7%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	3.3	0.5	
Average Beeline Distance to Arterial Roads (m)	94	331	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	100%	82%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	100%	82%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	22%	6%	
Average Block Size (ha)	1.7	4.4	
3-way Intersection Density (number per km <sup>2</sup> )	172	149	
4-way Intersection Density (number per km <sup>2</sup> )	59	15	
Walkability Ratio	1.3	1.5	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	170		
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	69%	51%	
Share of Residential Area Not Laid Out Before Occupation	35%	56%	
Share of Residential Area Laid Out Before Occupation	64%	43%	
Share of Residential Area in Informal Land Subdivisions	0%	8%	
Share of Residential Area in Formal Land Subdivisions	53%	10%	
Share of Residential Area in Housing Projects	10%	24%	



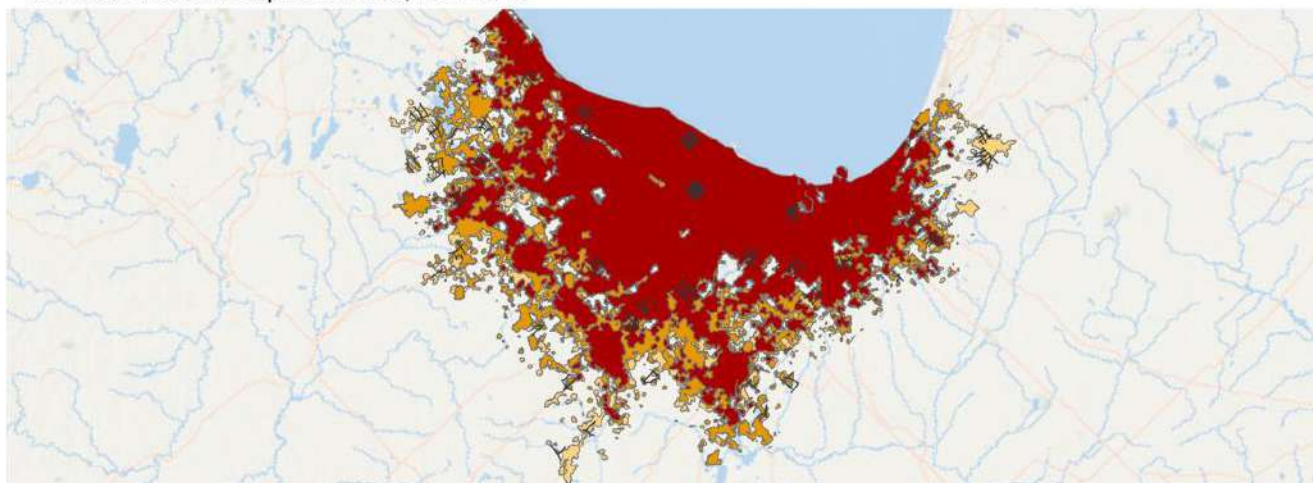
# Chicago, United States (Land-Rich Developed Countries)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2014



**Chicago, United States**  
1989-2014

0 25 50 75 100 km

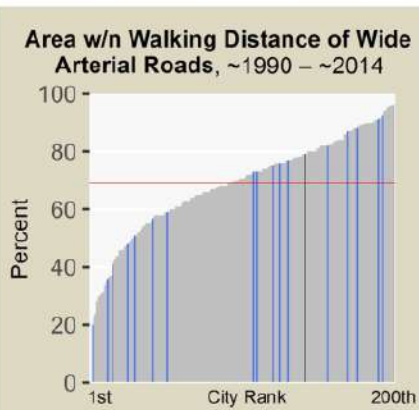
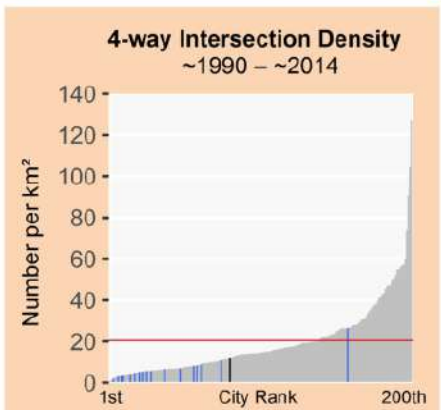
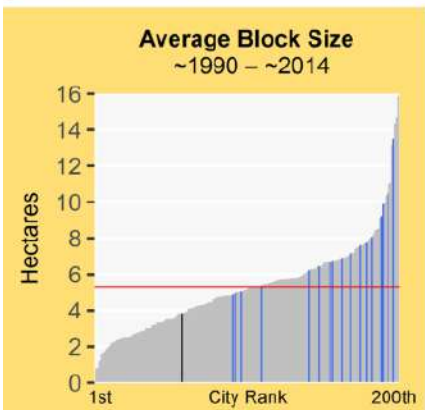
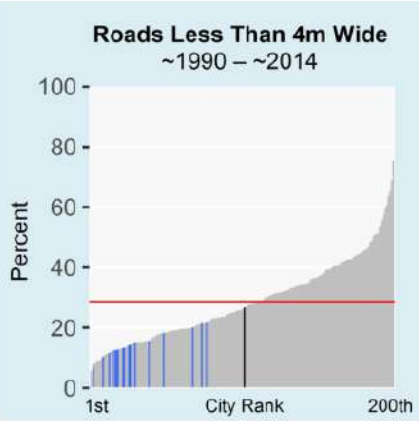
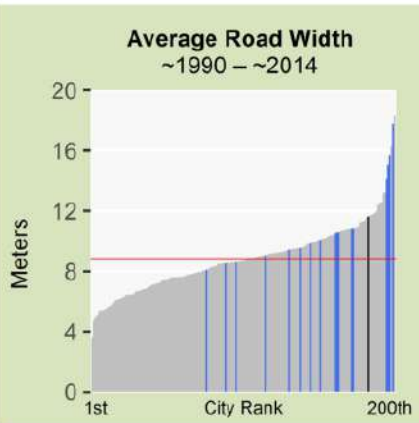
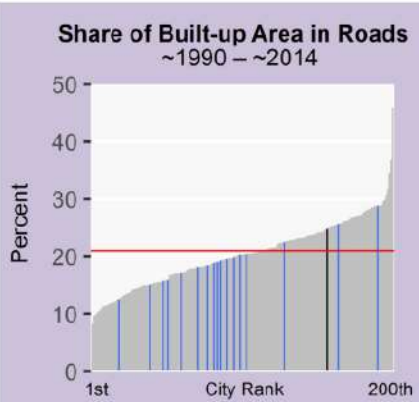
Urban Extent in 1989  
Expansion, 1989 - 2001  
Expansion, 2001 - 2014  
Arterial Roads



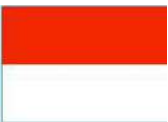
# Chicago, United States (Land-Rich Developed Countries)



Legend for Charts			
	Chicago	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1989	1989-2014	
Roads			
Share of Built-Up Area Occupied by Roads	27%	24%	
Share of Built-Up Area that is Gridded or Partially Gridded	56%	0%	
Average Road Width (m)	11.6	10.0	
Share of Roads less than 4m Wide	8%	26%	
Share of Roads more than 16m Wide	42%	29%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	1.4	1.4	
Average Beeline Distance to Arterial Roads (m)	241	258	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	92%	91%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	79%	79%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	33%	8%	
Average Block Size (ha)	7.4	3.9	
3-way Intersection Density (number per km <sup>2</sup> )	61	74	
4-way Intersection Density (number per km <sup>2</sup> )	38	12	
Walkability Ratio	1.5	1.7	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	637	1795	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	80%	82%	
Share of Residential Area Not Laid Out Before Occupation	1%	19%	
Share of Residential Area Laid Out Before Occupation	82%	80%	
Share of Residential Area in Informal Land Subdivisions	2%	0%	
Share of Residential Area in Formal Land Subdivisions	88%	64%	
Share of Residential Area in Housing Projects	7%	16%	



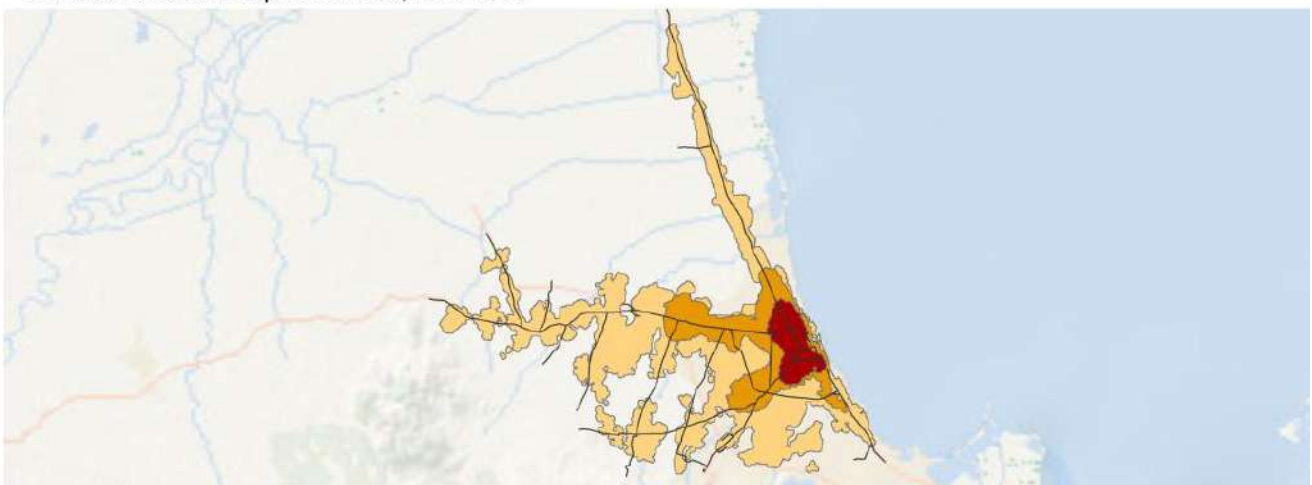
# Cirebon, Indonesia (Southeast Asia)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2014



Cirebon, Indonesia  
1989-2014

0 4 8 12 16 km

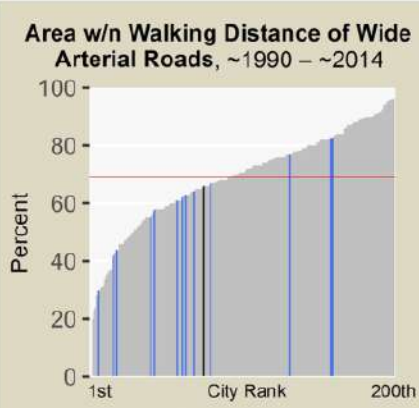
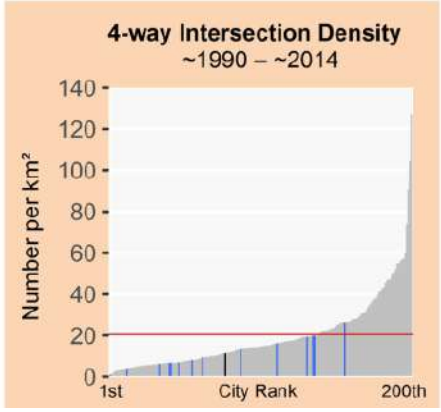
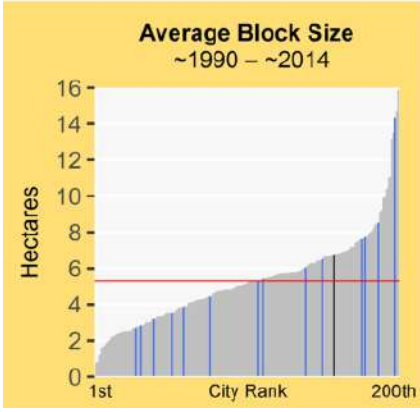
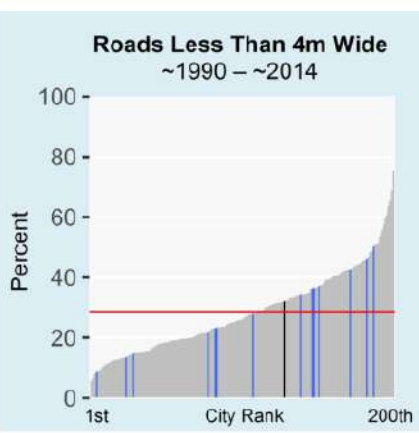
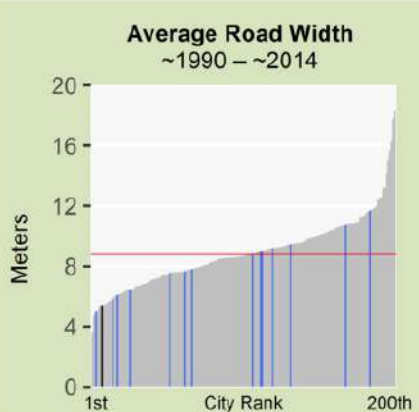
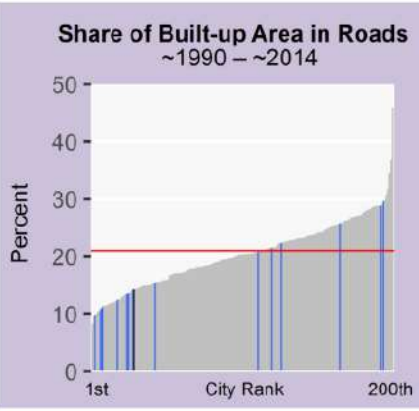
N

- Urban Extent in 1989
- Expansion, 1989 - 2000
- Expansion, 2000 - 2014
- Arterial Roads

# Cirebon, Indonesia (Southeast Asia)



Legend for Charts			
	Cirebon	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1989	1989-2014	
Roads			
Share of Built-Up Area Occupied by Roads	12%	14%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%	
Average Road Width (m)	5.4	5.8	
Share of Roads less than 4m Wide	39%	32%	
Share of Roads more than 16m Wide	1%	3%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	1.7	0.9	
Average Beeline Distance to Arterial Roads (m)	229	435	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	97%	77%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	95%	66%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	11%	4%	
Average Block Size (ha)	2.0	6.7	
3-way Intersection Density (number per km <sup>2</sup> )	179	123	
4-way Intersection Density (number per km <sup>2</sup> )	29	11	
Walkability Ratio	1.7	1.8	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		270	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	74%	81%	
Share of Residential Area Not Laid Out Before Occupation	47%	61%	
Share of Residential Area Laid Out Before Occupation	52%	38%	
Share of Residential Area in Informal Land Subdivisions	0%	16%	
Share of Residential Area in Formal Land Subdivisions	50%	22%	
Share of Residential Area in Housing Projects	1%	0%	



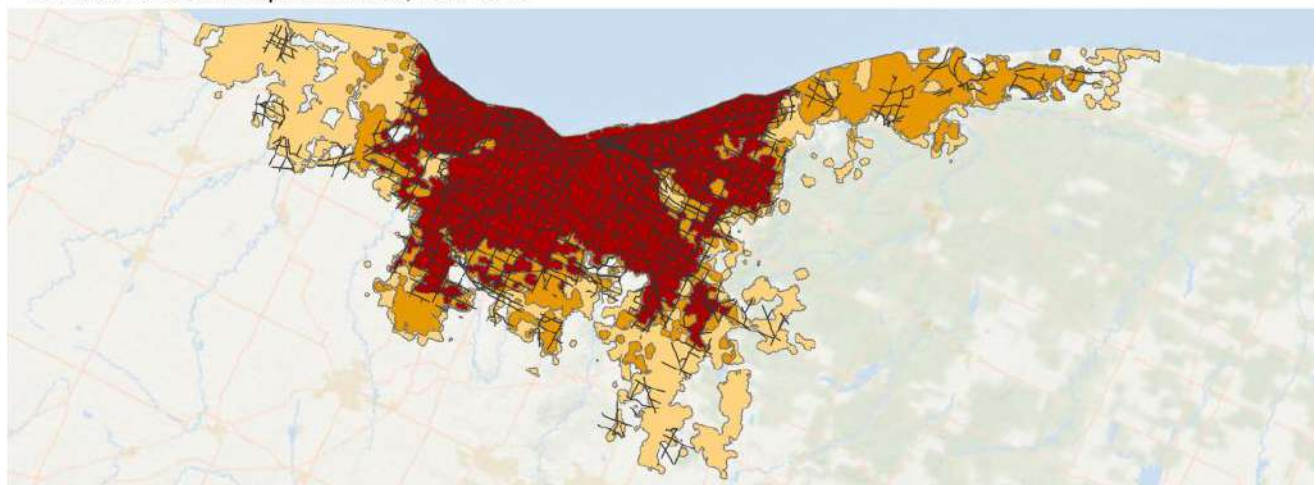
# Cleveland, United States (Land-Rich Developed Countries)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013



**Cleveland, United States**  
1990-2013

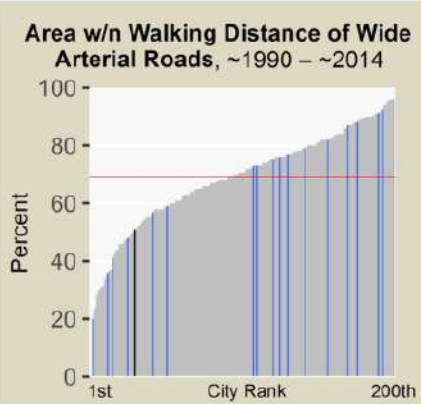
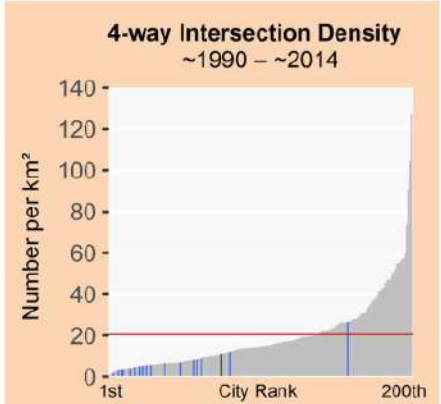
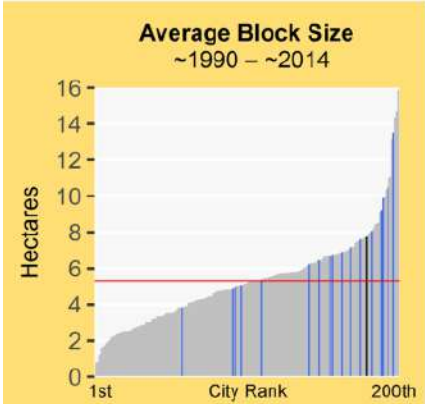
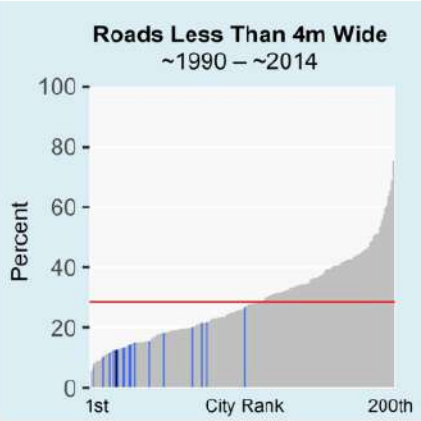
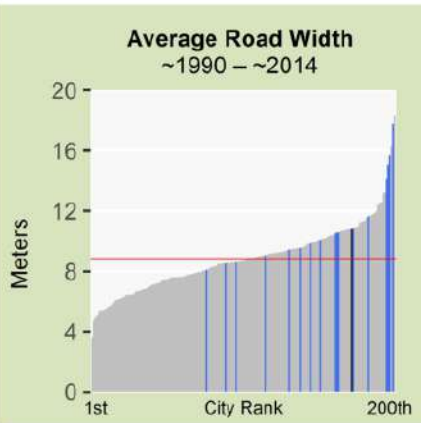
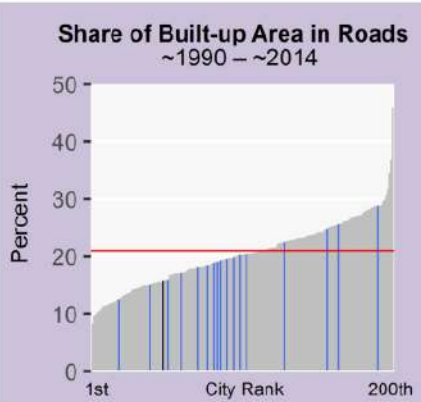
0 10 20 30 40 km

Urban Extent in 1990  
Expansion, 1990 - 2000  
Expansion, 2000 - 2013  
Arterial Roads

# Cleveland, United States (Land-Rich Developed Countries)



Legend for Charts			
	Cleveland	Other cities in region	All other cities
			Global average
Metrics	Pre-1990	1990-2013	
Roads			
Share of Built-Up Area Occupied by Roads	19%	15%	
Share of Built-Up Area that is Gridded or Partially Gridded	5%	0%	
Average Road Width (m)	10.8	21.8	
Share of Roads less than 4m Wide	18%	12%	
Share of Roads more than 16m Wide	26%	26%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	1.6	1.2	
Average Beeline Distance to Arterial Roads (m)	225	258	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	95%	91%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	90%	51%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	10%	9%	
Average Block Size (ha)	5.3	7.7	
3-way Intersection Density (number per km <sup>2</sup> )	82	99	
4-way Intersection Density (number per km <sup>2</sup> )	11	11	
Walkability Ratio	1.7	1.7	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	840	1381	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	67%	77%	
Share of Residential Area Not Laid Out Before Occupation	7%	15%	
Share of Residential Area Laid Out Before Occupation	92%	84%	
Share of Residential Area in Informal Land Subdivisions	0%	3%	
Share of Residential Area in Formal Land Subdivisions	85%	75%	
Share of Residential Area in Housing Projects	6%	6%	



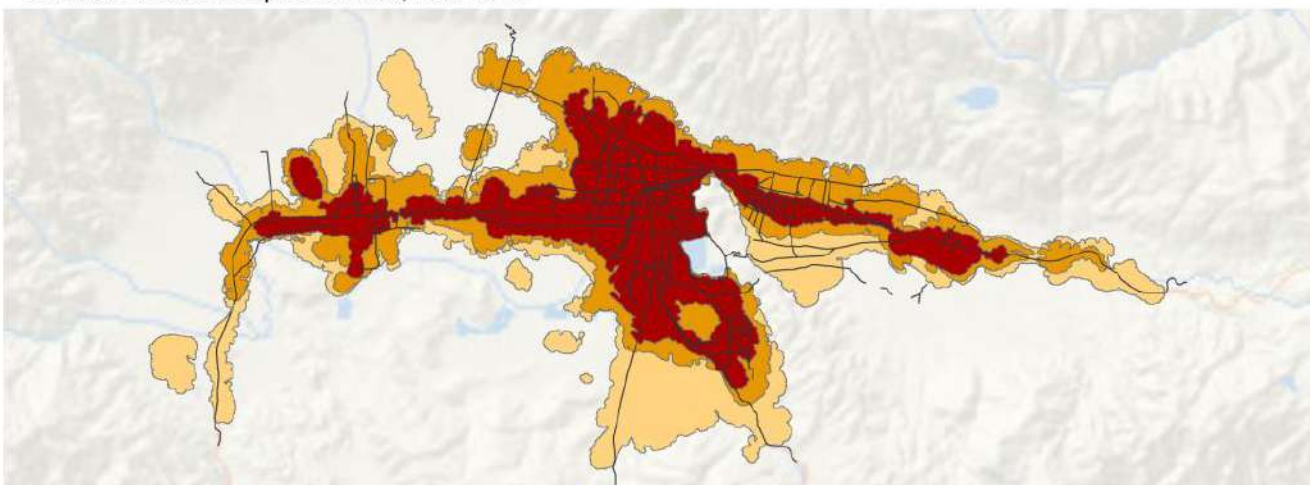
# Cochabamba, Bolivia (Latin America and the Caribbean)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013



**Cochabamba, Bolivia  
1990-2013**

0 4 8 12 16 km

N

- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2013
- Arterial Roads

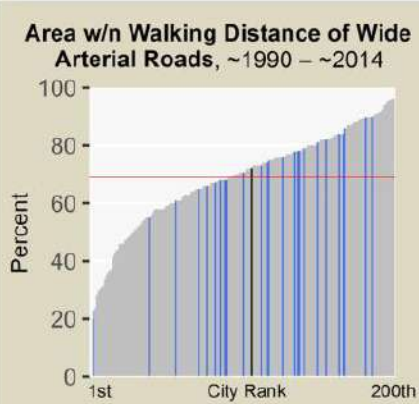
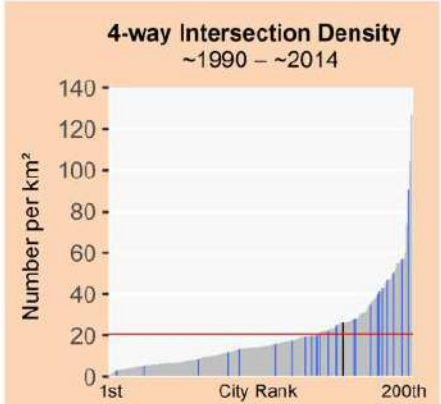
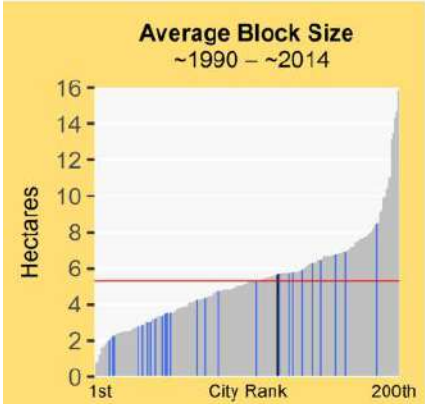
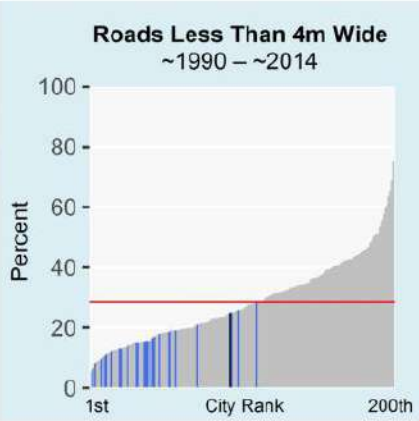
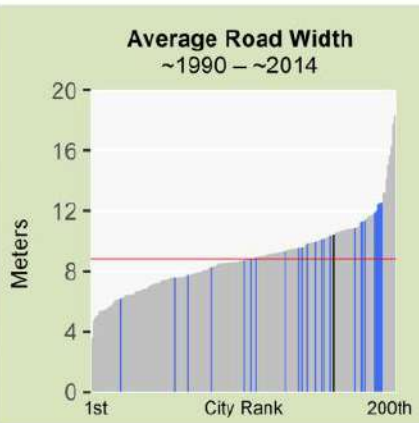
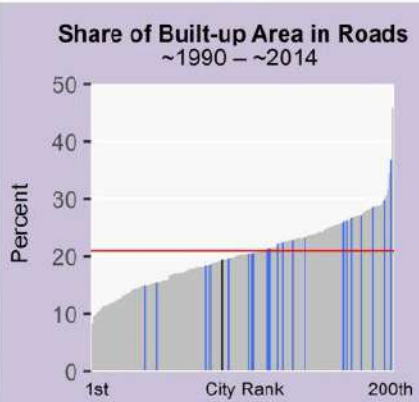
# Cochabamba, Bolivia (Latin America and the Caribbean)



**Legend for Charts**

Cochabamba | Other cities in region | All other cities | Global average —

Metrics	Pre-1990	1990-2013
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	24%	19%
Share of Built-Up Area that is Gridded or Partially Gridded	17%	0%
Average Road Width (m)	10.4	8.5
Share of Roads less than 4m Wide	7%	24%
Share of Roads more than 16m Wide	16%	2%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.4	1.2
Average Beeline Distance to Arterial Roads (m)	164	378
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	97%	81%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	95%	72%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	18%	17%
Average Block Size (ha)	2.1	5.6
3-way Intersection Density (number per km <sup>2</sup> )	126	133
4-way Intersection Density (number per km <sup>2</sup> )	27	26
Walkability Ratio	1.7	1.6
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		319
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	356	347
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	67%	62%
Share of Residential Area Not Laid Out Before Occupation	0%	30%
Share of Residential Area Laid Out Before Occupation	99%	69%
Share of Residential Area in Informal Land Subdivisions	33%	55%
Share of Residential Area in Formal Land Subdivisions	65%	13%
Share of Residential Area in Housing Projects	0%	0%



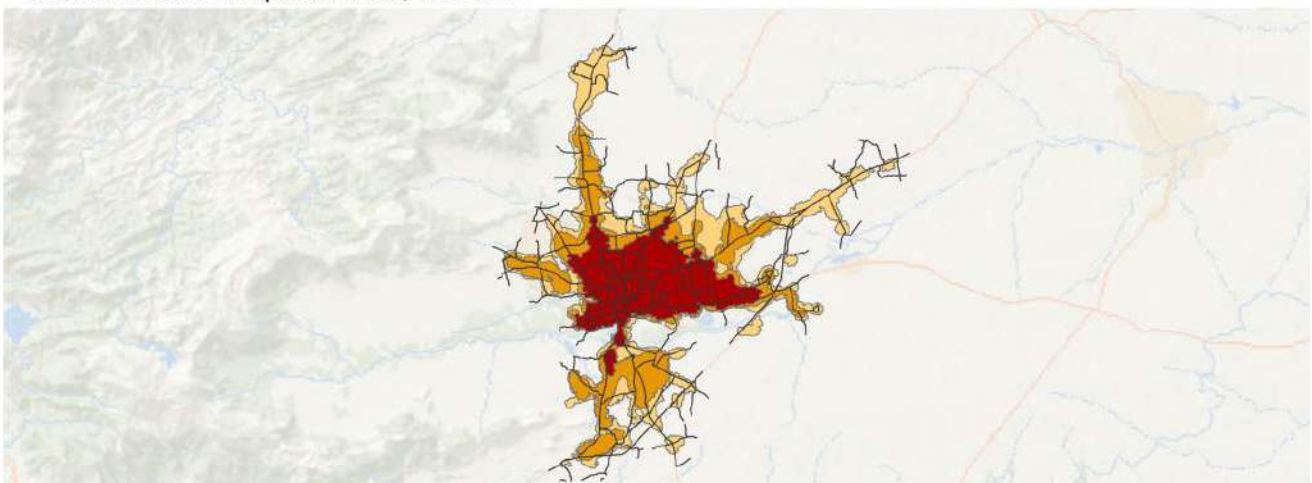
# Coimbatore, India (South and Central Asia)



Selected Locales in Area Developed Before 1992



Selected Locales in Expansion Area, 1992-2014



**Coimbatore, India**  
1992-2014


0 5 10 15 20 km

N

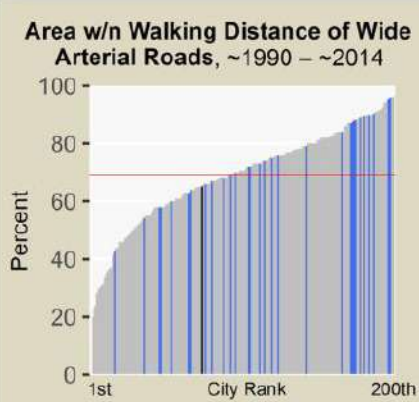
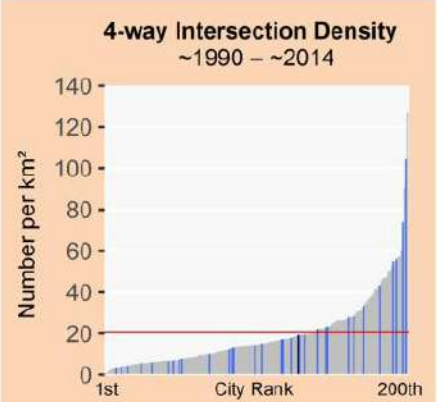
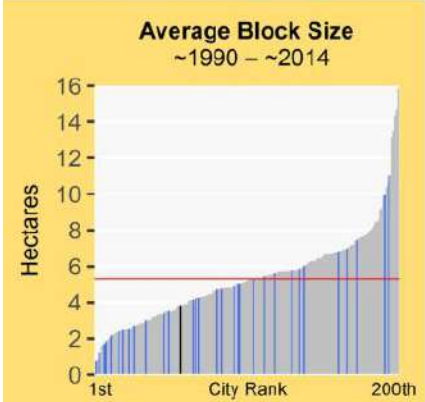
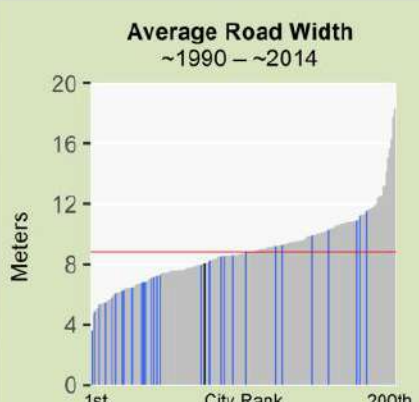
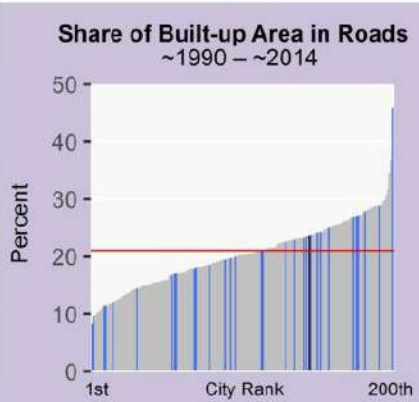
- Urban Extent in 1992
- Expansion, 1992 - 2000
- Expansion, 2000 - 2014
- Arterial Roads



# Coimbatore, India (South and Central Asia)



Legend for Charts			
	Coimbatore	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1992	1992-2014	
Roads			
Share of Built-Up Area Occupied by Roads	18%	23%	
Share of Built-Up Area that is Gridded or Partially Gridded	2%	0%	
Average Road Width (m)	8.1	6.5	
Share of Roads less than 4m Wide	10%	17%	
Share of Roads more than 16m Wide	8%	6%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	1.8	1.4	
Average Beeline Distance to Arterial Roads (m)	196	238	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	96%	93%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	78%	65%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	9%	7%	
Average Block Size (ha)	4.5	3.9	
3-way Intersection Density (number per km <sup>2</sup> )	130	182	
4-way Intersection Density (number per km <sup>2</sup> )	13	19	
Walkability Ratio	2.0	1.9	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	209	174	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	315	220	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	59%	57%	
Share of Residential Area Not Laid Out Before Occupation	20%	23%	
Share of Residential Area Laid Out Before Occupation	79%	76%	
Share of Residential Area in Informal Land Subdivisions	44%	69%	
Share of Residential Area in Formal Land Subdivisions	31%	1%	
Share of Residential Area in Housing Projects	2%	4%	



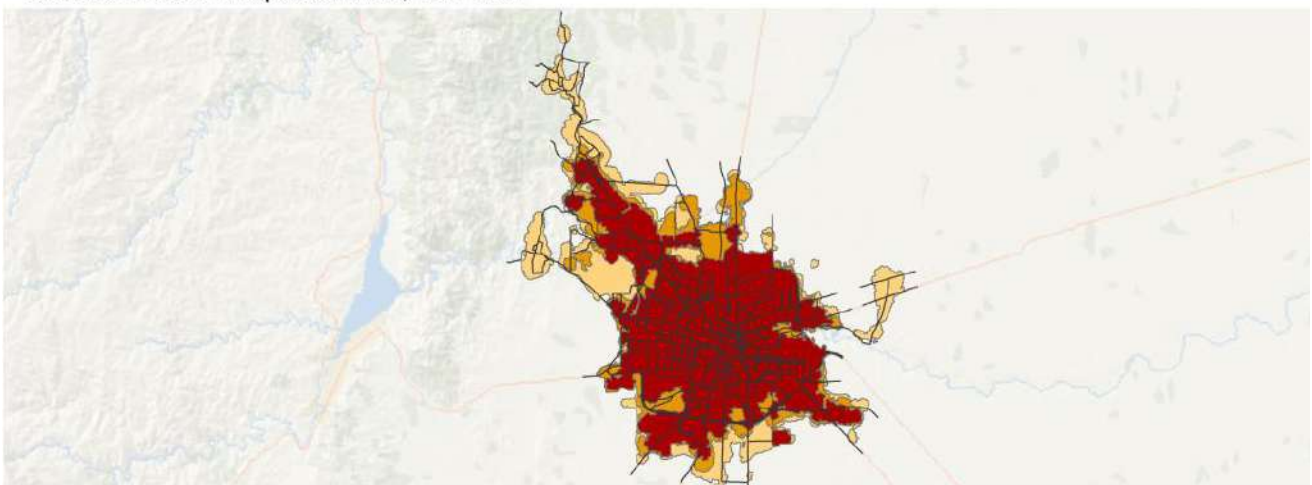
# Cordoba, Argentina (Latin America and the Caribbean)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2014



## Cordoba, Argentina 1991-2014



- Urban Extent in 1991
- Expansion, 1991 - 2001
- Expansion, 2001 - 2014

Arterial Roads

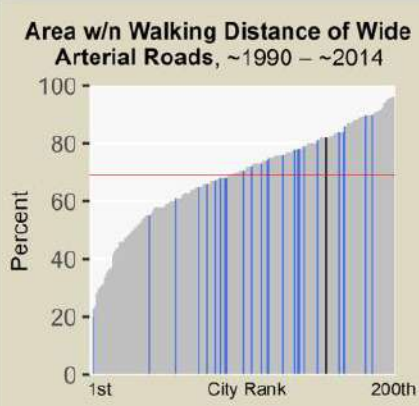
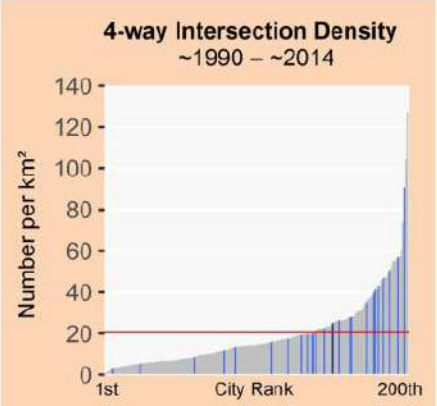
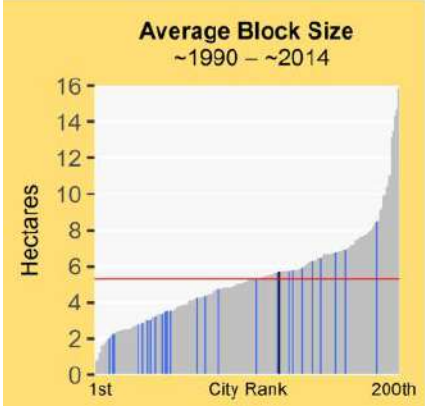
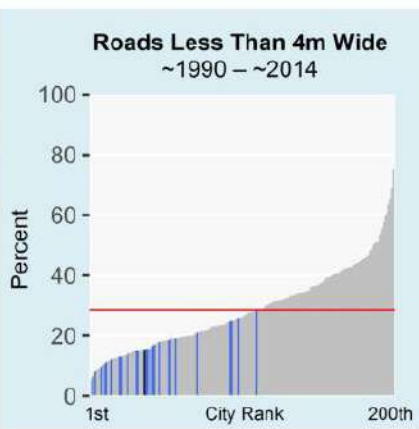
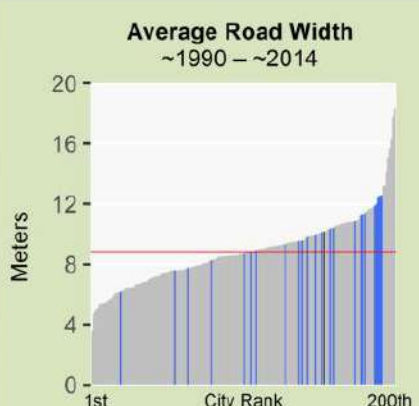
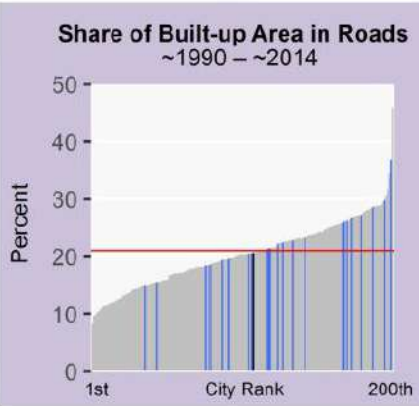
# Cordoba, Argentina (Latin America and the Caribbean)



**Legend for Charts**

Cordoba | Other cities in region | All other cities | Global average

Metrics	Pre-1991	1991-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	22%	20%
Share of Built-Up Area that is Gridded or Partially Gridded	47%	15%
Average Road Width (m)	10.2	7.5
Share of Roads less than 4m Wide	5%	15%
Share of Roads more than 16m Wide	8%	4%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.3	1.8
Average Beeline Distance to Arterial Roads (m)	190	235
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	95%	92%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	86%	82%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	42%	20%
Average Block Size (ha)	2.3	5.7
3-way Intersection Density (number per km <sup>2</sup> )	70	80
4-way Intersection Density (number per km <sup>2</sup> )	55	25
Walkability Ratio	1.4	1.7
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	344	789
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	326	768
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	79%	75%
Share of Residential Area Not Laid Out Before Occupation	3%	9%
Share of Residential Area Laid Out Before Occupation	96%	90%
Share of Residential Area in Informal Land Subdivisions	15%	53%
Share of Residential Area in Formal Land Subdivisions	80%	23%
Share of Residential Area in Housing Projects	1%	12%



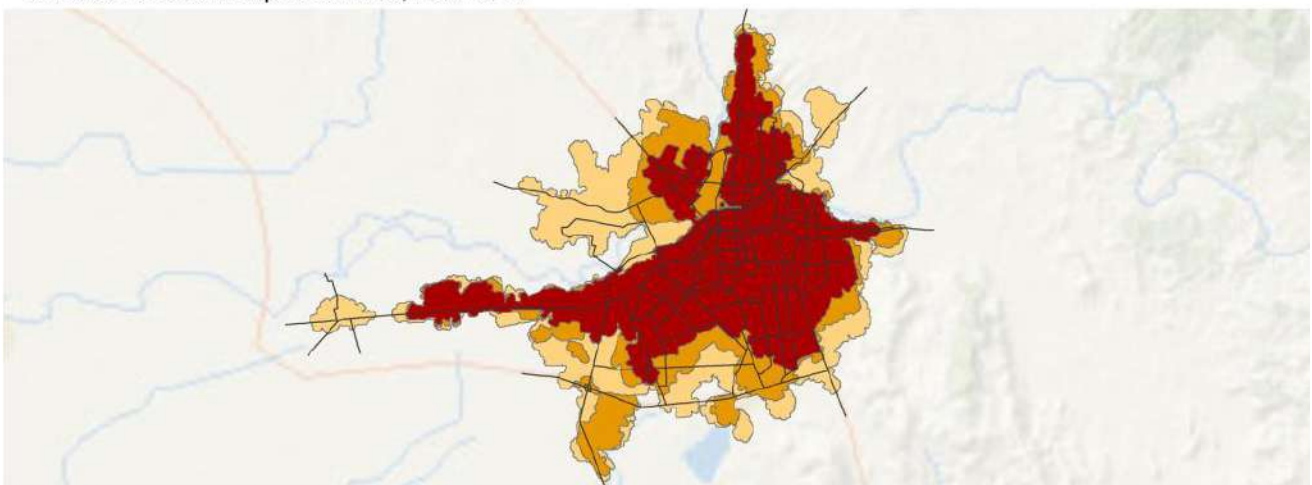
# Culiacan, Mexico (Latin America and the Caribbean)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



**Culiacan, Mexico**  
1990-2014

0 4 8 12 16 km

N

- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2014
- Arterial Roads

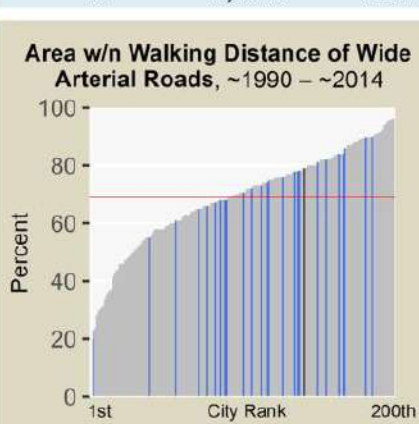
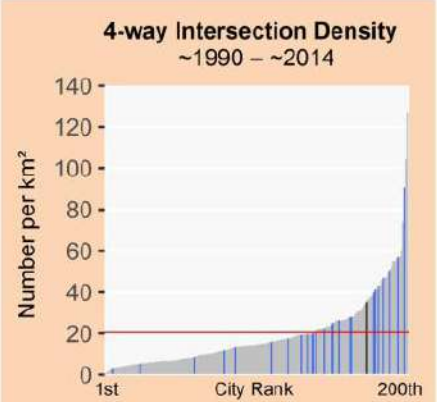
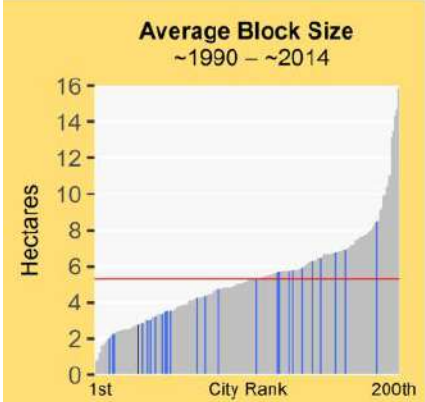
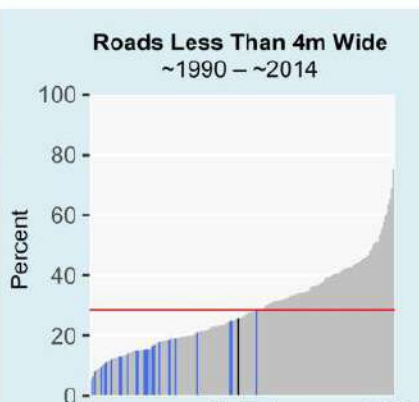
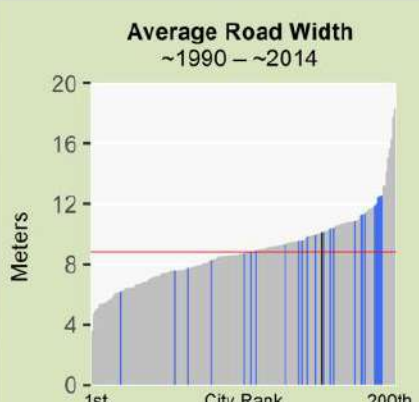
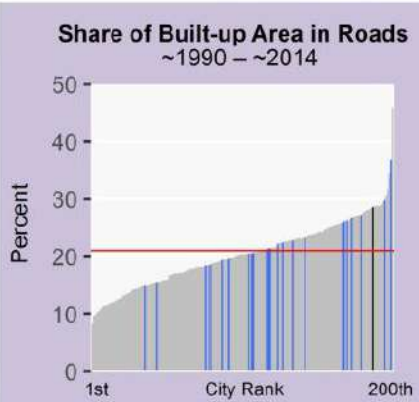
# Culiacan, Mexico (Latin America and the Caribbean)



**Legend for Charts**

Culiacan | Other cities in region | All other cities | Global average

Metrics	Pre-1990	1990-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	23%	28%
Share of Built-Up Area that is Gridded or Partially Gridded	35%	7%
Average Road Width (m)	10.1	7.0
Share of Roads less than 4m Wide	9%	25%
Share of Roads more than 16m Wide	12%	5%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.2	1.5
Average Beeline Distance to Arterial Roads (m)	159	297
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	97%	85%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	88%	79%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	37%	14%
Average Block Size (ha)	2.8	2.8
3-way Intersection Density (number per km <sup>2</sup> )	77	183
4-way Intersection Density (number per km <sup>2</sup> )	51	35
Walkability Ratio	1.8	2.0
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	265	152
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	161	132
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	66%	65%
Share of Residential Area Not Laid Out Before Occupation	2%	3%
Share of Residential Area Laid Out Before Occupation	97%	96%
Share of Residential Area in Informal Land Subdivisions	35%	23%
Share of Residential Area in Formal Land Subdivisions	61%	67%
Share of Residential Area in Housing Projects	0%	5%



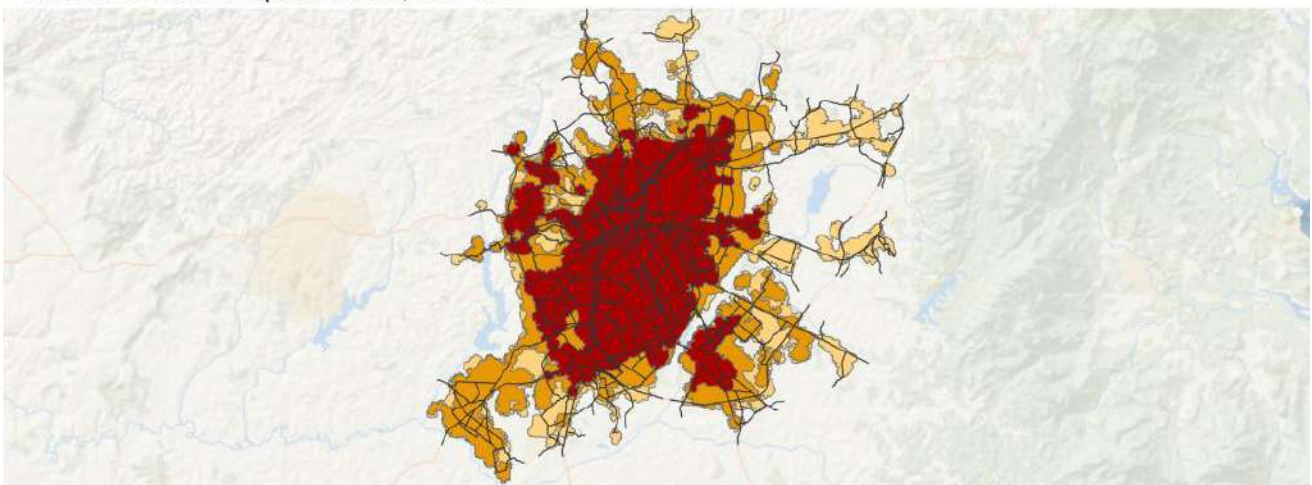
# Curitiba, Brazil (Latin America and the Caribbean)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



Curitiba, Brazil  
1990-2014

0 5 10 15 20 km

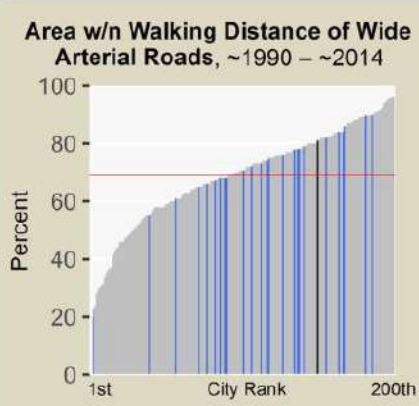
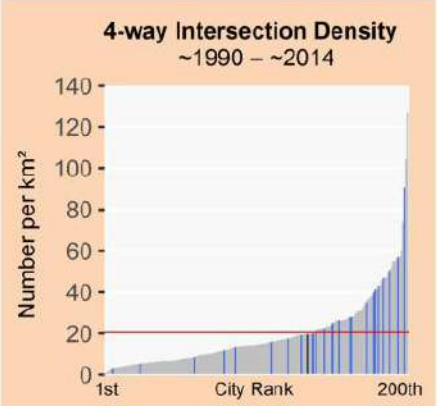
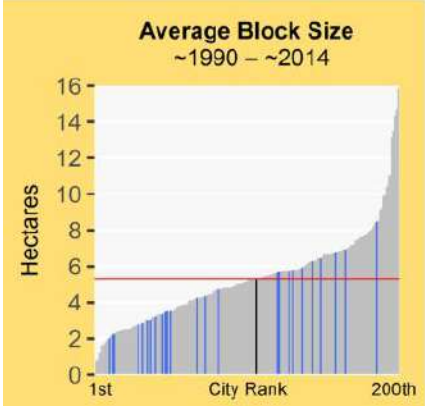
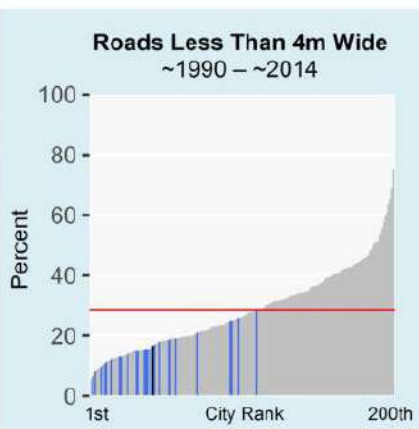
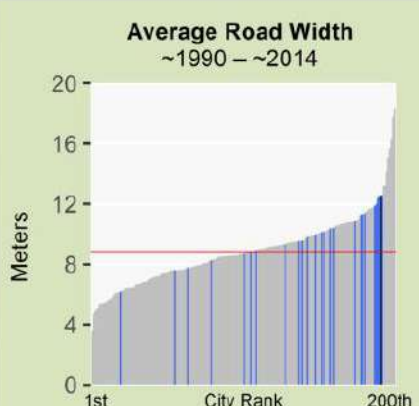
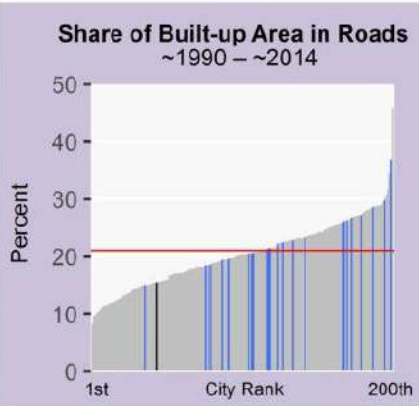
N

- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2014
- Arterial Roads

# Curitiba, Brazil (Latin America and the Caribbean)



Legend for Charts			
	Curitiba	Other cities in region	All other cities
			Global average —
Metrics			
	Pre-1990	1990-2014	
Roads			
Share of Built-Up Area Occupied by Roads	26%	15%	
Share of Built-Up Area that is Gridded or Partially Gridded	45%	17%	
Average Road Width (m)	12.5	6.6	
Share of Roads less than 4m Wide	7%	16%	
Share of Roads more than 16m Wide	26%	1%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	2.2	1.6	
Average Beeline Distance to Arterial Roads (m)	173	262	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	98%	90%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	96%	81%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	37%	18%	
Average Block Size (ha)	4.1	5.3	
3-way Intersection Density (number per km <sup>2</sup> )	57	70	
4-way Intersection Density (number per km <sup>2</sup> )	26	20	
Walkability Ratio	1.5	1.7	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		370	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	325	376	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	69%	71%	
Share of Residential Area Not Laid Out Before Occupation	1%	18%	
Share of Residential Area Laid Out Before Occupation	98%	81%	
Share of Residential Area in Informal Land Subdivisions	0%	29%	
Share of Residential Area in Formal Land Subdivisions	96%	47%	
Share of Residential Area in Housing Projects	1%	4%	



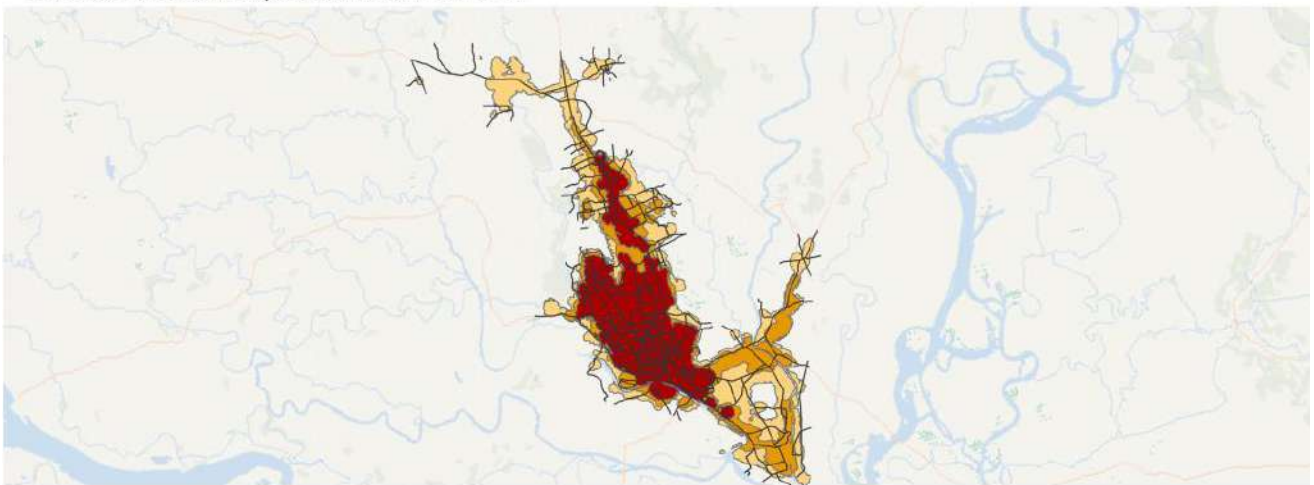
# Dhaka, Bangladesh (South and Central Asia)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2014



**Dhaka, Bangladesh**  
1989-2014

0 8 16 24 32 km

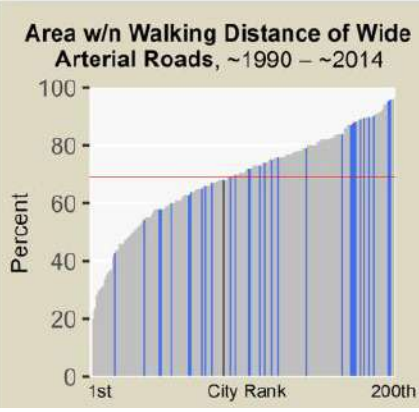
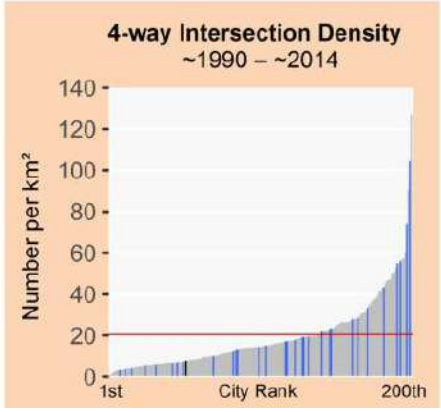
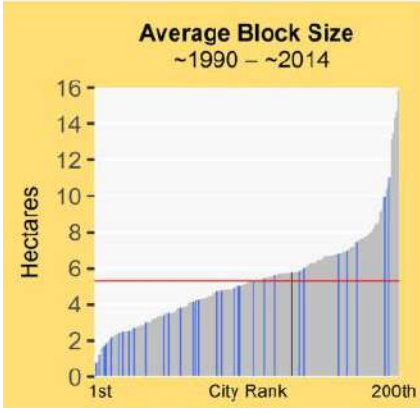
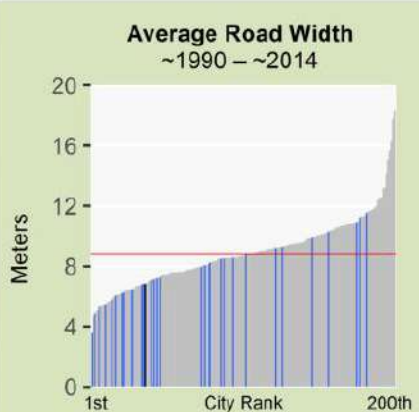
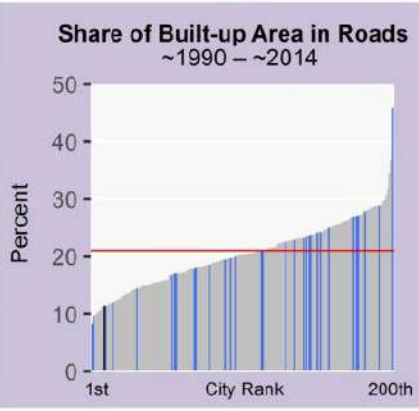
■ Urban Extent in 1989  
■ Expansion, 1989 - 1999  
■ Expansion, 1999 - 2014  
— Arterial Roads



# Dhaka, Bangladesh (South and Central Asia)



Legend for Charts		
Dhaka	Other cities in region	All other cities
		Global average
Metrics		
	Pre-1989	1989-2014
Roads		
Share of Built-Up Area Occupied by Roads	15%	11%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	6.8	4.3
Share of Roads less than 4m Wide	39%	55%
Share of Roads more than 16m Wide	9%	1%
Arterial Roads		
Density of Arterial Roads (km/km <sup>2</sup> )	2.3	1.5
Average Beeline Distance to Arterial Roads (m)	162	261
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	97%	90%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	88%	68%
Block Size, Plot Size, Intersection Density, and Walkability		
Share of Intersections that are 4-way	9%	5%
Average Block Size (ha)	3.3	5.8
3-way Intersection Density (number per km <sup>2</sup> )	131	149
4-way Intersection Density (number per km <sup>2</sup> )	15	8
Walkability Ratio	1.6	1.5
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	270	349
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	379	
Stages in the Evolution of Residential Layouts		
Share of Built-Up Area in Residential Use	74%	70%
Share of Residential Area Not Laid Out Before Occupation	68%	91%
Share of Residential Area Laid Out Before Occupation	30%	8%
Share of Residential Area in Informal Land Subdivisions	17%	5%
Share of Residential Area in Formal Land Subdivisions	7%	0%
Share of Residential Area in Housing Projects	6%	3%



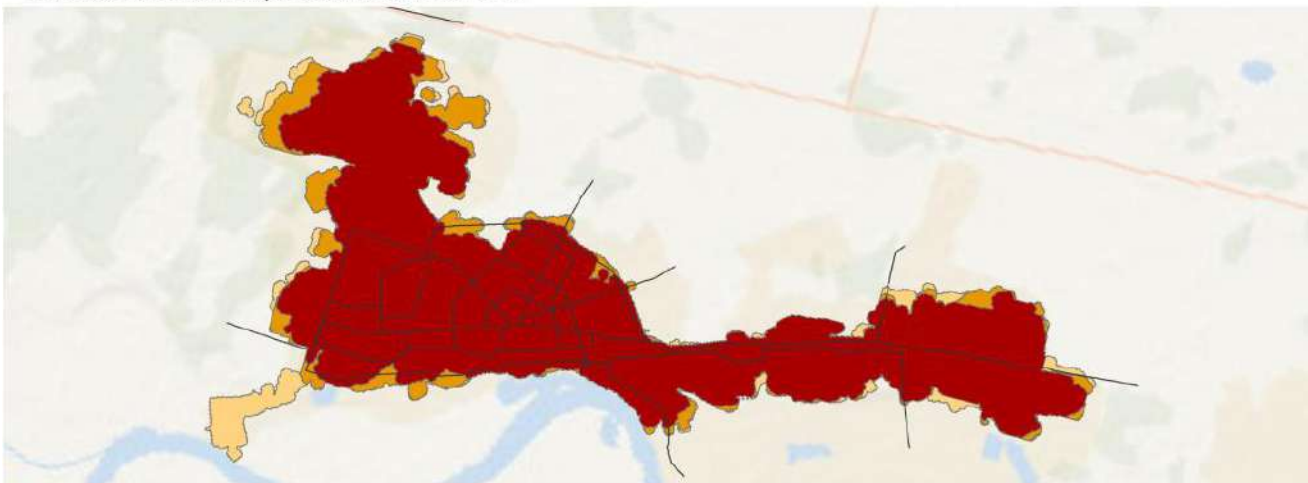
# Dzerzhinsk, Russia (Europe and Japan)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2010



**Dzerzhinsk, Russia**  
1989-2010

0 2 4 6 8 km

Urban Extent in 1989  
 Expansion, 1989 - 2000  
 Expansion, 2000 - 2010

— Arterial Roads

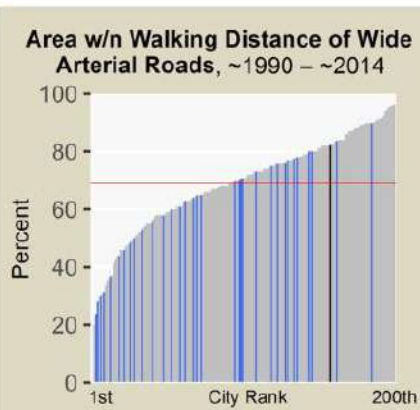
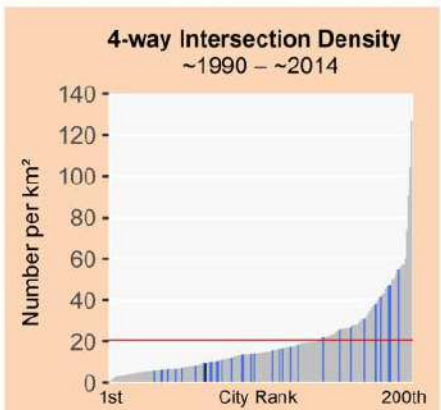
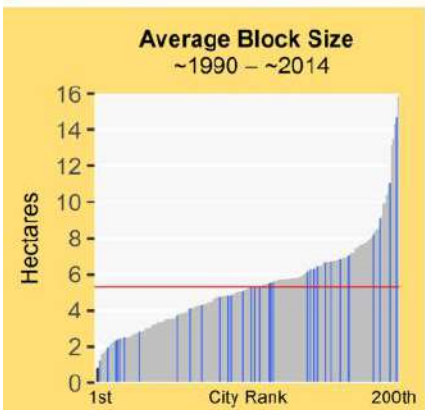
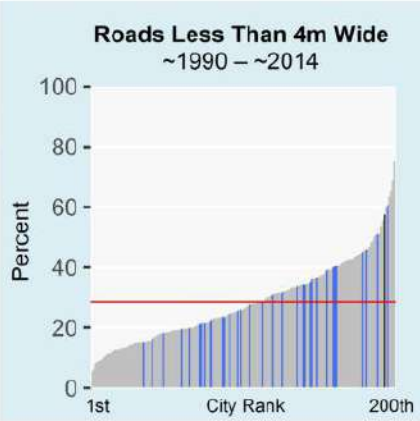
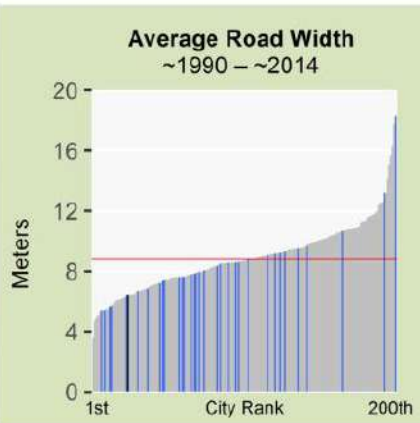
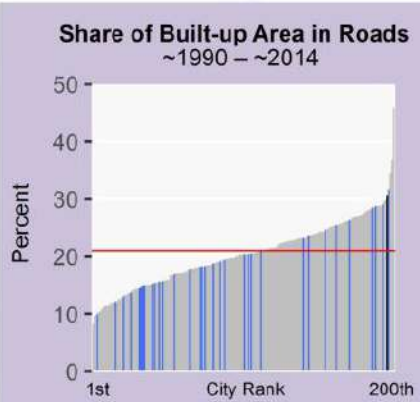
# Dzerzhinsk, Russia (Europe and Japan)



**Legend for Charts**

Dzerzhinsk | Other cities in region | All other cities | Global average —

Metrics	Pre-1989	1989-2010
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	21%	17%
Share of Built-Up Area that is Gridded or Partially Gridded		0%
Average Road Width (m)	6.5	5.2
Share of Roads less than 4m Wide	27%	30%
Share of Roads more than 16m Wide	6%	1%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.5	1.3
Average Beeline Distance to Arterial Roads (m)	471	494
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	75%	73%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	83%	82%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	8%	8%
Average Block Size (ha)	4.0	8.7
3-way Intersection Density (number per km <sup>2</sup> )	155	83
4-way Intersection Density (number per km <sup>2</sup> )	20	9
Walkability Ratio	2.0	2.1
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	683	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	49%	93%
Share of Residential Area Not Laid Out Before Occupation	4%	1%
Share of Residential Area Laid Out Before Occupation	95%	98%
Share of Residential Area in Informal Land Subdivisions	60%	94%
Share of Residential Area in Formal Land Subdivisions	28%	4%
Share of Residential Area in Housing Projects	6%	0%



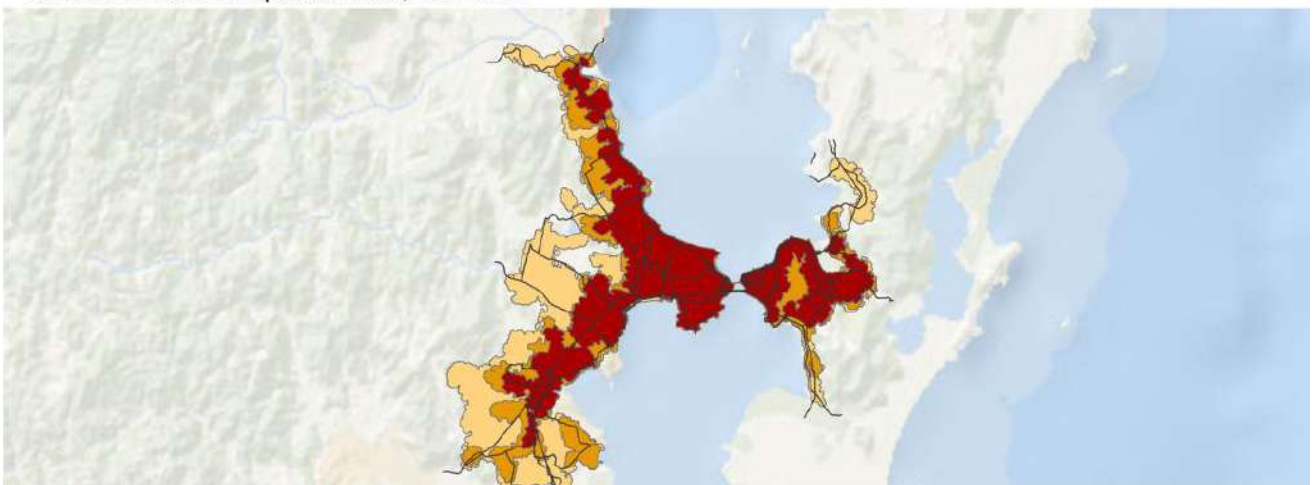
# Florianopolis, Brazil (Latin America and the Caribbean)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



**Florianopolis, Brazil**  
1990-2014

0 5 10 15 20 km

N

- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2014
- Arterial Roads

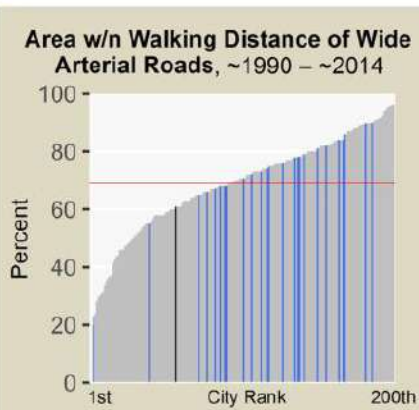
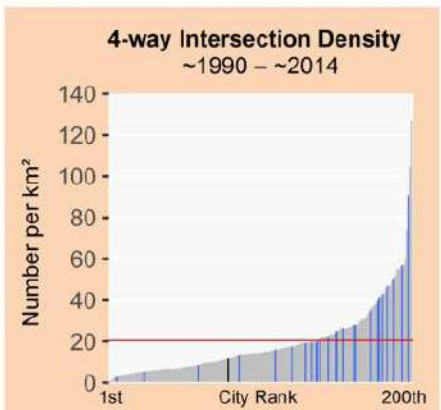
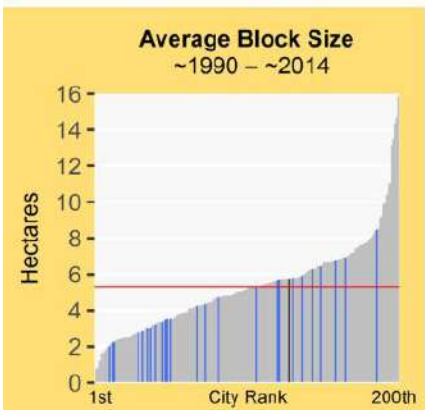
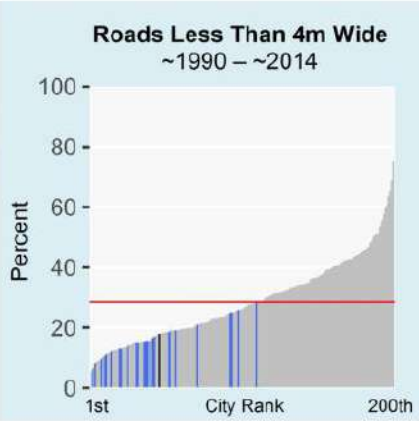
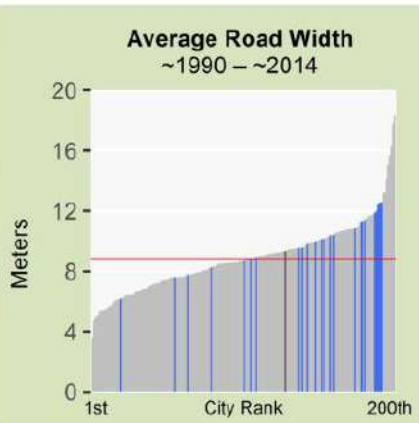
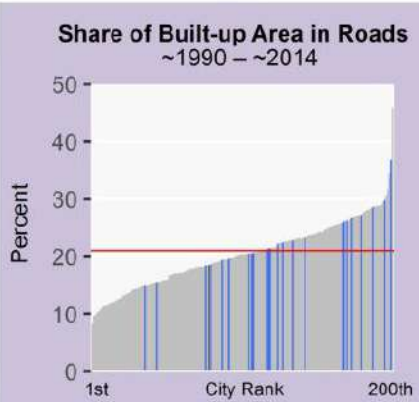
# Florianopolis, Brazil (Latin America and the Caribbean)



**Legend for Charts**

Florianopolis | Other cities in region | All other cities | Global average

Metrics	Pre-1990	1990-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	23%	18%
Share of Built-Up Area that is Gridded or Partially Gridded	7%	0%
Average Road Width (m)	9.3	6.3
Share of Roads less than 4m Wide	5%	17%
Share of Roads more than 16m Wide	6%	0%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.0	1.4
Average Beeline Distance to Arterial Roads (m)	206	344
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	96%	85%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	73%	61%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	18%	10%
Average Block Size (ha)	3.6	5.7
3-way Intersection Density (number per km <sup>2</sup> )	73	54
4-way Intersection Density (number per km <sup>2</sup> )	18	12
Walkability Ratio	1.8	1.9
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	345	233
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	326	241
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	61%	88%
Share of Residential Area Not Laid Out Before Occupation	3%	14%
Share of Residential Area Laid Out Before Occupation	96%	85%
Share of Residential Area in Informal Land Subdivisions	5%	22%
Share of Residential Area in Formal Land Subdivisions	82%	60%
Share of Residential Area in Housing Projects	8%	2%



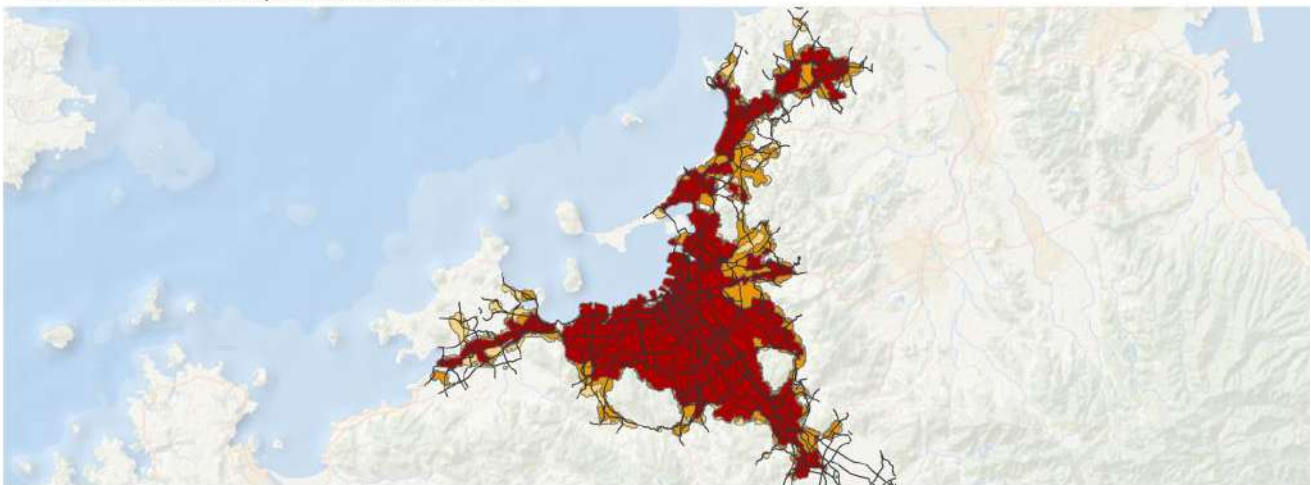
# Fukuoka, Japan (Europe and Japan)



Selected Locales in Area Developed Before 1993



Selected Locales in Expansion Area, 1993-2014



**Fukuoka, Japan**  
1993-2014

0 8 16 24 32 km

N

- Urban Extent in 1993
- Expansion, 1993 - 2001
- Expansion, 2001 - 2014
- Arterial Roads

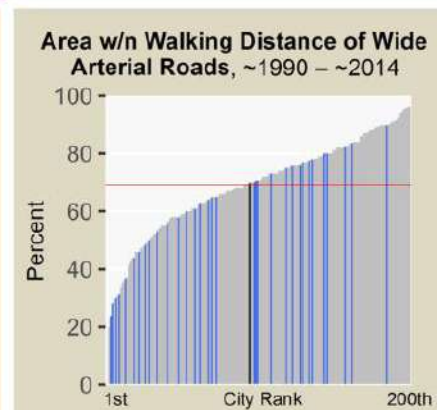
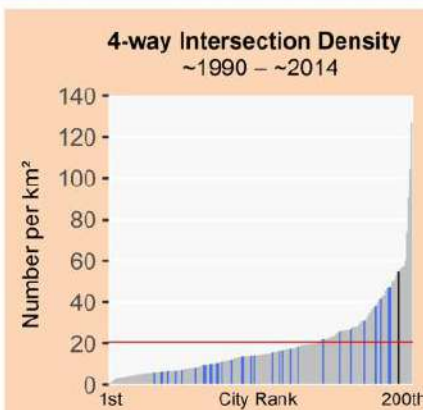
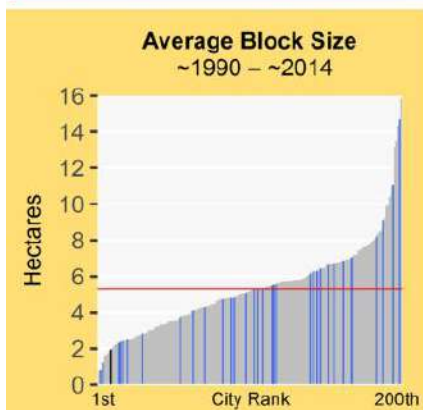
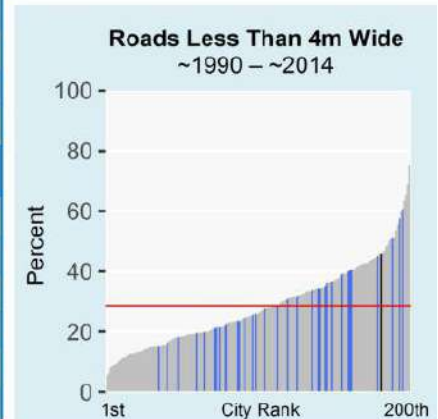
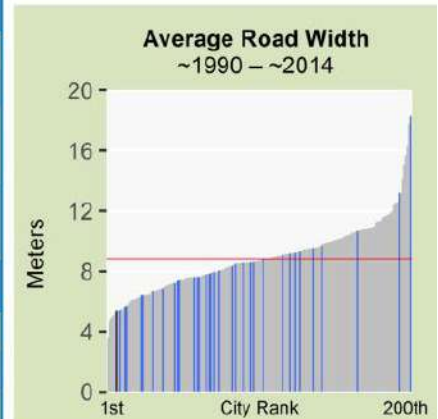
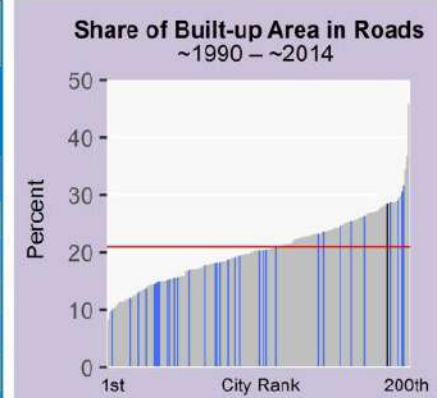
# Fukuoka, Japan (Europe and Japan)



### Legend for Charts

Fukuoka | Other cities in region | All other cities | Global average

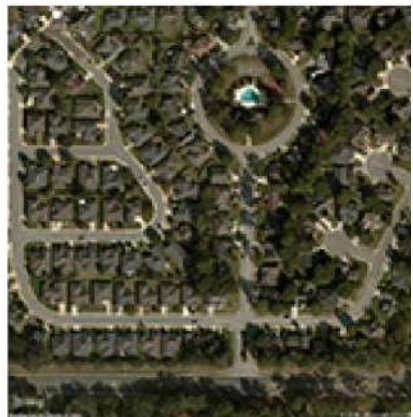
Metrics	Pre-1993	1993-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	24%	28%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	5.4	5.1
Share of Roads less than 4m Wide	48%	45%
Share of Roads more than 16m Wide	4%	1%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.3	2.1
Average Beeline Distance to Arterial Roads (m)	174	185
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	97%	97%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	76%	70%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	17%	15%
Average Block Size (ha)	1.6	1.9
3-way Intersection Density (number per km <sup>2</sup> )	254	288
4-way Intersection Density (number per km <sup>2</sup> )	57	55
Walkability Ratio	1.5	1.5
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	230	229
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	248	257
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	64%	58%
Share of Residential Area Not Laid Out Before Occupation	18%	31%
Share of Residential Area Laid Out Before Occupation	81%	68%
Share of Residential Area in Informal Land Subdivisions	4%	9%
Share of Residential Area in Formal Land Subdivisions	76%	58%
Share of Residential Area in Housing Projects	0%	0%



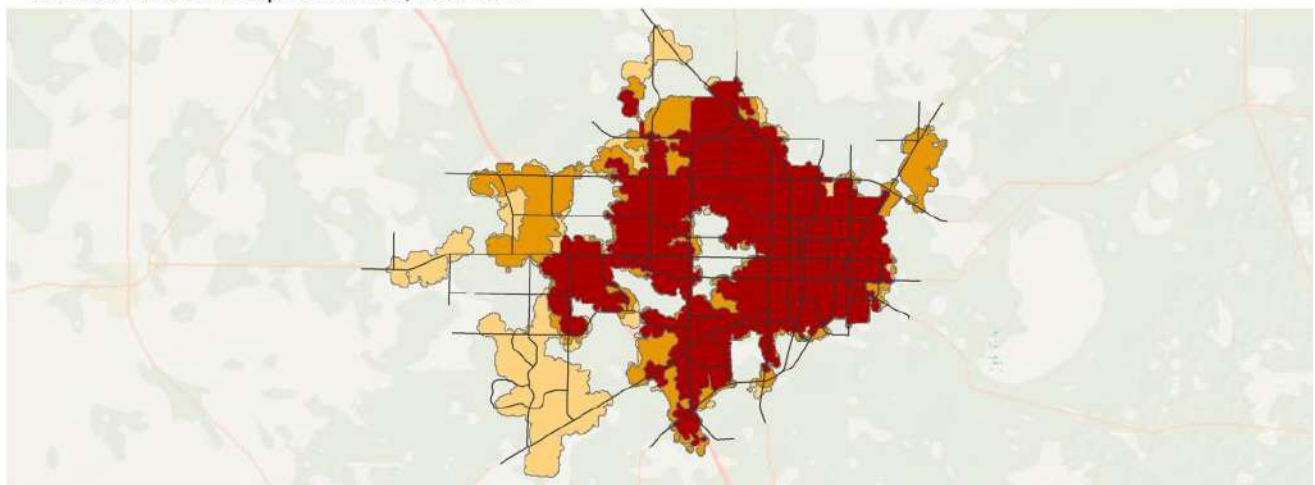
# Gainesville, FL, United States (Land-Rich Developed Countries)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013



**Gainesville, FL, United States**  
1990-2013

0 3 6 9 12 km

N

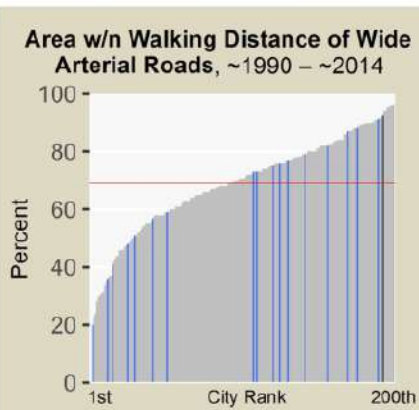
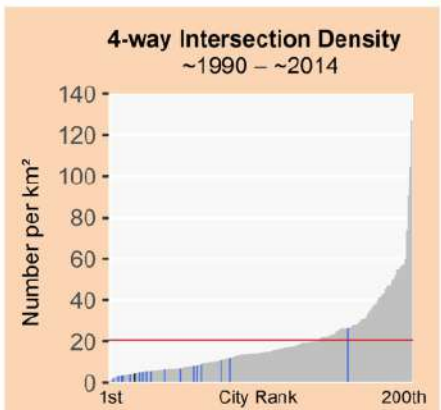
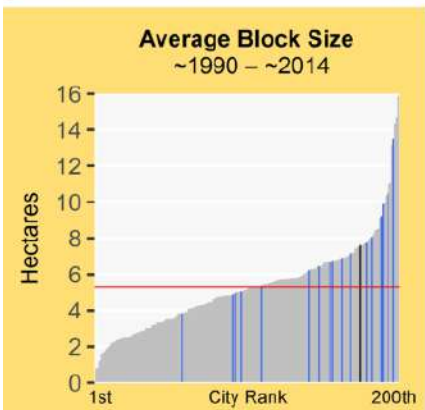
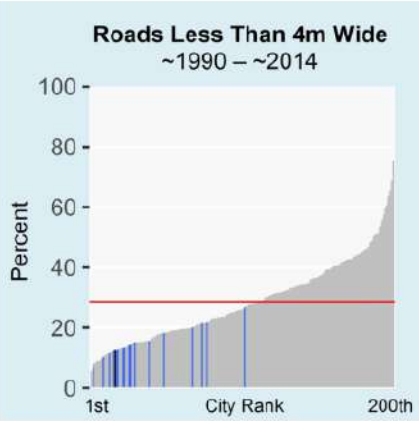
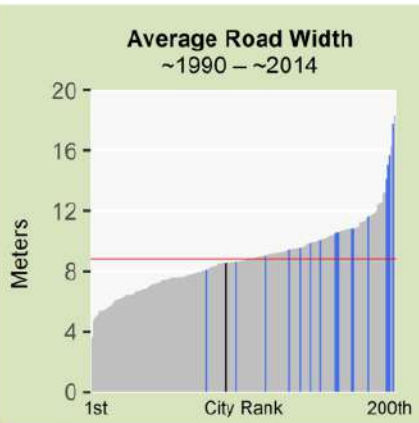
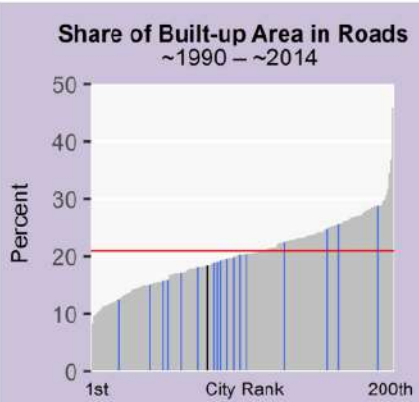
- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2013
- Arterial Roads



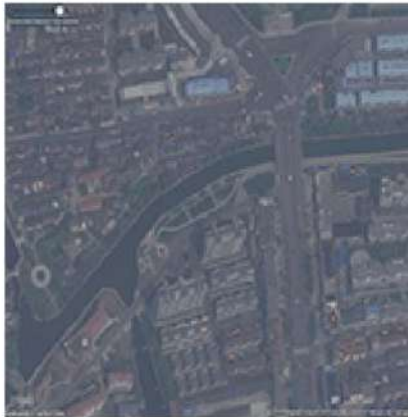
# Gainesville, FL, United States (Land-Rich Developed Countries)



Legend for Charts			
	Gainesville	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1990	1990-2013	
Roads			
Share of Built-Up Area Occupied by Roads	18%	18%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%	
Average Road Width (m)	8.5	9.9	
Share of Roads less than 4m Wide	17%	12%	
Share of Roads more than 16m Wide	13%	13%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	1.7	1.4	
Average Beeline Distance to Arterial Roads (m)	197	233	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	96%	93%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	96%	92%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	13%	6%	
Average Block Size (ha)	3.8	7.6	
3-way Intersection Density (number per km <sup>2</sup> )	92	69	
4-way Intersection Density (number per km <sup>2</sup> )	17	5	
Walkability Ratio	1.8	2.4	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	1037	1009	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	71%	74%	
Share of Residential Area Not Laid Out Before Occupation	3%	10%	
Share of Residential Area Laid Out Before Occupation	96%	89%	
Share of Residential Area in Informal Land Subdivisions	0%	0%	
Share of Residential Area in Formal Land Subdivisions	89%	74%	
Share of Residential Area in Housing Projects	6%	14%	



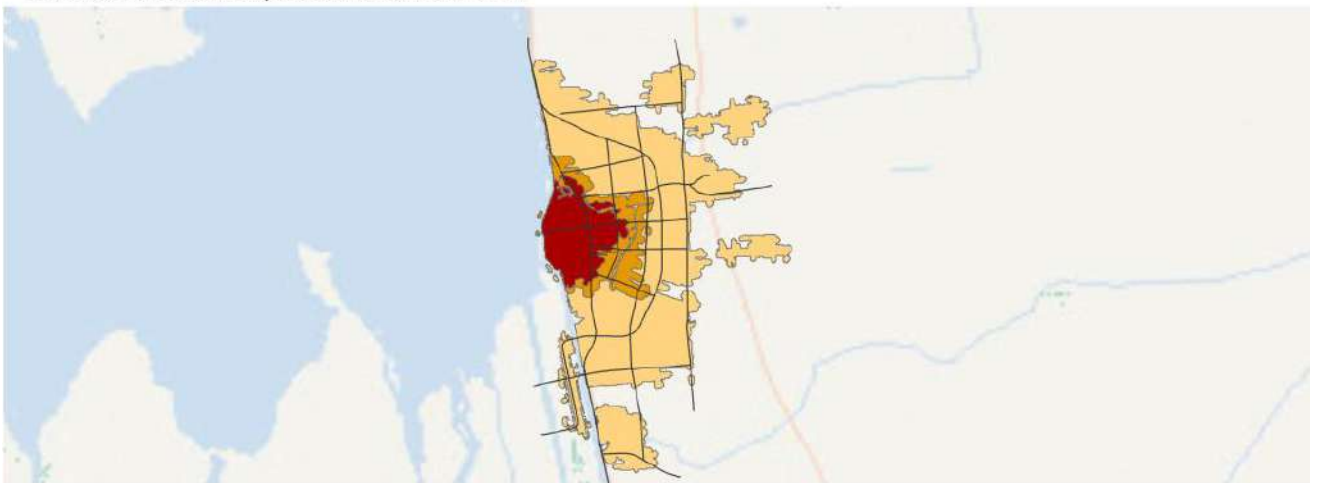
# Gaoyou, Jiangsu, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2016



**Gaoyou, Jiangsu, China**  
1990-2016

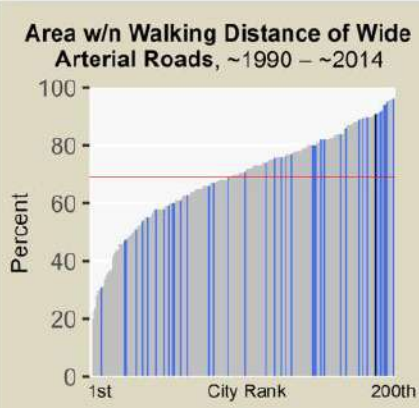
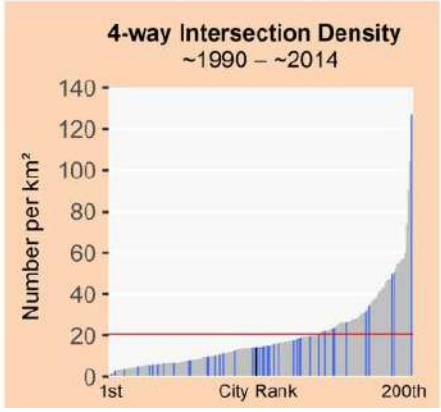
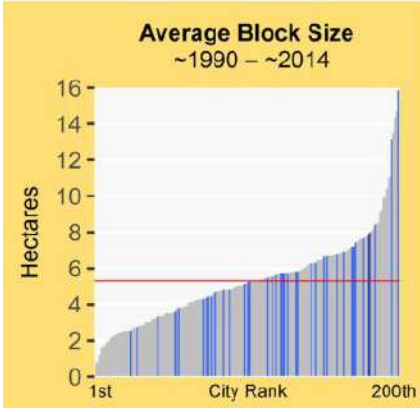
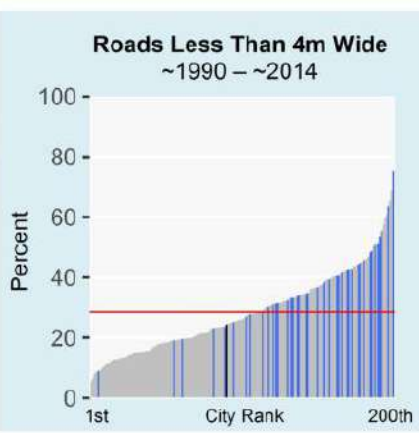
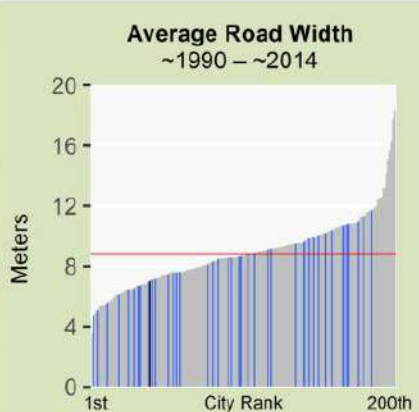
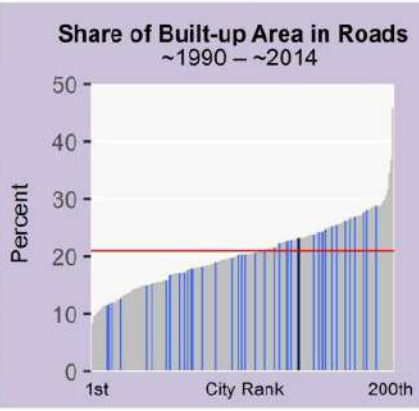
0 4 8 12 16 km

N

- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2016
- Arterial Roads

# Gaoyou, Jiangsu, China (East Asia and the Pacific)

Legend for Charts				
	Gaoyou	Other cities in region	All other cities	Global average
<b>Metrics</b>				
		Pre-1990	1990-2016	
<b>Roads</b>				
Share of Built-Up Area Occupied by Roads		12%	23%	
Share of Built-Up Area that is Gridded or Partially Gridded				
Average Road Width (m)		7.0	8.6	
Share of Roads less than 4m Wide		33%	24%	
Share of Roads more than 16m Wide		9%	16%	
<b>Arterial Roads</b>				
Density of Arterial Roads (km/km <sup>2</sup> )		1.5	1.5	
Average Beeline Distance to Arterial Roads (m)		334	310	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads		83%	91%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)		83%	91%	
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>				
Share of Intersections that are 4-way		9%	14%	
Average Block Size (ha)		5.3	8.0	
3-way Intersection Density (number per km <sup>2</sup> )		80	59	
4-way Intersection Density (number per km <sup>2</sup> )		12	14	
Walkability Ratio		1.5	1.5	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )				
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )			674	
<b>Stages in the Evolution of Residential Layouts</b>				
Share of Built-Up Area in Residential Use		69%	51%	
Share of Residential Area Not Laid Out Before Occupation		40%	43%	
Share of Residential Area Laid Out Before Occupation		60%	56%	
Share of Residential Area in Informal Land Subdivisions		1%	0%	
Share of Residential Area in Formal Land Subdivisions		35%	39%	
Share of Residential Area in Housing Projects		23%	16%	



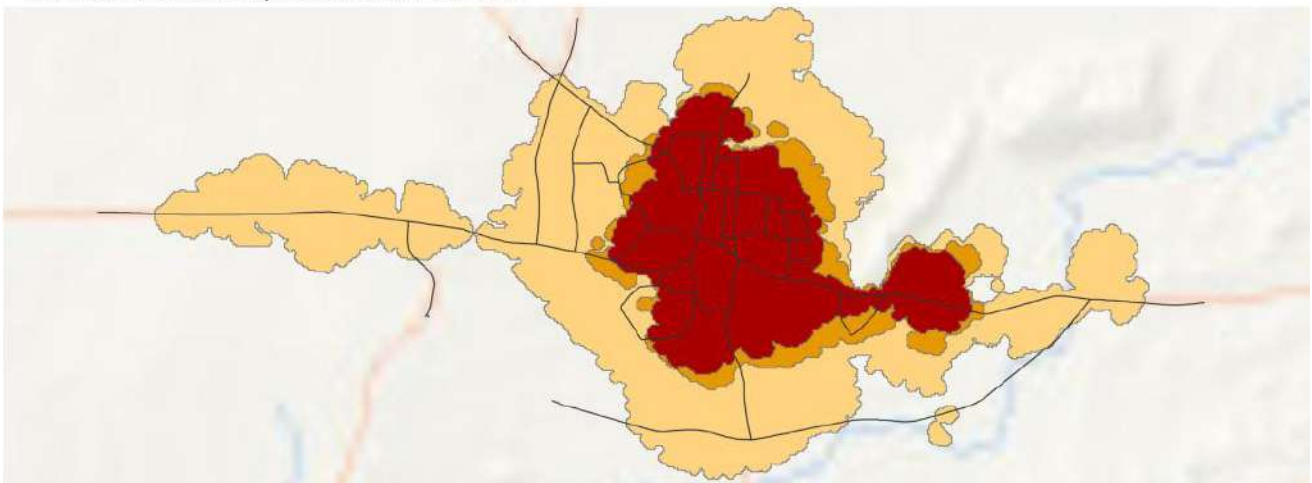
# Gombe, Nigeria (Sub-Saharan Africa)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013



## Gombe, Nigeria 1990-2013



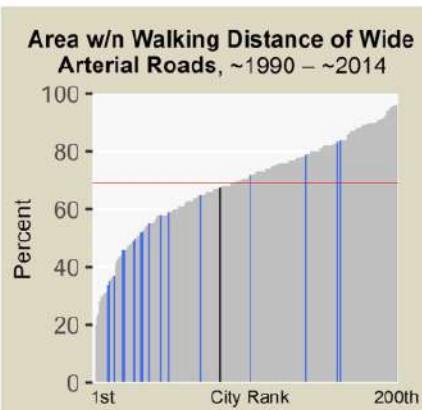
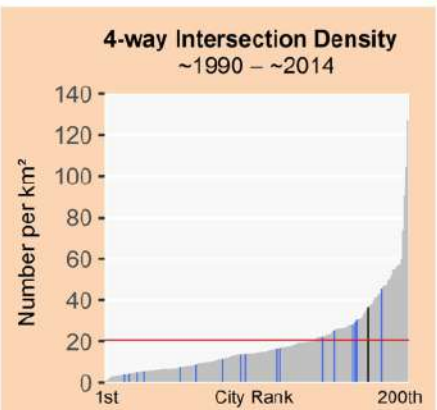
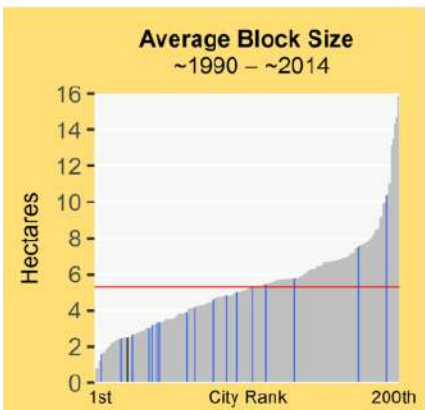
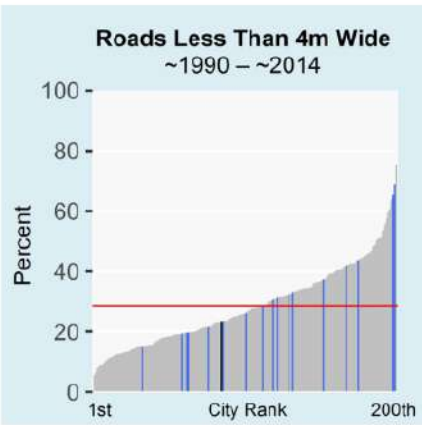
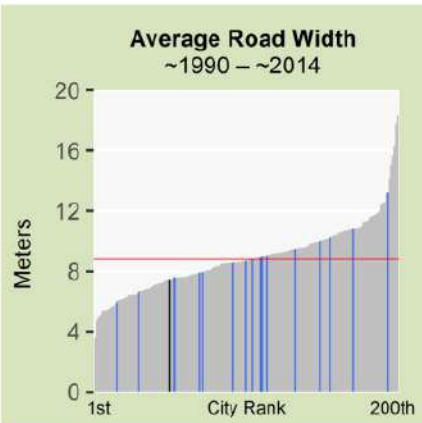
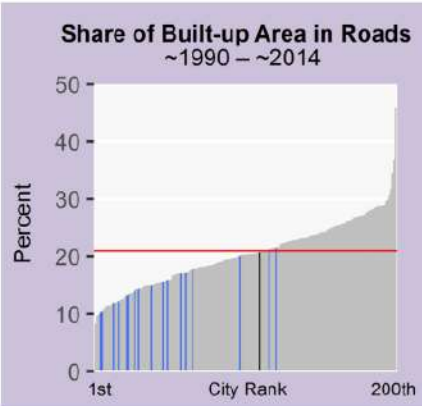
- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2013

Arterial Roads

# Gombe, Nigeria (Sub-Saharan Africa)



Legend for Charts			
	Gombe	Other cities in region	All other cities
<b>Legend for Charts</b>			
	Gombe	Other cities in region	All other cities
			Global average
Metrics	Pre-1990	1990-2013	
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	20%	20%	
Share of Built-Up Area that is Gridded or Partially Gridded	7%	0%	
Average Road Width (m)	7.5	8.2	
Share of Roads less than 4m Wide	16%	23%	
Share of Roads more than 16m Wide	6%	6%	
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	2.2	1.2	
Average Beeline Distance to Arterial Roads (m)	170	336	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	96%	81%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	89%	67%	
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	21%	9%	
Average Block Size (ha)	1.6	2.5	
3-way Intersection Density (number per km <sup>2</sup> )	193	248	
4-way Intersection Density (number per km <sup>2</sup> )	55	37	
Walkability Ratio	1.5	1.7	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		599	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		806	
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	76%	73%	
Share of Residential Area Not Laid Out Before Occupation	9%	41%	
Share of Residential Area Laid Out Before Occupation	90%	58%	
Share of Residential Area in Informal Land Subdivisions	85%	52%	
Share of Residential Area in Formal Land Subdivisions	5%	3%	
Share of Residential Area in Housing Projects	0%	2%	



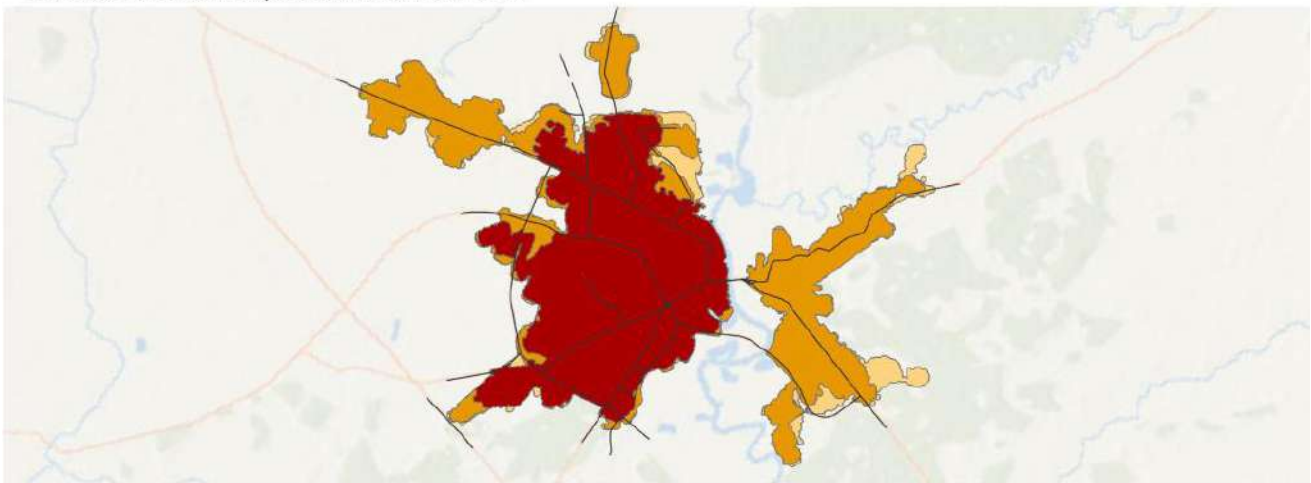
# Gomel, Belarus (Europe and Japan)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013



**Gomel, Belarus**  
1990-2013

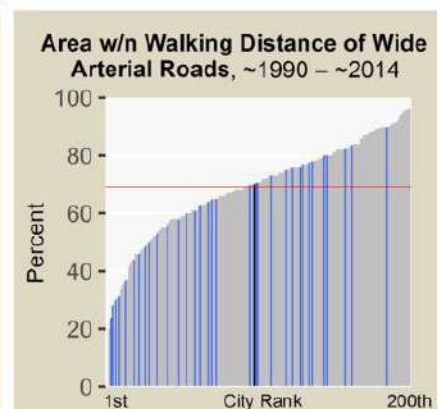
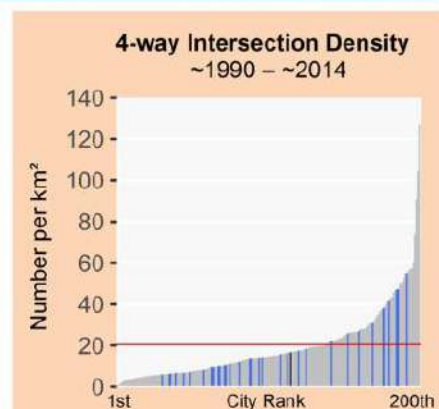
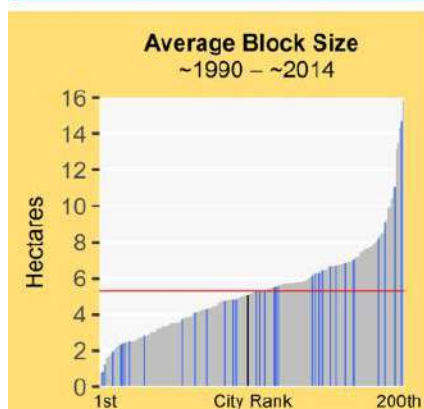
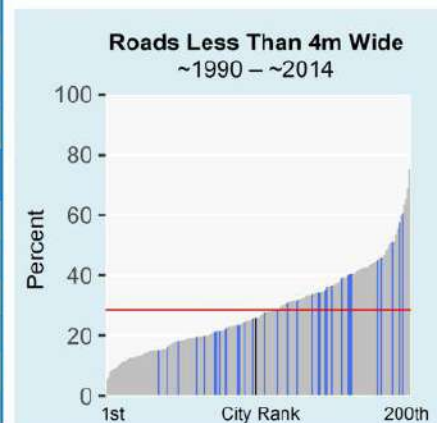
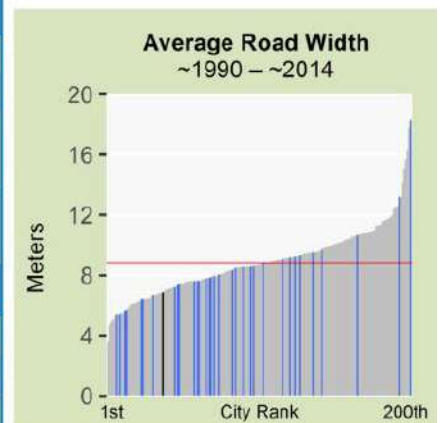
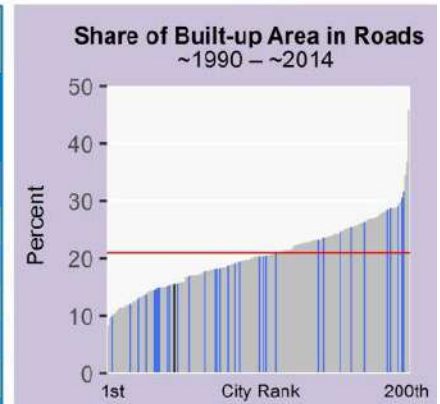
0 3 6 9 12 km

Urban Extent in 1990  
Expansion, 1990 - 2000  
Expansion, 2000 - 2013  
Arterial Roads

# Gomel, Belarus (Europe and Japan)



Legend for Charts			
	Gomel	Other cities in region	All other cities
<b>Legend for Charts</b>			
	Gomel	Other cities in region	All other cities
			Global average
Metrics	Pre-1990	1990-2013	
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	19%	15%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%	
Average Road Width (m)	6.9	6.5	
Share of Roads less than 4m Wide	22%	25%	
Share of Roads more than 16m Wide	7%	5%	
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	0.8	0.7	
Average Beeline Distance to Arterial Roads (m)	448	475	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	72%	70%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	71%	70%	
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	14%	13%	
Average Block Size (ha)	3.4	5.1	
3-way Intersection Density (number per km <sup>2</sup> )	164	79	
4-way Intersection Density (number per km <sup>2</sup> )	20	17	
Walkability Ratio	2.0	1.8	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		847	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	731	806	
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	58%	77%	
Share of Residential Area Not Laid Out Before Occupation	0%	5%	
Share of Residential Area Laid Out Before Occupation	99%	94%	
Share of Residential Area in Informal Land Subdivisions	37%	81%	
Share of Residential Area in Formal Land Subdivisions	41%	7%	
Share of Residential Area in Housing Projects	20%	5%	



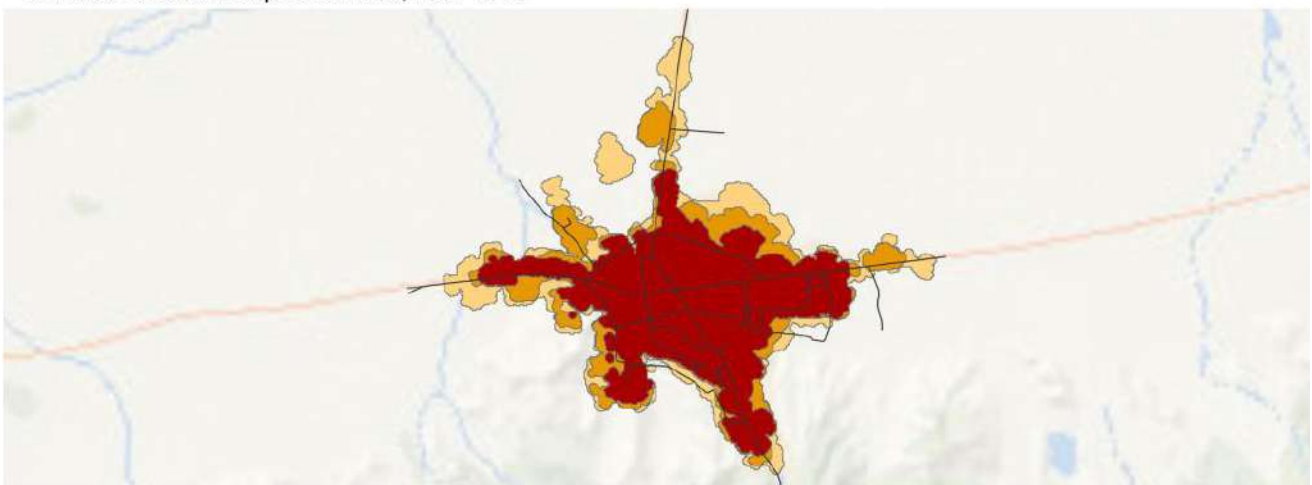
# Gorgan, Iran (South and Central Asia)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2014



**Gorgan, Iran**  
1991-2014

0 2 4 6 8 km

N

- Urban Extent in 1991
- Expansion, 1991 - 2000
- Expansion, 2000 - 2014
- Arterial Roads



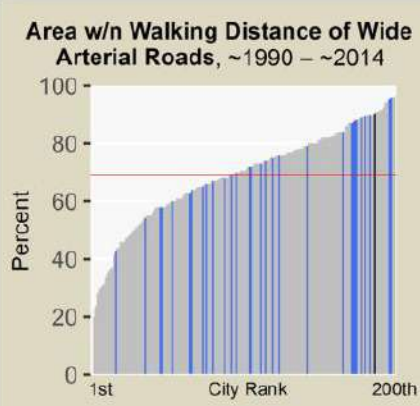
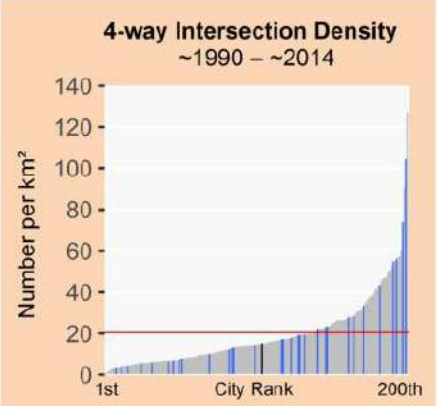
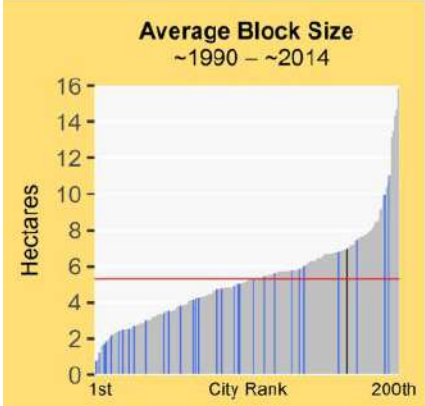
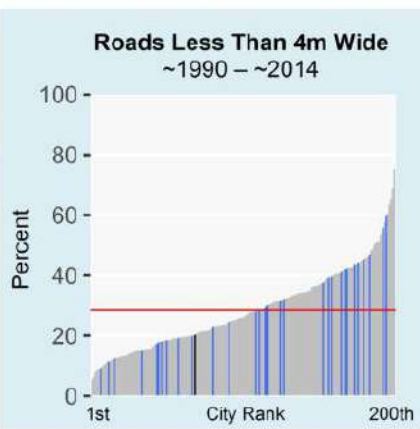
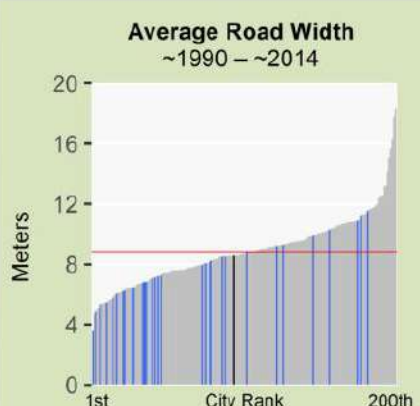
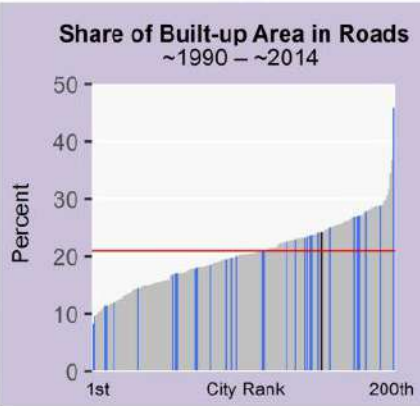
# Gorgan, Iran (South and Central Asia)



**Legend for Charts**

Gorgan | Other cities in region | All other cities | Global average

Metrics	Pre-1991	1991-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	22%	24%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	8.6	8.6
Share of Roads less than 4m Wide	14%	20%
Share of Roads more than 16m Wide	10%	9%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.9	1.5
Average Beeline Distance to Arterial Roads (m)	169	236
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	99%	92%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	98%	90%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	7%	7%
Average Block Size (ha)	2.1	7.0
3-way Intersection Density (number per km <sup>2</sup> )	171	109
4-way Intersection Density (number per km <sup>2</sup> )	16	15
Walkability Ratio	1.8	1.7
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	259	
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	65%	68%
Share of Residential Area Not Laid Out Before Occupation	11%	6%
Share of Residential Area Laid Out Before Occupation	88%	93%
Share of Residential Area in Informal Land Subdivisions	7%	75%
Share of Residential Area in Formal Land Subdivisions	78%	14%
Share of Residential Area in Housing Projects	2%	3%



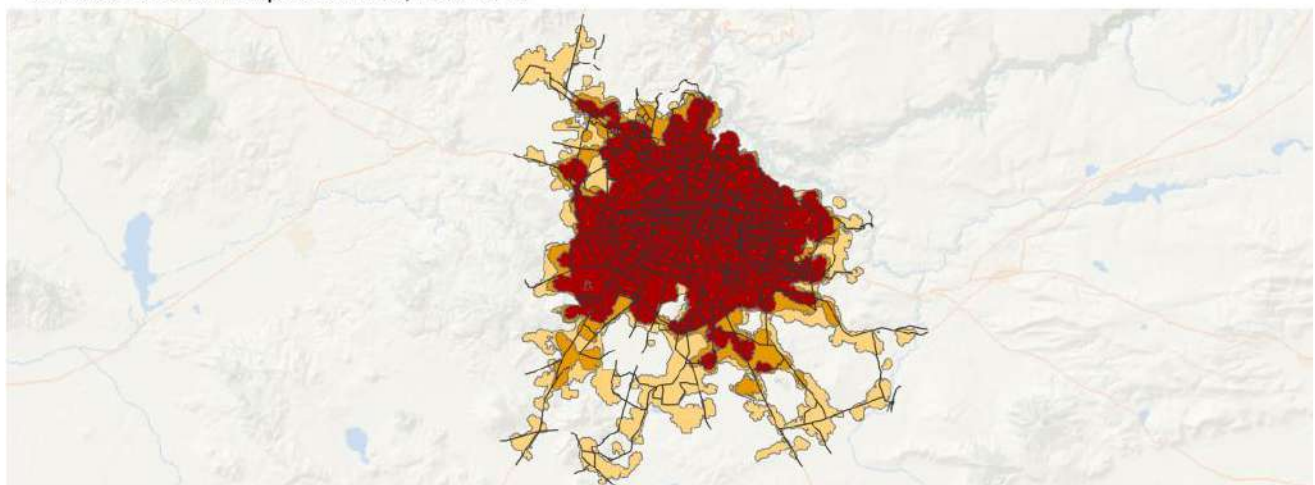
# Guadalajara, Mexico (Latin America and the Caribbean)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



## Guadalajara, Mexico 1990-2014

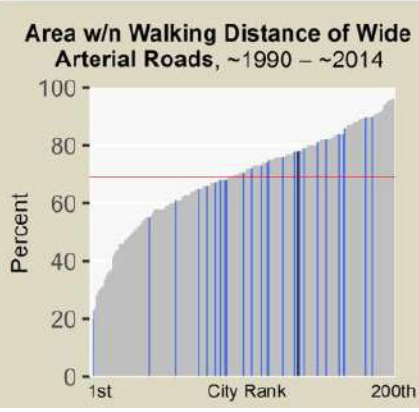
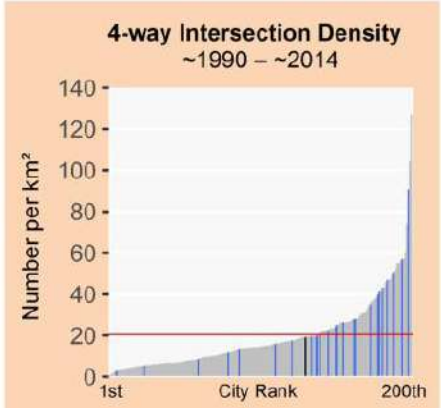
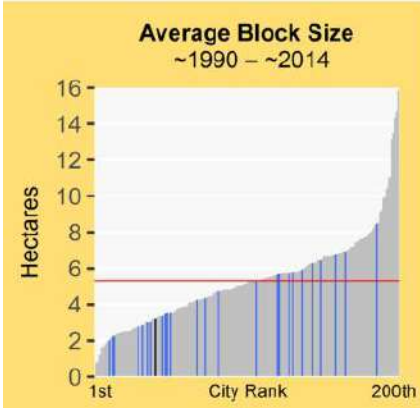
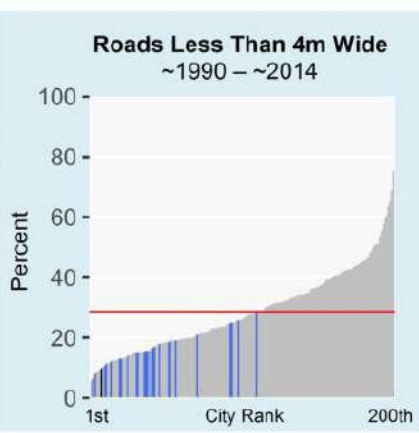
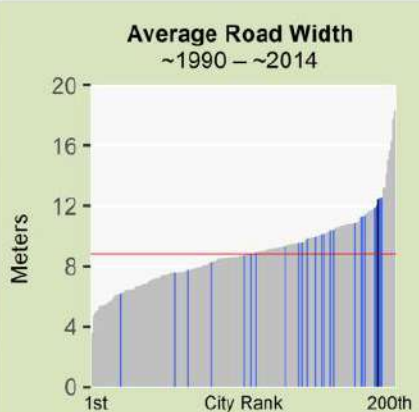
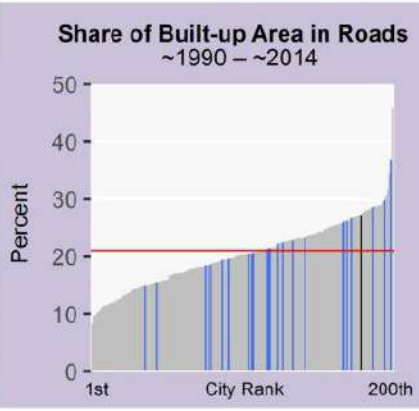


- Urban Extent in 1990
- Expansion, 1990 - 1999
- Expansion, 1999 - 2014

Arterial Roads

# Guadalajara, Mexico (Latin America and the Caribbean)

Legend for Charts		
Guadalajara	Other cities in region	All other cities
		Global average —
Metrics	Pre-1990	1990-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	26%	27%
Share of Built-Up Area that is Gridded or Partially Gridded	27%	7%
Average Road Width (m)	12.4	9.3
Share of Roads less than 4m Wide	5%	9%
Share of Roads more than 16m Wide	18%	10%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.3	1.6
Average Beeline Distance to Arterial Roads (m)	165	298
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	97%	86%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	92%	78%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	28%	10%
Average Block Size (ha)	3.0	3.2
3-way Intersection Density (number per km <sup>2</sup> )	100	142
4-way Intersection Density (number per km <sup>2</sup> )	44	19
Walkability Ratio	1.7	1.8
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	60%	76%
Share of Residential Area Not Laid Out Before Occupation	0%	2%
Share of Residential Area Laid Out Before Occupation	100%	97%
Share of Residential Area in Informal Land Subdivisions	15%	40%
Share of Residential Area in Formal Land Subdivisions	79%	45%
Share of Residential Area in Housing Projects	5%	12%



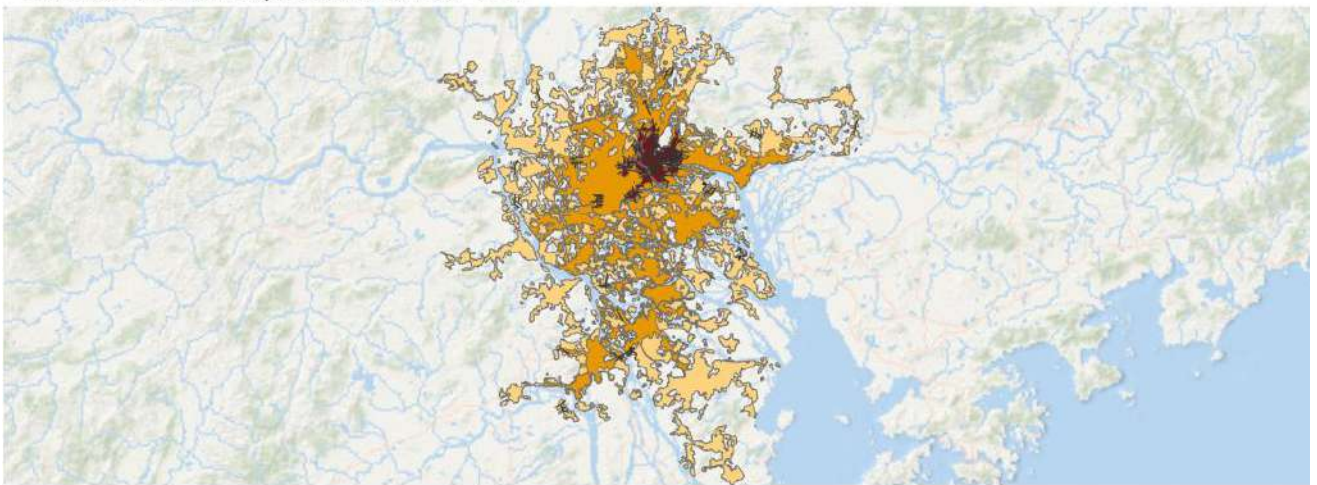
# Guangzhou, Guangdong, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2014



**Guangzhou, Guangdong, China**  
1991-2014

0 25 50 75 100 km

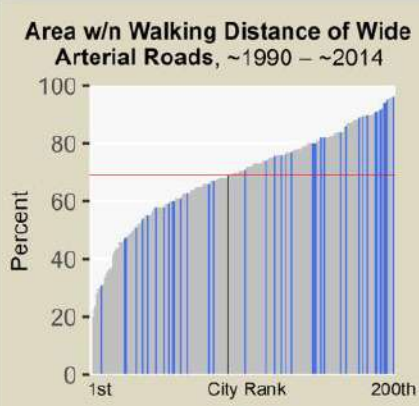
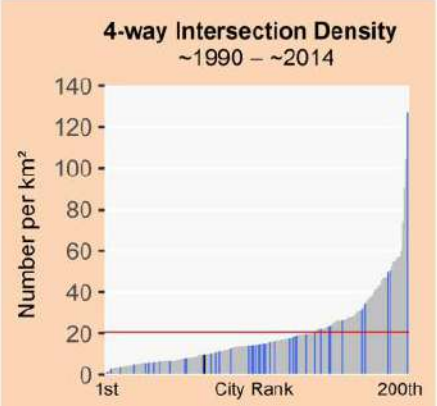
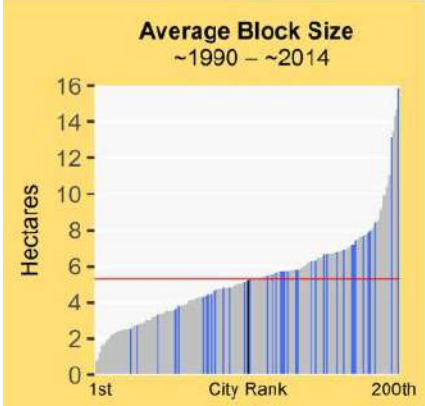
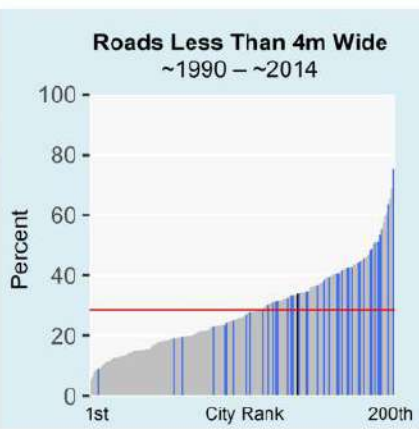
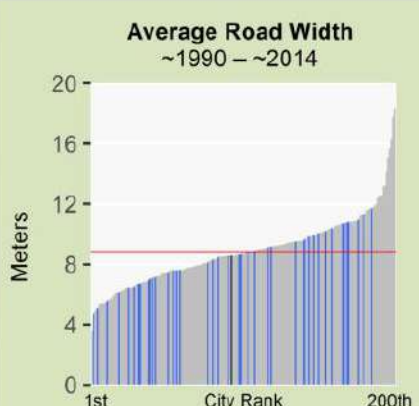
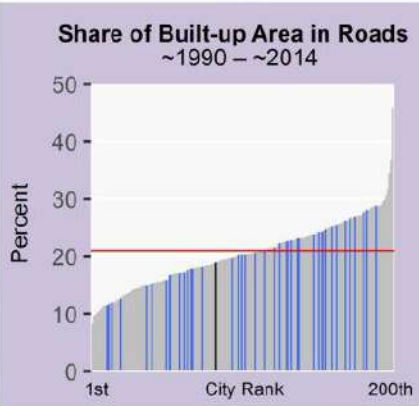
N

- Urban Extent in 1991
- Expansion, 1991 - 2000
- Expansion, 2000 - 2014
- Arterial Roads

# Guangzhou, Guangdong, China (East Asia and the Pacific)



Legend for Charts			
	Guangzhou	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1991	1991-2014	
Roads			
Share of Built-Up Area Occupied by Roads	18%	19%	
Share of Built-Up Area that is Gridded or Partially Gridded		0%	
Average Road Width (m)	8.6	7.9	
Share of Roads less than 4m Wide	27%	33%	
Share of Roads more than 16m Wide	12%	12%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	2.2	0.6	
Average Beeline Distance to Arterial Roads (m)	175	912	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	97%	70%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	97%	69%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	6%	5%	
Average Block Size (ha)	3.6	5.2	
3-way Intersection Density (number per km <sup>2</sup> )	123	124	
4-way Intersection Density (number per km <sup>2</sup> )	10	10	
Walkability Ratio	1.8	1.8	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		168	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )			
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	51%	49%	
Share of Residential Area Not Laid Out Before Occupation	46%	49%	
Share of Residential Area Laid Out Before Occupation	53%	50%	
Share of Residential Area in Informal Land Subdivisions	0%	26%	
Share of Residential Area in Formal Land Subdivisions	37%	10%	
Share of Residential Area in Housing Projects	15%	13%	



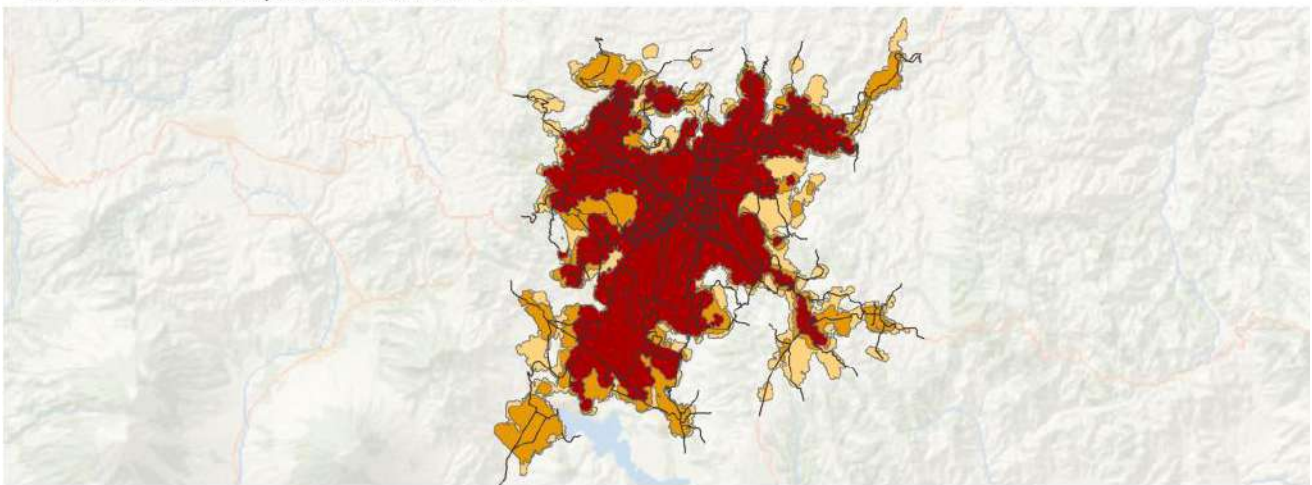
# Guatemala City, Guatemala (Latin America and the Caribbean)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013




## Guatemala City, Guatemala 1990-2013



- Urban Extent in 1990
- Expansion, 1990 - 2001
- Expansion, 2001 - 2013

Arterial Roads

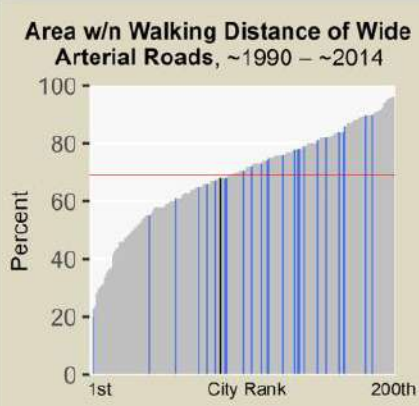
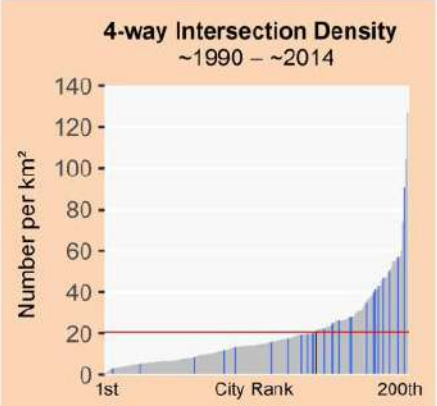
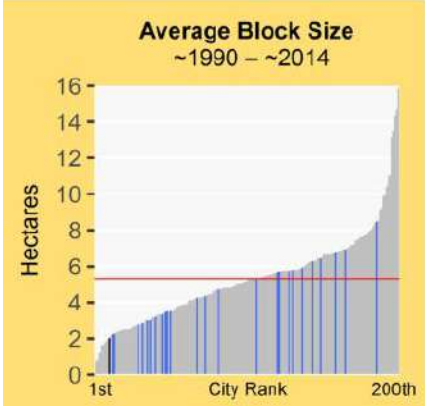
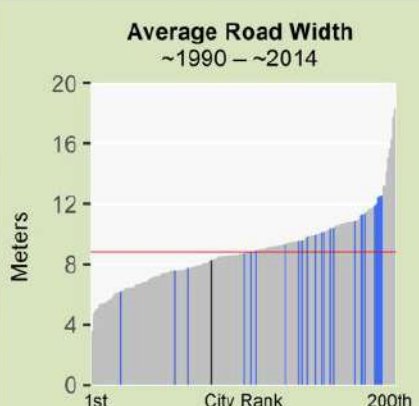
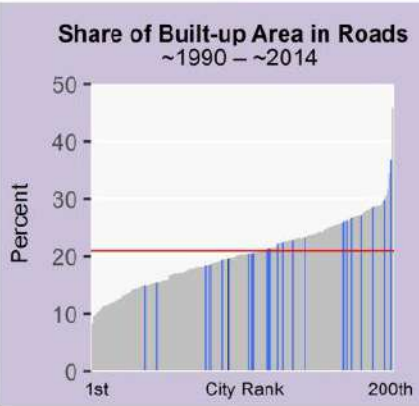
# Guatemala City, Guatemala (Latin America and the Caribbean)



**Legend for Charts**

Guatemala City | Other cities in region | All other cities | Global average —

Metrics	Pre-1990	1990-2013
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	20%	19%
Share of Built-Up Area that is Gridded or Partially Gridded	49%	2%
Average Road Width (m)	8.3	6.9
Share of Roads less than 4m Wide	12%	12%
Share of Roads more than 16m Wide	9%	3%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.0	1.5
Average Beeline Distance to Arterial Roads (m)	187	250
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	95%	90%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	81%	67%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	30%	9%
Average Block Size (ha)	2.1	2.0
3-way Intersection Density (number per km <sup>2</sup> )	89	97
4-way Intersection Density (number per km <sup>2</sup> )	42	21
Walkability Ratio	1.6	1.8
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	392	187
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	72%	72%
Share of Residential Area Not Laid Out Before Occupation	25%	15%
Share of Residential Area Laid Out Before Occupation	67%	84%
Share of Residential Area in Informal Land Subdivisions	7%	36%
Share of Residential Area in Formal Land Subdivisions	63%	40%
Share of Residential Area in Housing Projects	3%	7%



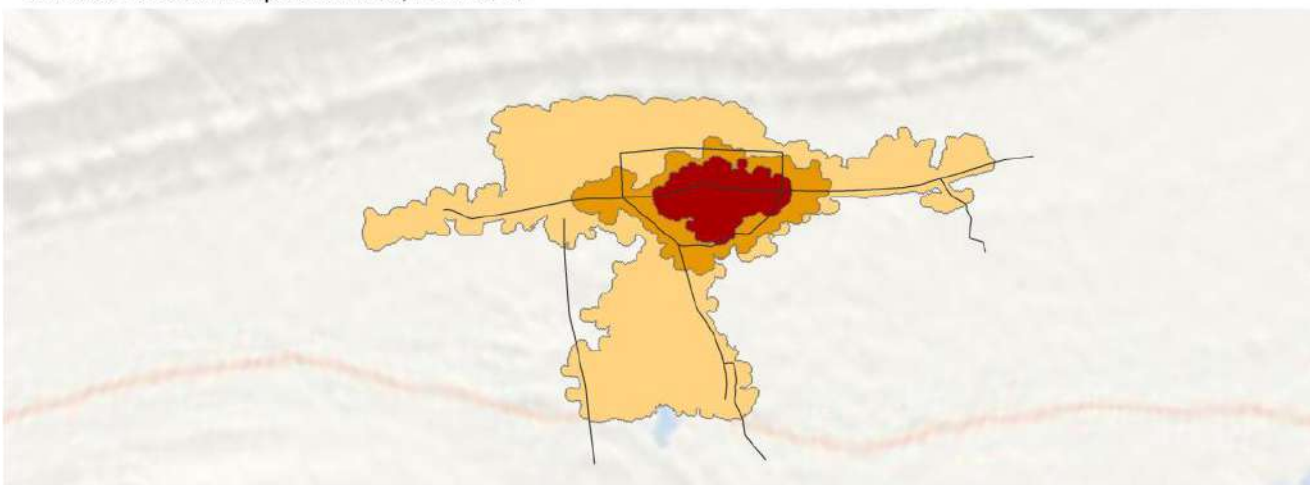
# Guixi, Chongqing, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1988



Selected Locales in Expansion Area, 1988-2016



## Guixi, Chongqing, China 1988-2016



- Urban Extent in 1988
- Expansion, 1988 - 2001
- Expansion, 2001 - 2016

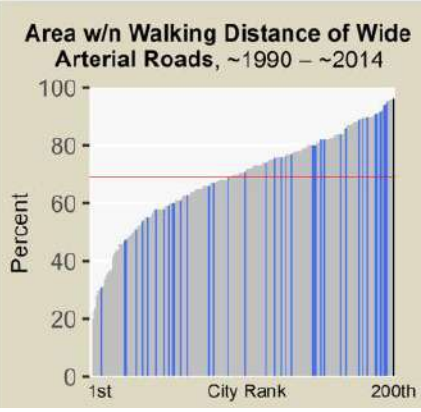
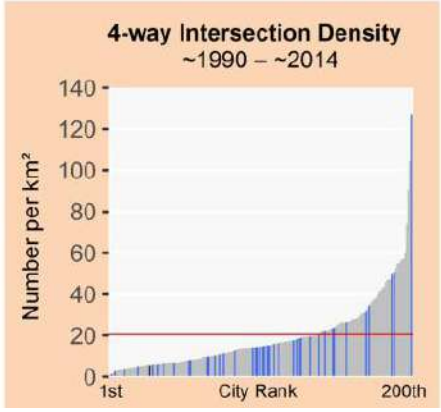
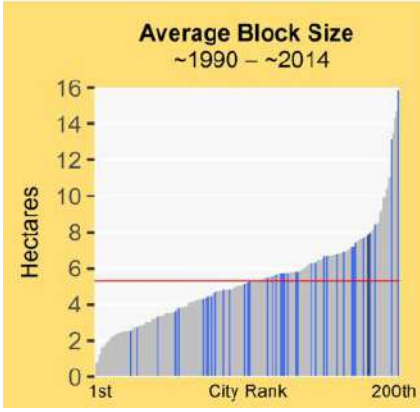
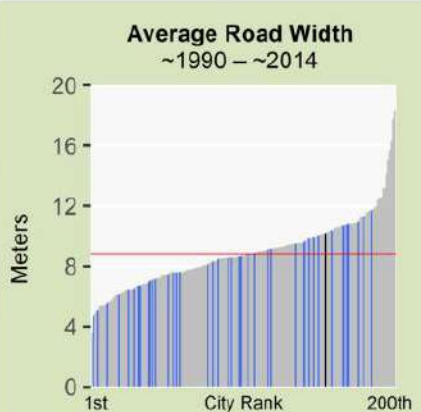
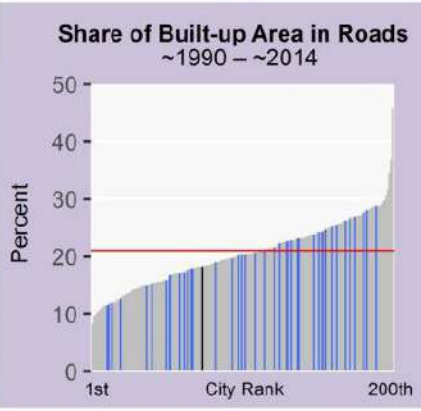
Arterial Roads



# Guixi, Chongqing, China (East Asia and the Pacific)



Legend for Charts			
	Guixi	Other cities in region	All other cities
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	17%		18%
Share of Built-Up Area that is Gridded or Partially Gridded	0%		0%
Average Road Width (m)	10.2		9.5
Share of Roads less than 4m Wide	17%		38%
Share of Roads more than 16m Wide	18%		17%
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	1.0		1.0
Average Beeline Distance to Arterial Roads (m)	214		264
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	100%		88%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	100%		96%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	27%		5%
Average Block Size (ha)	4.1		7.9
3-way Intersection Density (number per km <sup>2</sup> )	69		47
4-way Intersection Density (number per km <sup>2</sup> )	17		6
Walkability Ratio	1.4		1.7
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )			
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	66%		61%
Share of Residential Area Not Laid Out Before Occupation	54%		63%
Share of Residential Area Laid Out Before Occupation	45%		36%
Share of Residential Area in Informal Land Subdivisions	0%		3%
Share of Residential Area in Formal Land Subdivisions	44%		7%
Share of Residential Area in Housing Projects	1%		25%



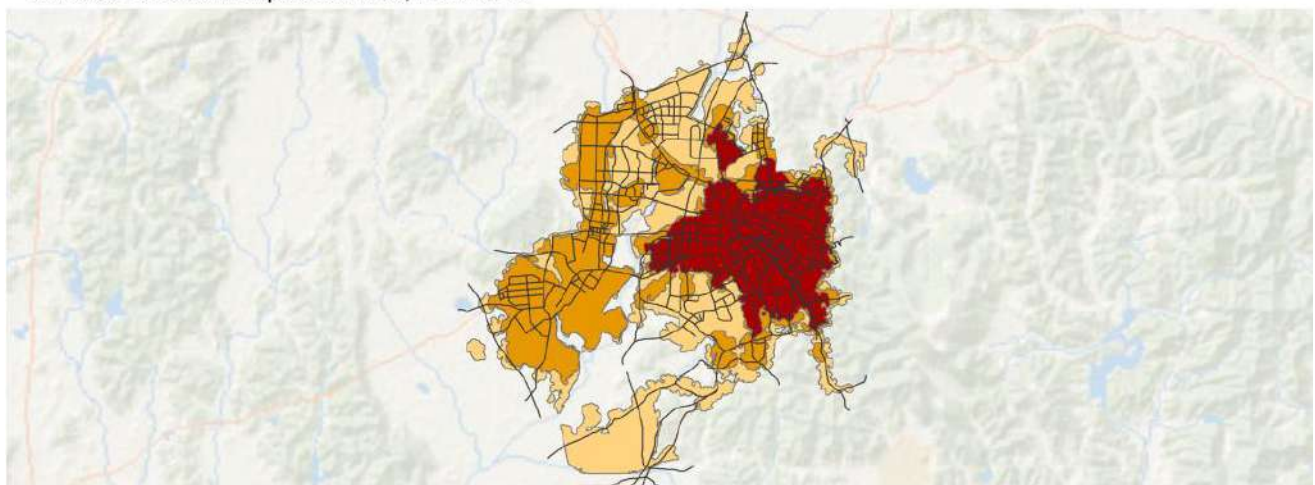
# Gwangju, Korea Rep. (East Asia and the Pacific)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2015



Gwangju, Korea Rep. 1989-2015

0 5 10 15 20 km

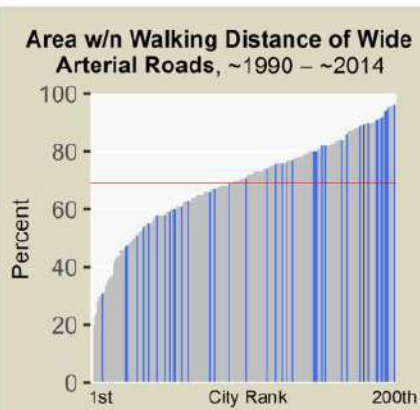
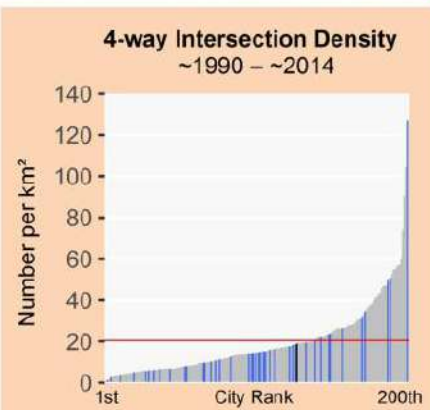
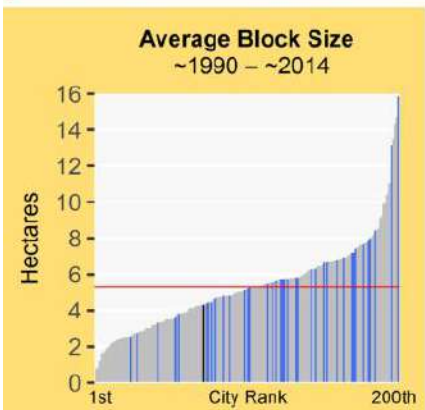
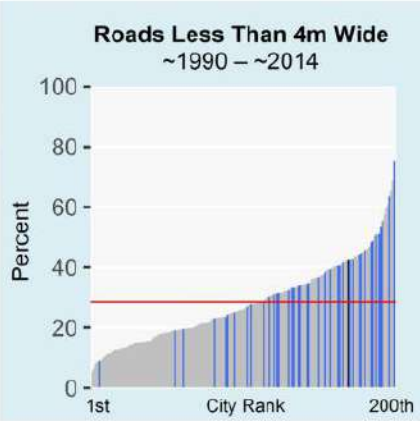
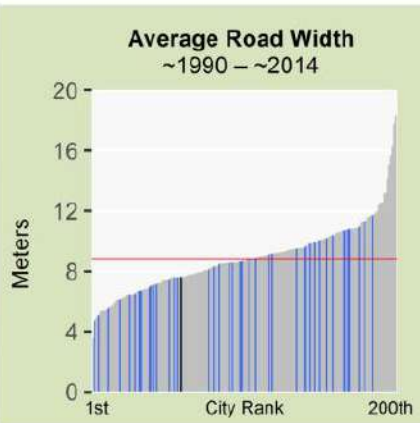
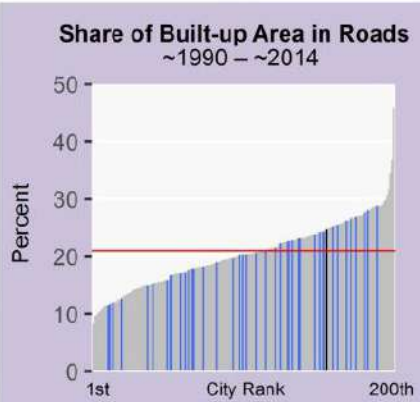
N

- Urban Extent in 1989
- Expansion, 1989 - 2000
- Expansion, 2000 - 2015
- Arterial Roads

# Gwangju, Korea Rep. (East Asia and the Pacific)



Legend for Charts			
	Gwangju	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1989	1989-2015	
Roads			
Share of Built-Up Area Occupied by Roads	23%	24%	
Share of Built-Up Area that is Gridded or Partially Gridded	2%	0%	
Average Road Width (m)	7.6	6.7	
Share of Roads less than 4m Wide	30%	42%	
Share of Roads more than 16m Wide	10%	7%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	4.6	2.8	
Average Beeline Distance to Arterial Roads (m)	69	199	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	99%	91%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	99%	89%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	17%	10%	
Average Block Size (ha)	2.3	4.3	
3-way Intersection Density (number per km <sup>2</sup> )	150	189	
4-way Intersection Density (number per km <sup>2</sup> )	38	19	
Walkability Ratio	1.5	1.7	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	189	236	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	61%	30%	
Share of Residential Area Not Laid Out Before Occupation	25%	37%	
Share of Residential Area Laid Out Before Occupation	74%	62%	
Share of Residential Area in Informal Land Subdivisions	0%	3%	
Share of Residential Area in Formal Land Subdivisions	41%	33%	
Share of Residential Area in Housing Projects	33%	24%	



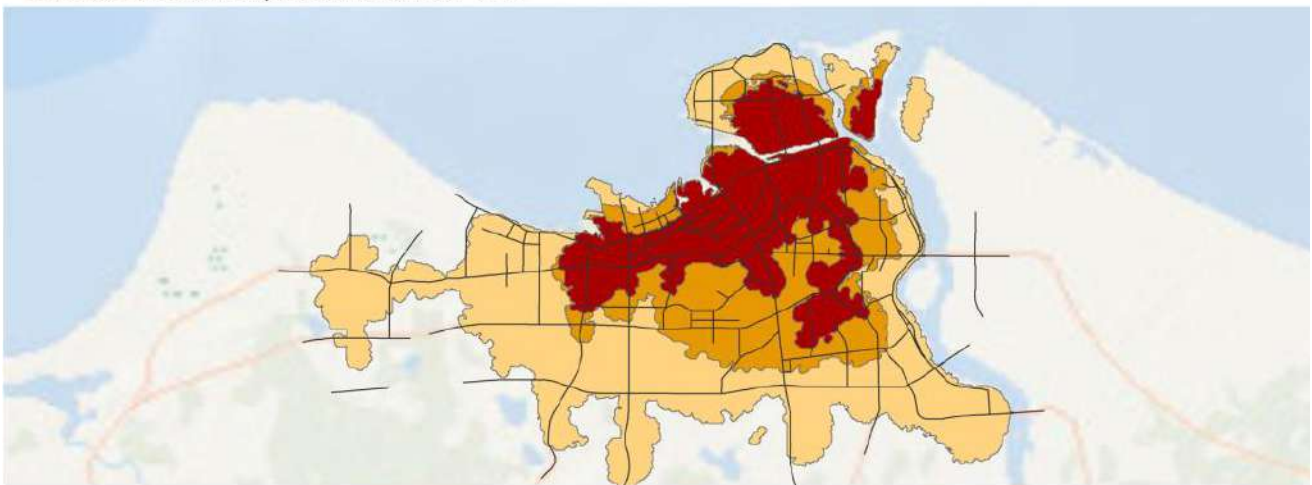
# Haikou, Hainan, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2013



Haikou, Hainan, China  
1991-2013

0 3 6 9 12 km

N

- Urban Extent in 1991
- Expansion, 1991 - 2001
- Expansion, 2001 - 2013
- Arterial Roads

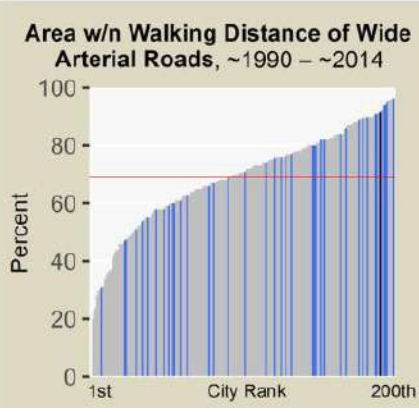
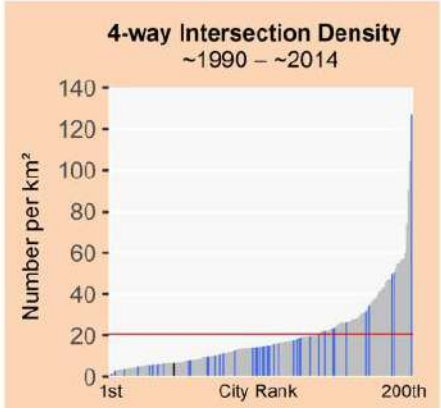
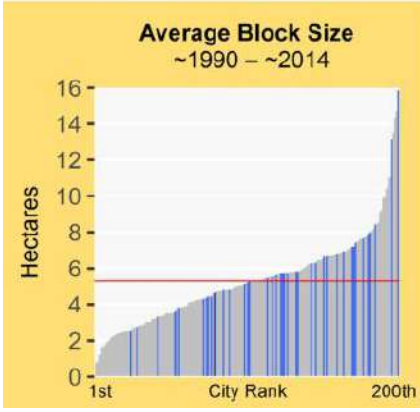
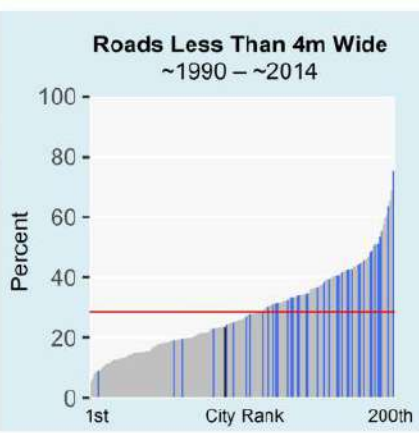
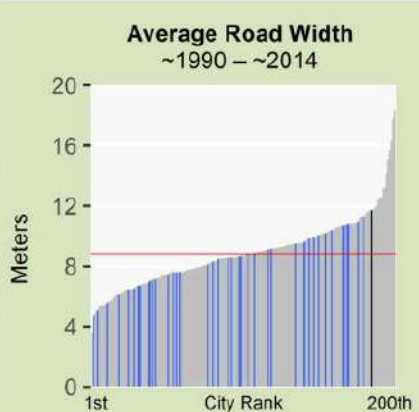
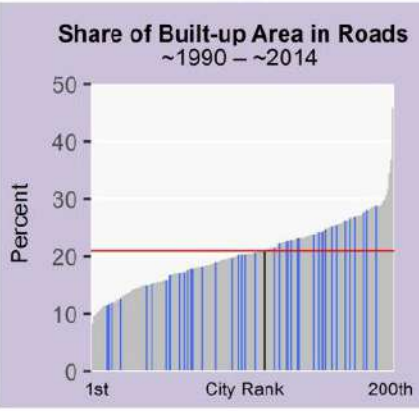
# Haikou, Hainan, China (East Asia and the Pacific)



**Legend for Charts**

Haikou | Other cities in region | All other cities | Global average

Metrics	Pre-1991	1991-2013
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	22%	21%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	11.7	7.9
Share of Roads less than 4m Wide	18%	23%
Share of Roads more than 16m Wide	21%	8%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.0	1.6
Average Beeline Distance to Arterial Roads (m)	192	249
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	95%	91%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	95%	91%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	10%	4%
Average Block Size (ha)	3.7	4.6
3-way Intersection Density (number per km <sup>2</sup> )	99	136
4-way Intersection Density (number per km <sup>2</sup> )	7	7
Walkability Ratio	1.8	1.7
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	54%	59%
Share of Residential Area Not Laid Out Before Occupation	25%	40%
Share of Residential Area Laid Out Before Occupation	74%	59%
Share of Residential Area in Informal Land Subdivisions	2%	10%
Share of Residential Area in Formal Land Subdivisions	50%	16%
Share of Residential Area in Housing Projects	21%	32%



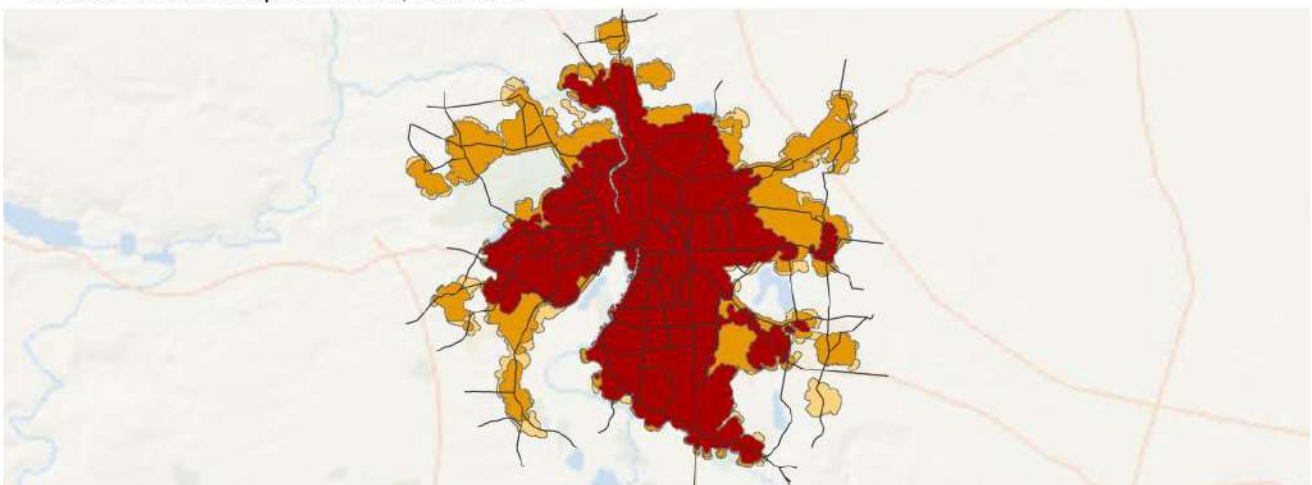
# Halle, Germany (Europe and Japan)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2010



Halle, Germany  
1990-2010

0 3 6 9 12 km

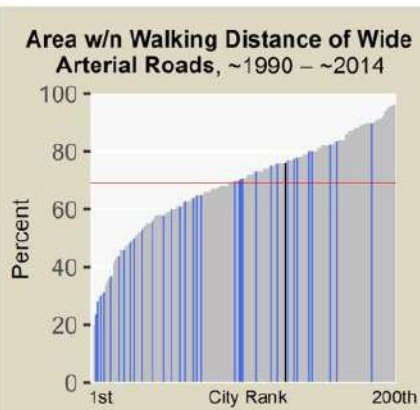
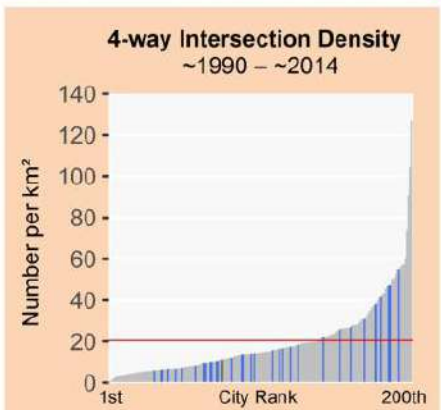
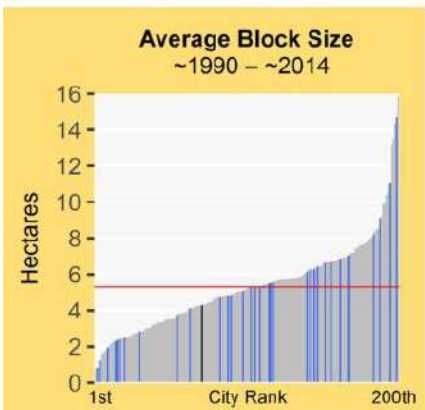
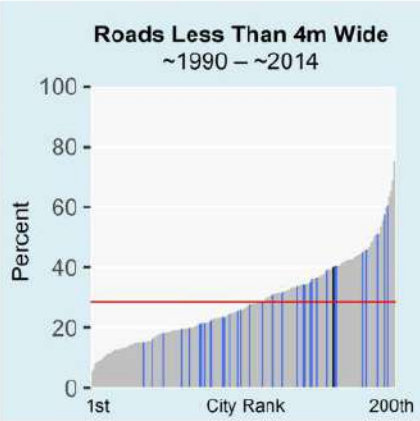
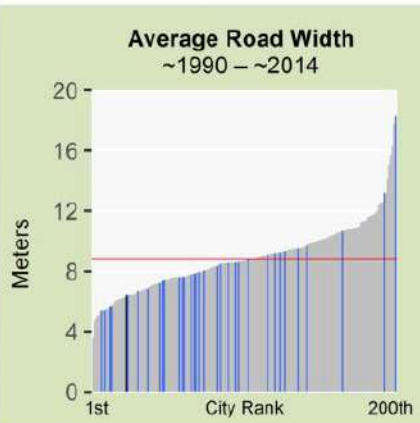
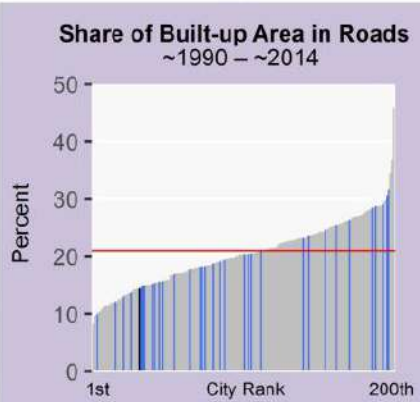
N

- Urban Extent in 1990
- Expansion, 1990 - 1999
- Expansion, 1999 - 2010
- Arterial Roads

# Halle, Germany (Europe and Japan)



Legend for Charts			
	Halle	Other cities in region	All other cities
			Global average —
Metrics			
	Pre-1990	1990-2010	
Roads			
Share of Built-Up Area Occupied by Roads	18%	14%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%	
Average Road Width (m)	6.4	5.0	
Share of Roads less than 4m Wide	37%	39%	
Share of Roads more than 16m Wide	6%	0%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	2.2	1.9	
Average Beeline Distance to Arterial Roads (m)	155	187	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	98%	96%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	90%	76%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	9%	3%	
Average Block Size (ha)	2.5	4.3	
3-way Intersection Density (number per km <sup>2</sup> )	214	155	
4-way Intersection Density (number per km <sup>2</sup> )	27	11	
Walkability Ratio	1.7	1.6	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		325	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	405	674	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	57%	69%	
Share of Residential Area Not Laid Out Before Occupation	4%	23%	
Share of Residential Area Laid Out Before Occupation	95%	76%	
Share of Residential Area in Informal Land Subdivisions	1%	13%	
Share of Residential Area in Formal Land Subdivisions	66%	62%	
Share of Residential Area in Housing Projects	27%	1%	



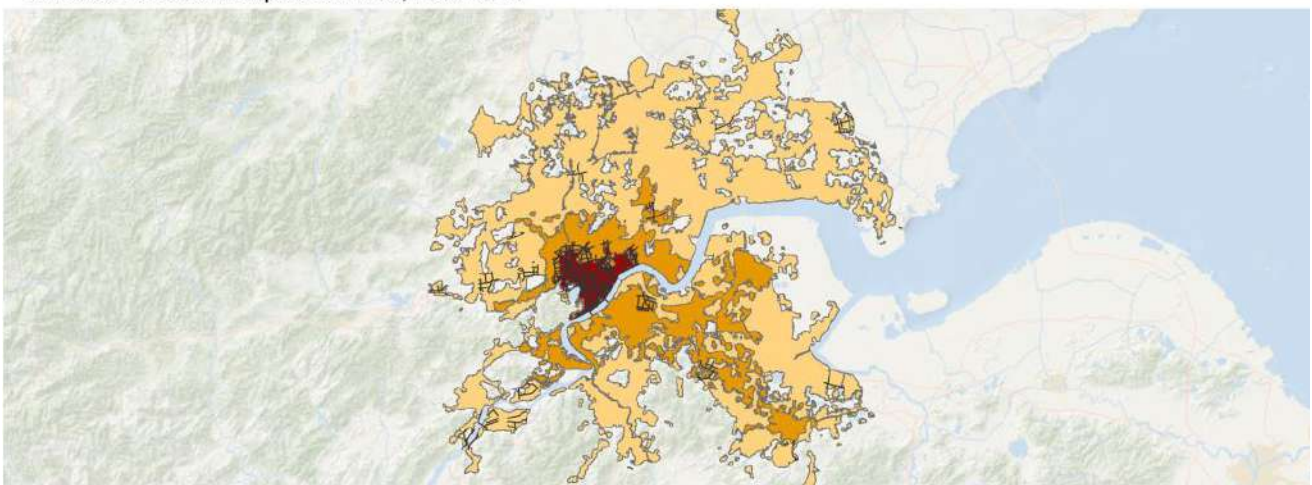
# Hangzhou, Zhejiang, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013



Hangzhou, Zhejiang, China  
1990-2013

0 20 40 60 80 km

Urban Extent in 1990  
Expansion, 1990 - 2000  
Expansion, 2000 - 2013

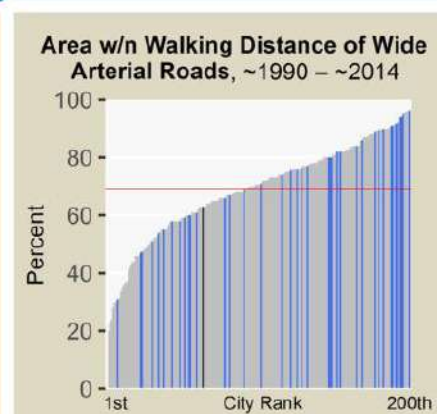
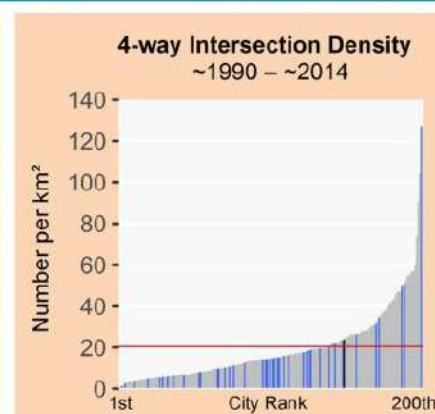
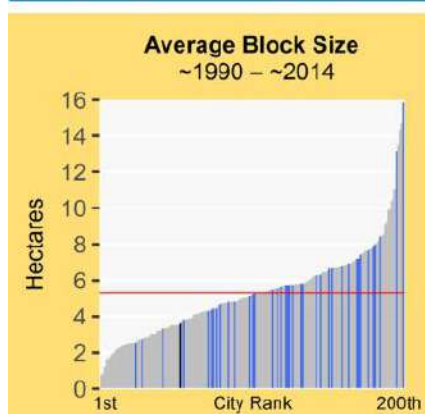
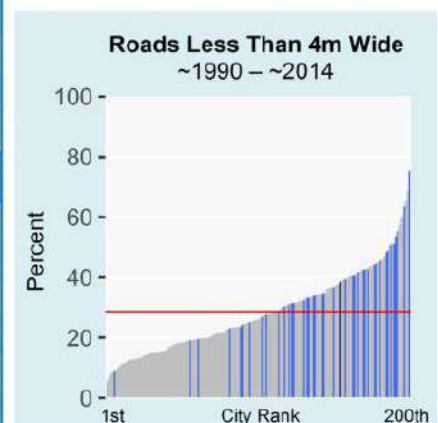
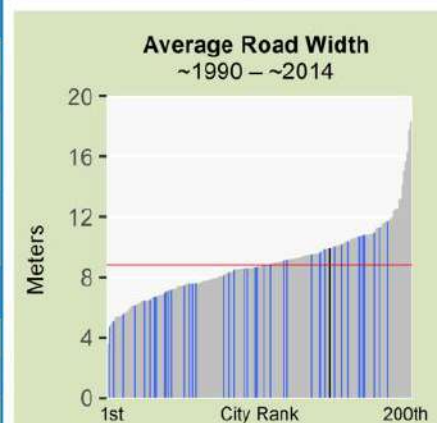
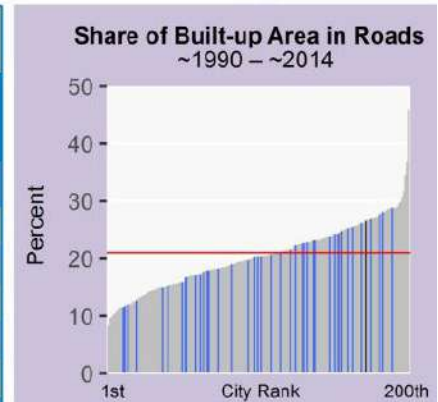
Arterial Roads



# Hangzhou, Zhejiang, China (East Asia and the Pacific)



Legend for Charts			
	Hangzhou	Other cities in region	All other cities
<b>Legend for Charts</b>			
	Hangzhou	Other cities in region	All other cities
			Global average
Metrics	Pre-1990	1990-2013	
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	31%	26%	
Share of Built-Up Area that is Gridded or Partially Gridded	2%	2%	
Average Road Width (m)	9.9	8.1	
Share of Roads less than 4m Wide	25%	38%	
Share of Roads more than 16m Wide	16%	13%	
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	3.0	0.7	
Average Beeline Distance to Arterial Roads (m)	129	1556	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	99%	66%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	99%	63%	
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	13%	12%	
Average Block Size (ha)	2.4	3.6	
3-way Intersection Density (number per km <sup>2</sup> )	259	154	
4-way Intersection Density (number per km <sup>2</sup> )	42	24	
Walkability Ratio	1.7	1.7	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	162	592	
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	46%	55%	
Share of Residential Area Not Laid Out Before Occupation	24%	21%	
Share of Residential Area Laid Out Before Occupation	75%	78%	
Share of Residential Area in Informal Land Subdivisions	0%	38%	
Share of Residential Area in Formal Land Subdivisions	23%	17%	
Share of Residential Area in Housing Projects	51%	22%	



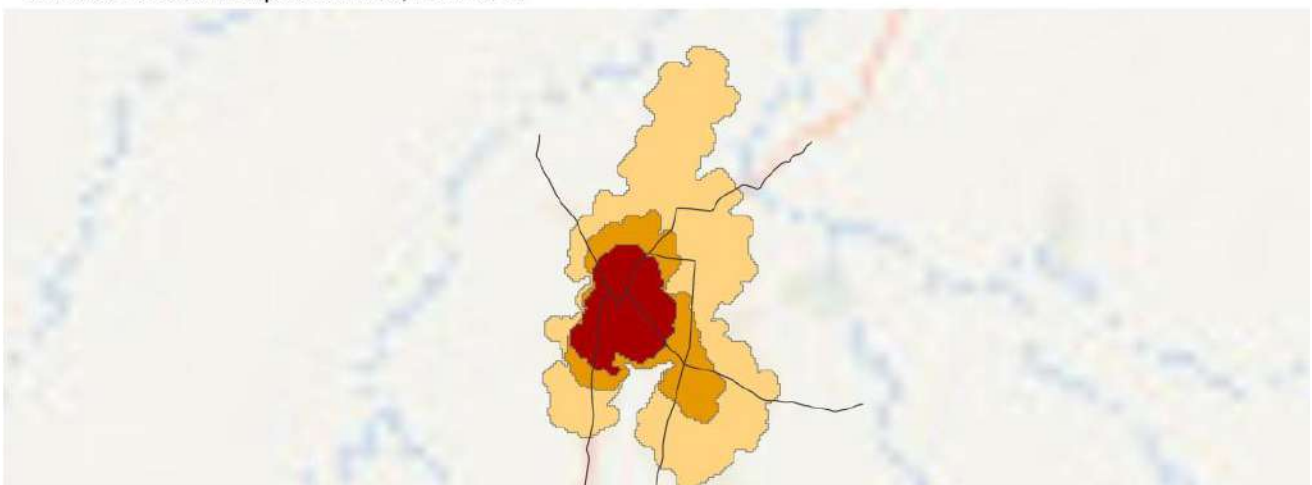
# Hindupur, India (South and Central Asia)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2014



**Hindupur, India**  
1989-2014

0 1 2 3 4 km

N

- Urban Extent in 1989
- Expansion, 1989 - 2000
- Expansion, 2000 - 2014
- Arterial Roads

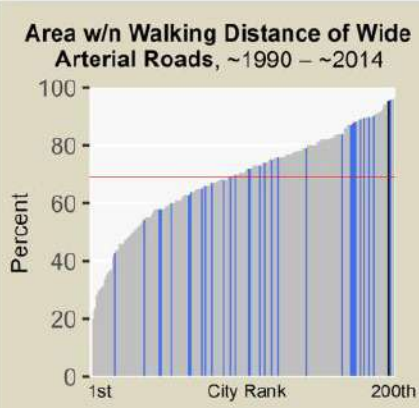
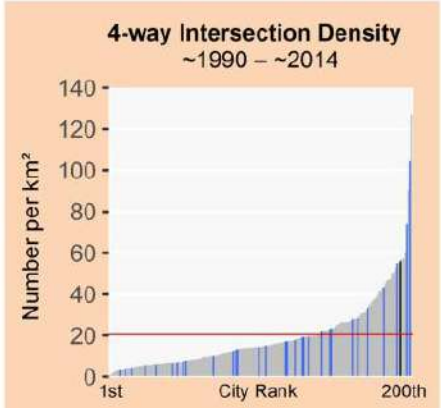
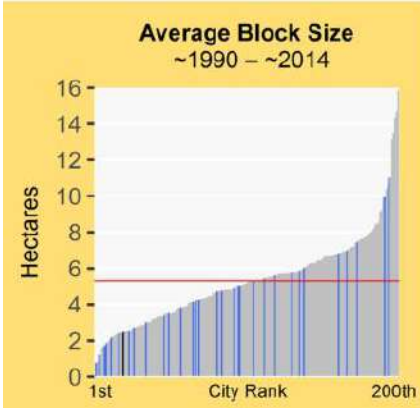
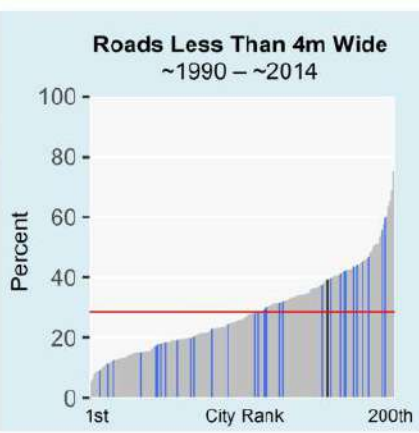
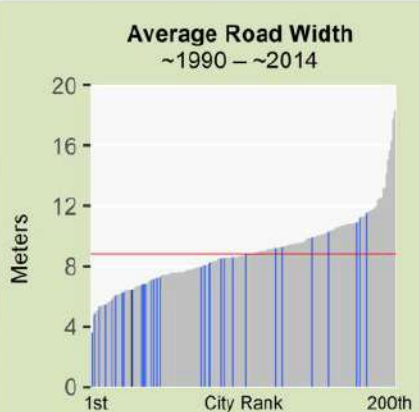
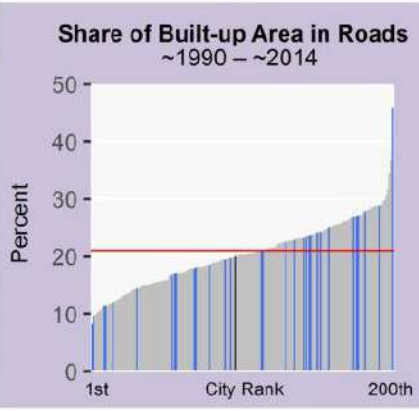
# Hindupur, India (South and Central Asia)



**Legend for Charts**

Hindupur | Other cities in region | All other cities | Global average

Metrics	Pre-1989	1989-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	18%	20%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	6.5	5.1
Share of Roads less than 4m Wide	26%	39%
Share of Roads more than 16m Wide	3%	1%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.3	1.3
Average Beeline Distance to Arterial Roads (m)	115	219
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	100%	94%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	91%	95%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	13%	16%
Average Block Size (ha)	1.7	2.5
3-way Intersection Density (number per km <sup>2</sup> )	193	279
4-way Intersection Density (number per km <sup>2</sup> )	25	56
Walkability Ratio	1.5	1.7
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	155	141
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	77%	74%
Share of Residential Area Not Laid Out Before Occupation	1%	24%
Share of Residential Area Laid Out Before Occupation	98%	75%
Share of Residential Area in Informal Land Subdivisions	98%	73%
Share of Residential Area in Formal Land Subdivisions	0%	0%
Share of Residential Area in Housing Projects	0%	1%



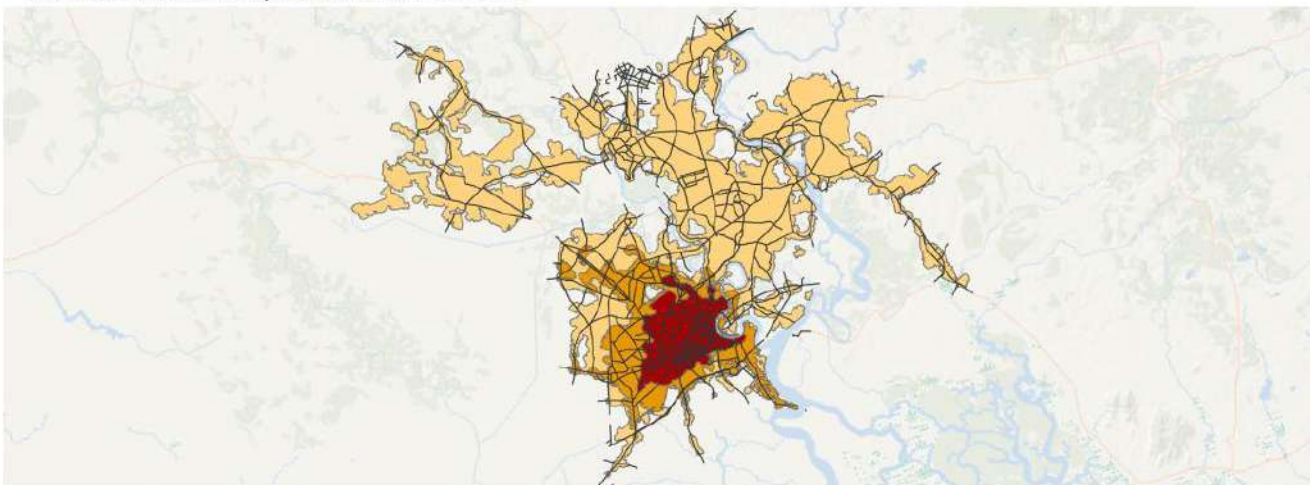
# Ho Chi Minh City, Vietnam (Southeast Asia)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2015



**Ho Chi Minh City, Vietnam**  
1989-2015

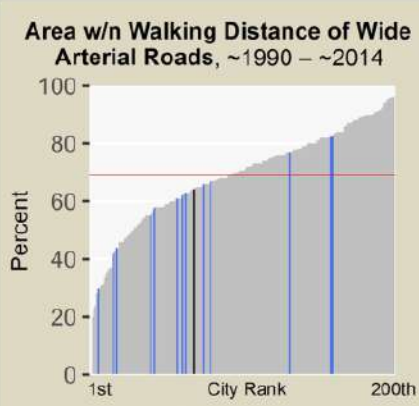
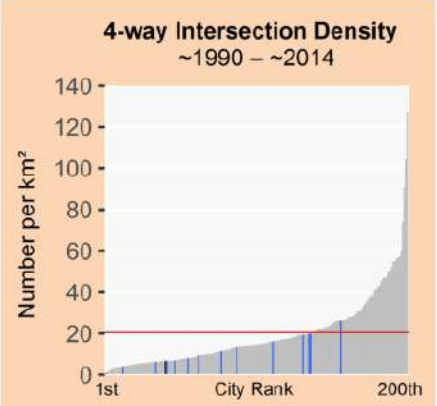
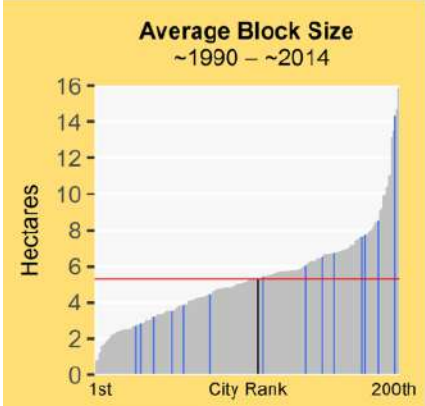
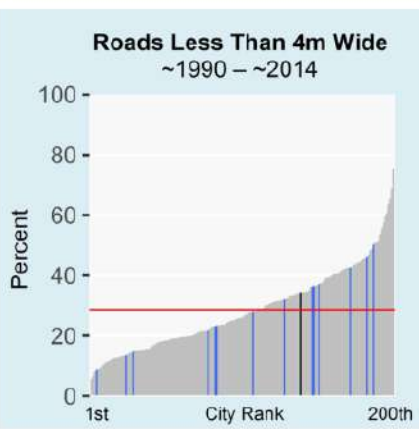
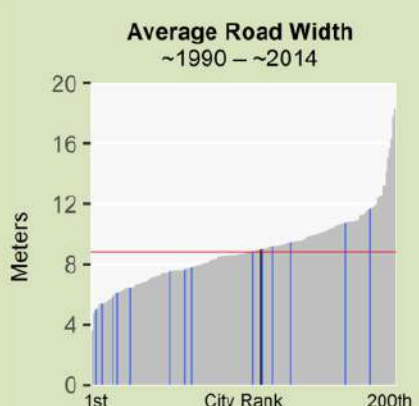
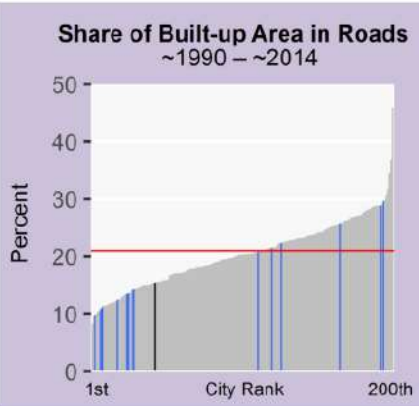
0 10 20 30 40 km

Urban Extent in 1989  
Expansion, 1989 - 1999  
Expansion, 1999 - 2015  
Arterial Roads

# Ho Chi Minh City, Vietnam (Southeast Asia)



Legend for Charts			
	Ho Chi Minh City	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1989	1989-2015	
Roads			
Share of Built-Up Area Occupied by Roads	17%	15%	
Share of Built-Up Area that is Gridded or Partially Gridded	7%	2%	
Average Road Width (m)	9.0	7.2	
Share of Roads less than 4m Wide	23%	34%	
Share of Roads more than 16m Wide	13%	6%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	2.6	1.2	
Average Beeline Distance to Arterial Roads (m)	146	362	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	97%	82%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	94%	64%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	14%	5%	
Average Block Size (ha)	3.0	5.3	
3-way Intersection Density (number per km <sup>2</sup> )	118	88	
4-way Intersection Density (number per km <sup>2</sup> )	22	7	
Walkability Ratio	1.7	1.8	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		193	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	66%	67%	
Share of Residential Area Not Laid Out Before Occupation	49%	56%	
Share of Residential Area Laid Out Before Occupation	50%	43%	
Share of Residential Area in Informal Land Subdivisions	0%	22%	
Share of Residential Area in Formal Land Subdivisions	50%	19%	
Share of Residential Area in Housing Projects	0%	0%	



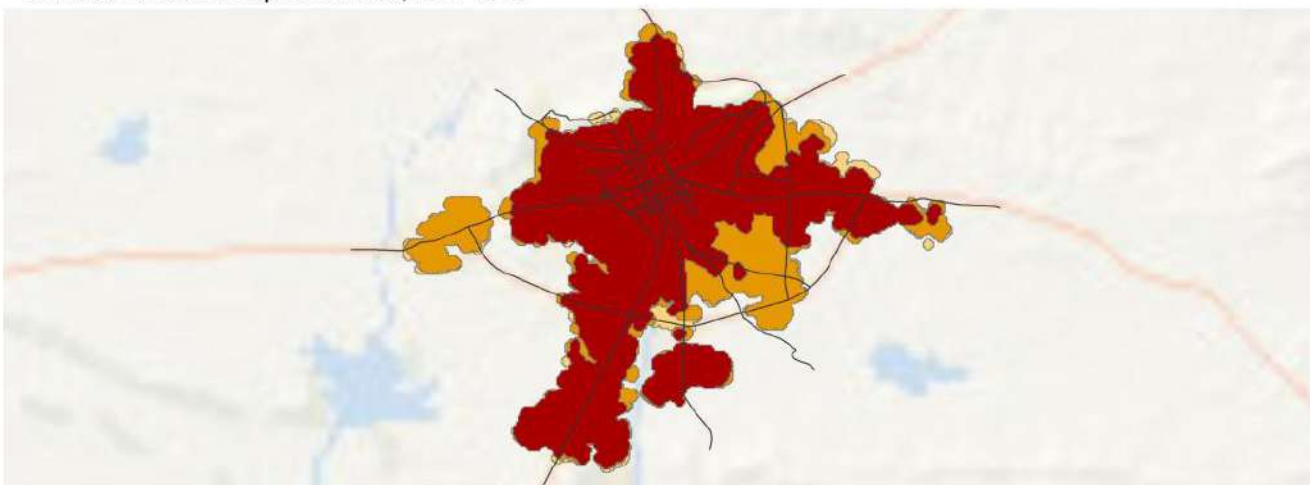
# Holguin, Cuba (Latin America and the Caribbean)



Selected Locales in Area Developed Before 1987



Selected Locales in Expansion Area, 1987-2014



**Holguin, Cuba**  
1987-2014

0 1.5 3 4.5 6 km

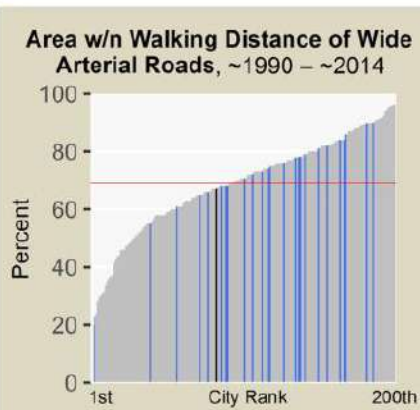
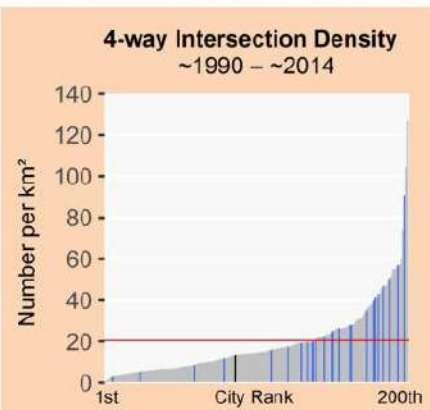
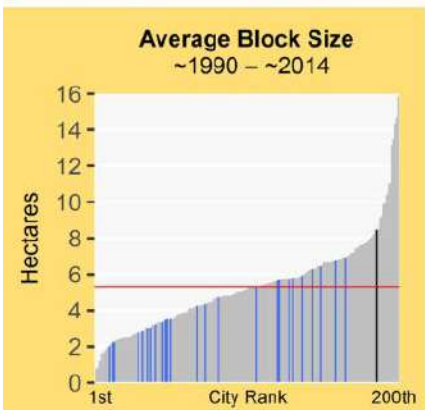
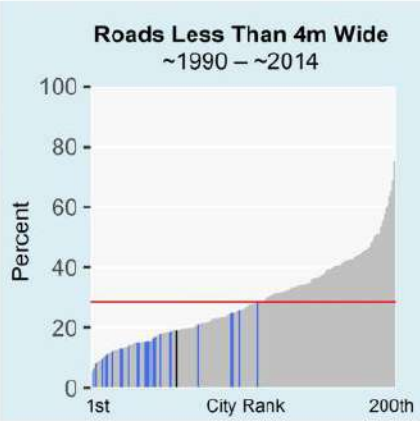
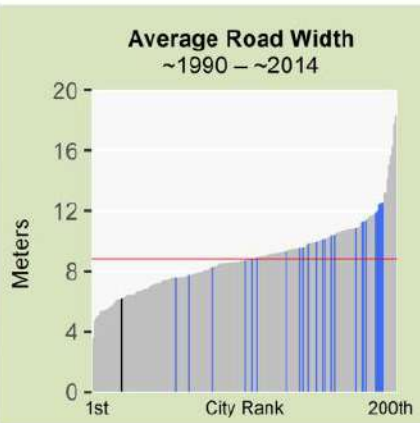
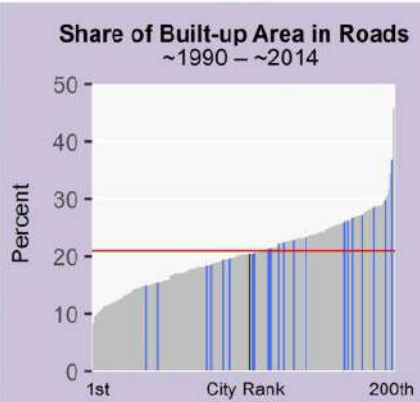
N

- Urban Extent in 1987
- Expansion, 1987 - 2001
- Expansion, 2001 - 2014
- Arterial Roads

# Holguin, Cuba (Latin America and the Caribbean)



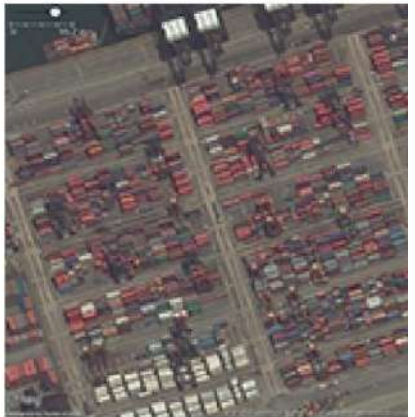
Legend for Charts			
	Holguin	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1987	1987-2014	
Roads			
Share of Built-Up Area Occupied by Roads	15%	20%	
Share of Built-Up Area that is Gridded or Partially Gridded	12%	0%	
Average Road Width (m)	6.2	7.0	
Share of Roads less than 4m Wide	17%	19%	
Share of Roads more than 16m Wide	3%	8%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	1.7	1.5	
Average Beeline Distance to Arterial Roads (m)	235	250	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	92%	92%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	68%	67%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	20%	6%	
Average Block Size (ha)	4.2	8.5	
3-way Intersection Density (number per km <sup>2</sup> )	96	117	
4-way Intersection Density (number per km <sup>2</sup> )	32	14	
Walkability Ratio	1.5	1.8	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	134		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	241		
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	72%	68%	
Share of Residential Area Not Laid Out Before Occupation	32%	56%	
Share of Residential Area Laid Out Before Occupation	67%	43%	
Share of Residential Area in Informal Land Subdivisions	43%	42%	
Share of Residential Area in Formal Land Subdivisions	15%	0%	
Share of Residential Area in Housing Projects	8%	1%	



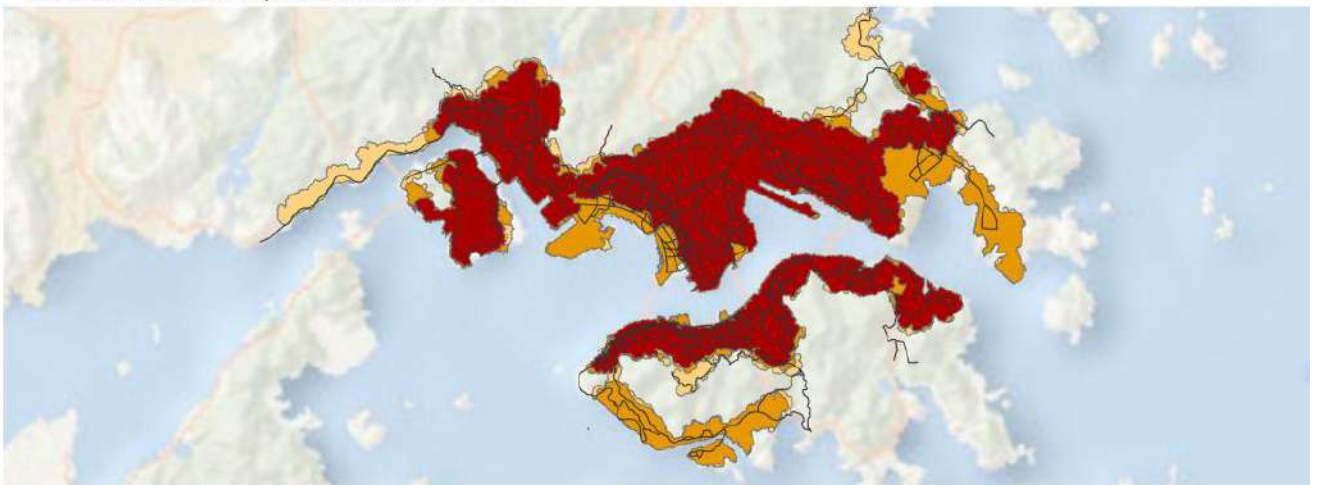
# Hong Kong, Hong Kong, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2013



Hong Kong, Hong Kong, China  
1989-2013

0 3 6 9 12 km

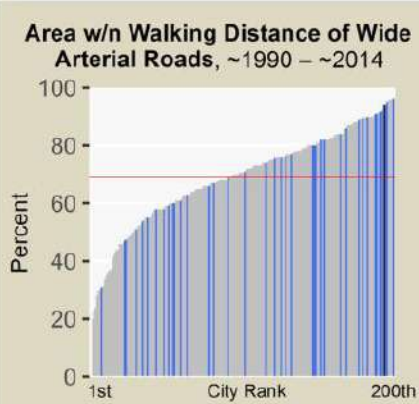
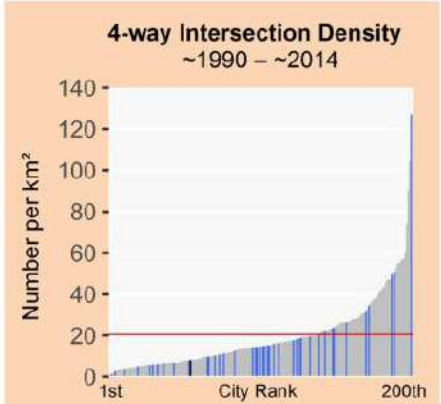
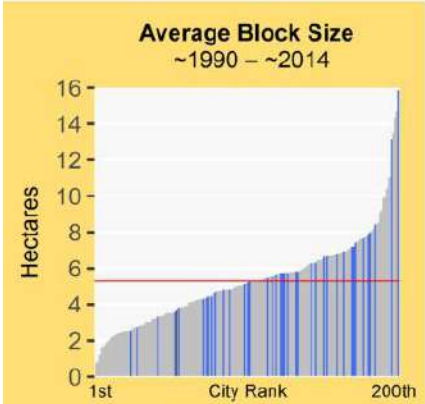
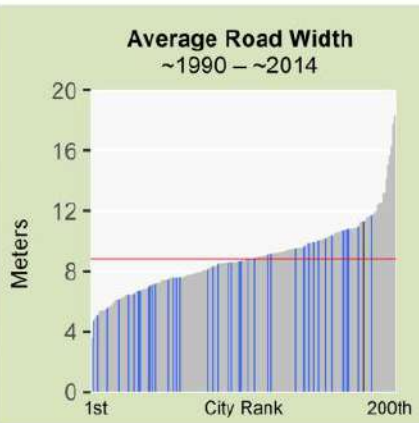
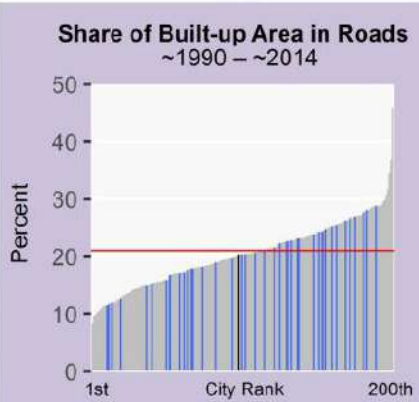
Urban Extent in 1989  
Expansion, 1989 - 2000  
Expansion, 2000 - 2013  
Arterial Roads



# Hong Kong, Hong Kong, China (East Asia and the Pacific)



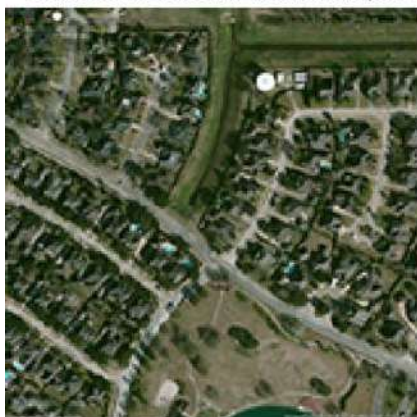
Legend for Charts		
	Hong Kong	Other cities in region   All other cities   Global average
Metrics	Pre-1989	1989-2013
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	25%	20%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	2%
Average Road Width (m)	11.3	9.4
Share of Roads less than 4m Wide	14%	25%
Share of Roads more than 16m Wide	23%	16%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	3.9	3.2
Average Beeline Distance to Arterial Roads (m)	105	132
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	99%	97%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	98%	94%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	11%	17%
Average Block Size (ha)	4.6	3.7
3-way Intersection Density (number per km <sup>2</sup> )	55	27
4-way Intersection Density (number per km <sup>2</sup> )	12	8
Walkability Ratio	1.9	1.7
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	1098	
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	50%	44%
Share of Residential Area Not Laid Out Before Occupation	16%	31%
Share of Residential Area Laid Out Before Occupation	83%	68%
Share of Residential Area in Informal Land Subdivisions	0%	0%
Share of Residential Area in Formal Land Subdivisions	31%	8%
Share of Residential Area in Housing Projects	52%	60%



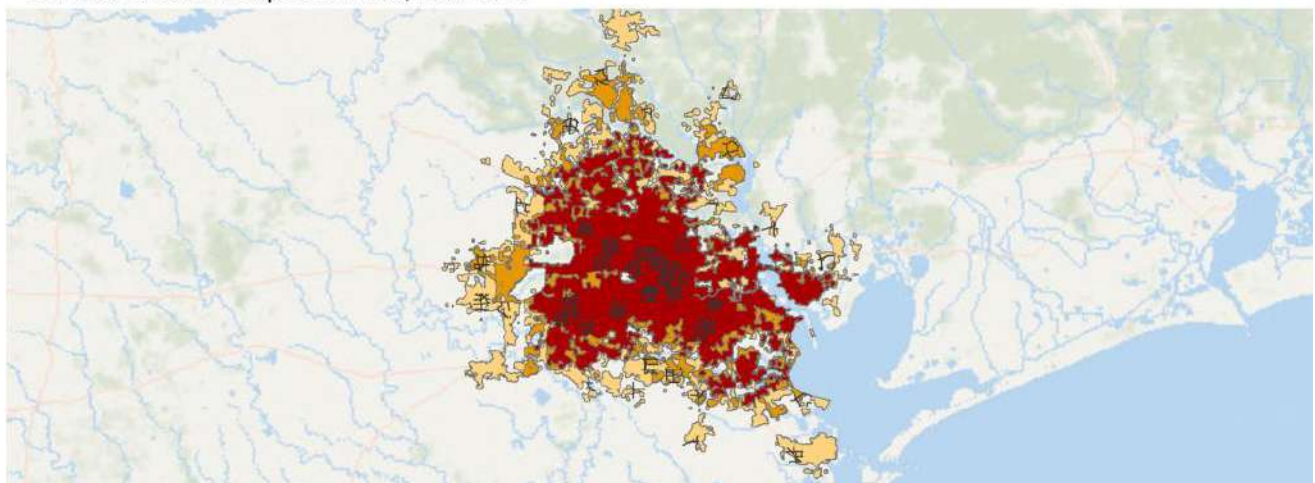
# Houston, United States (Land-Rich Developed Countries)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



**Houston, United States**  
1990-2014

0 20 40 60 80 km

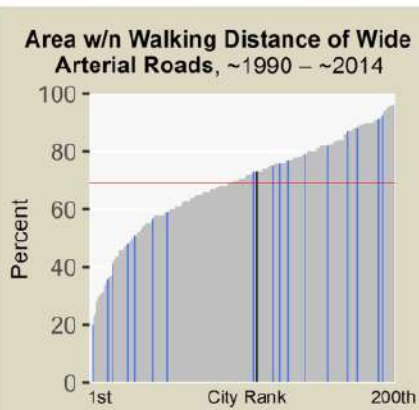
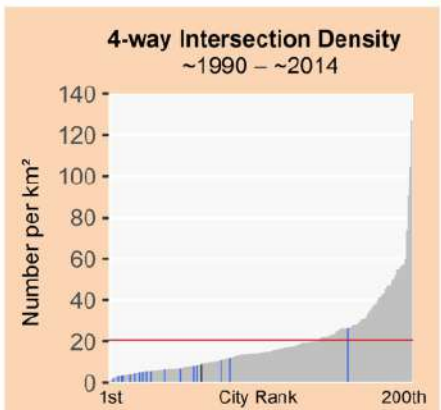
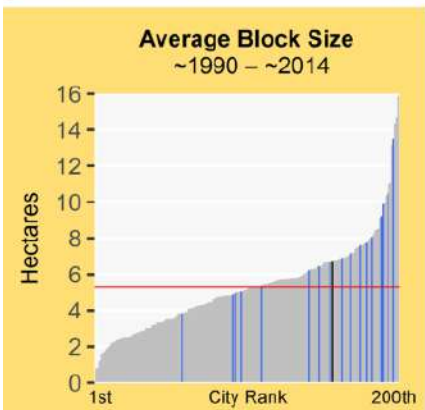
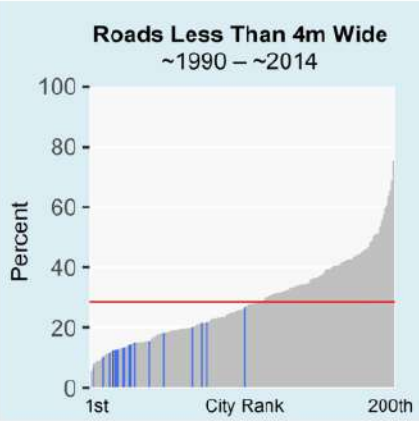
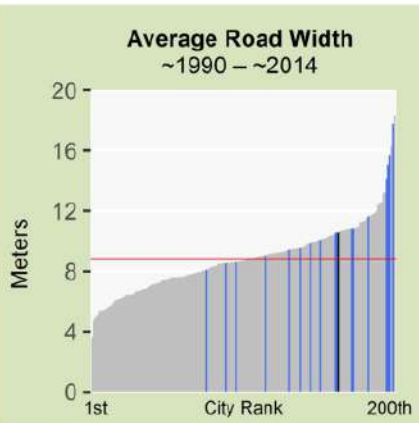
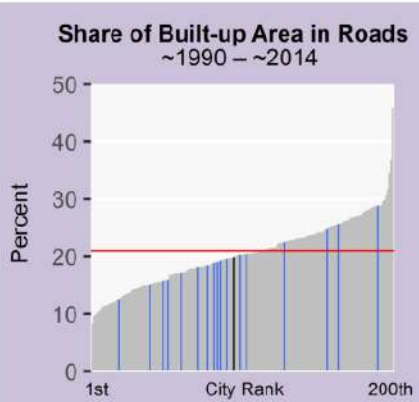
N

- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2014
- Arterial Roads

# Houston, United States (Land-Rich Developed Countries)



Legend for Charts			
	Houston	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1990	1990-2014	
Roads			
Share of Built-Up Area Occupied by Roads	20%	19%	
Share of Built-Up Area that is Gridded or Partially Gridded	5%	0%	
Average Road Width (m)	10.6	10.0	
Share of Roads less than 4m Wide	11%	12%	
Share of Roads more than 16m Wide	20%	14%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	2.0	0.8	
Average Beeline Distance to Arterial Roads (m)	181	396	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	97%	80%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	95%	73%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	13%	11%	
Average Block Size (ha)	5.9	6.7	
3-way Intersection Density (number per km <sup>2</sup> )	81	53	
4-way Intersection Density (number per km <sup>2</sup> )	13	9	
Walkability Ratio	1.8	1.9	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	800	852	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	64%	83%	
Share of Residential Area Not Laid Out Before Occupation	4%	13%	
Share of Residential Area Laid Out Before Occupation	95%	86%	
Share of Residential Area in Informal Land Subdivisions	0%	0%	
Share of Residential Area in Formal Land Subdivisions	85%	73%	
Share of Residential Area in Housing Projects	9%	13%	



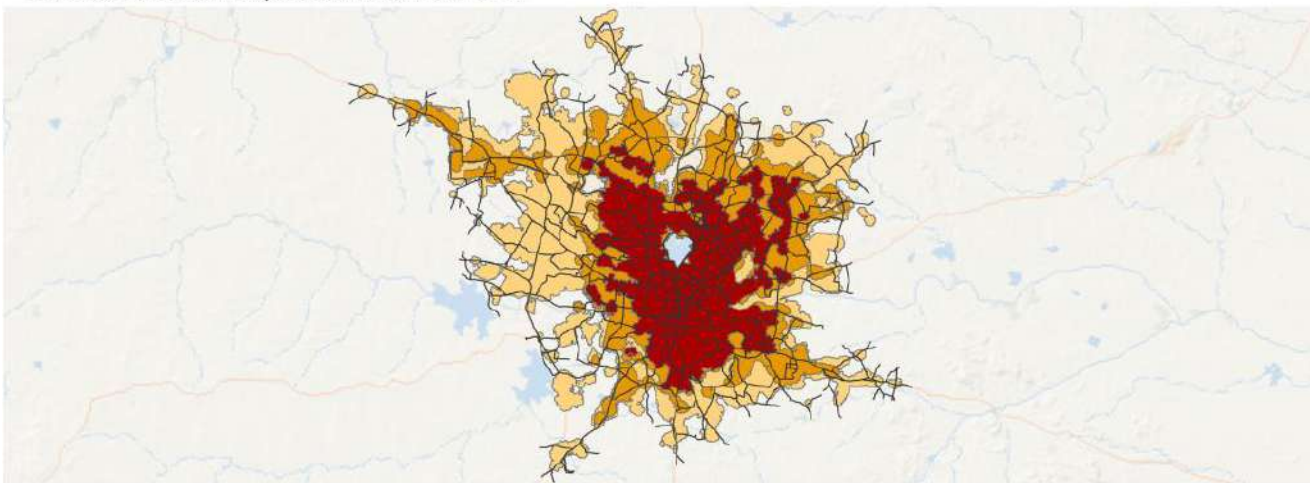
# Hyderabad, India (South and Central Asia)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



## Hyderabad, India 1990-2014



- Urban Extent in 1990
- Expansion, 1990 - 1999
- Expansion, 1999 - 2014

Arterial Roads

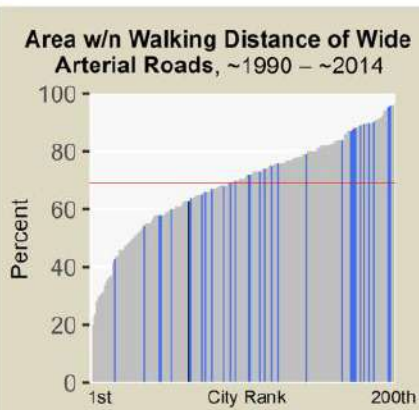
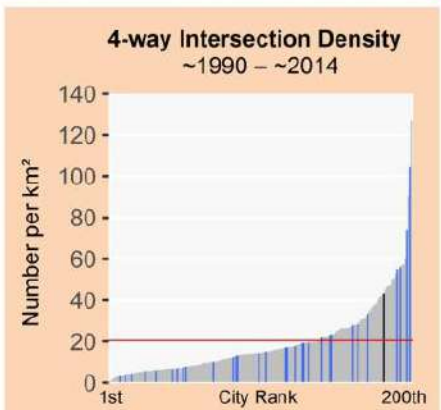
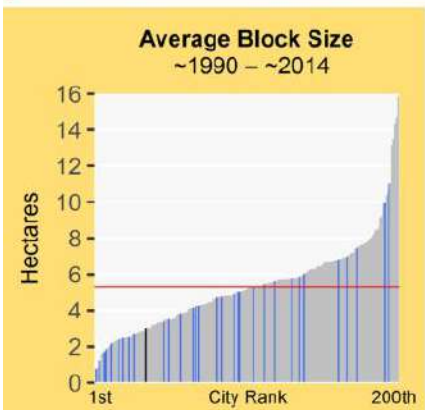
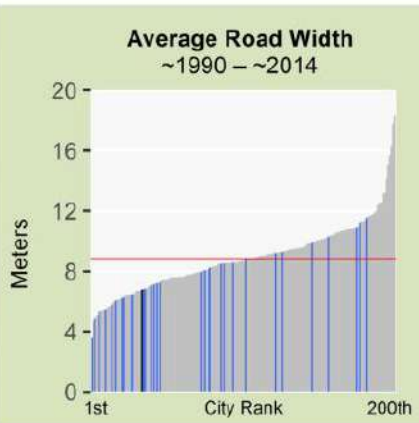
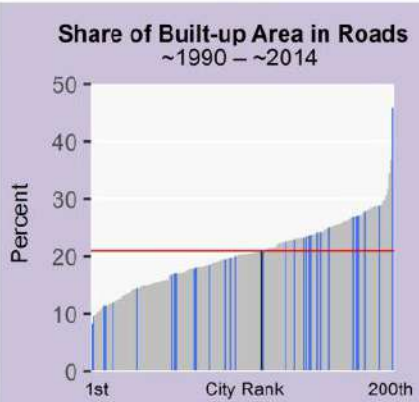
# Hyderabad, India (South and Central Asia)



**Legend for Charts**

Hyderabad | Other cities in region | All other cities | Global average —

Metrics	Pre-1990	1990-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	18%	20%
Share of Built-Up Area that is Gridded or Partially Gridded	2%	0%
Average Road Width (m)	6.8	6.2
Share of Roads less than 4m Wide	18%	23%
Share of Roads more than 16m Wide	3%	2%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.9	1.3
Average Beeline Distance to Arterial Roads (m)	184	279
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	98%	90%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	77%	63%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	9%	15%
Average Block Size (ha)	2.2	3.0
3-way Intersection Density (number per km <sup>2</sup> )	189	204
4-way Intersection Density (number per km <sup>2</sup> )	25	43
Walkability Ratio	1.7	1.5
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	95	159
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	213	190
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	68%	66%
Share of Residential Area Not Laid Out Before Occupation	10%	14%
Share of Residential Area Laid Out Before Occupation	89%	85%
Share of Residential Area in Informal Land Subdivisions	3%	64%
Share of Residential Area in Formal Land Subdivisions	83%	19%
Share of Residential Area in Housing Projects	2%	1%



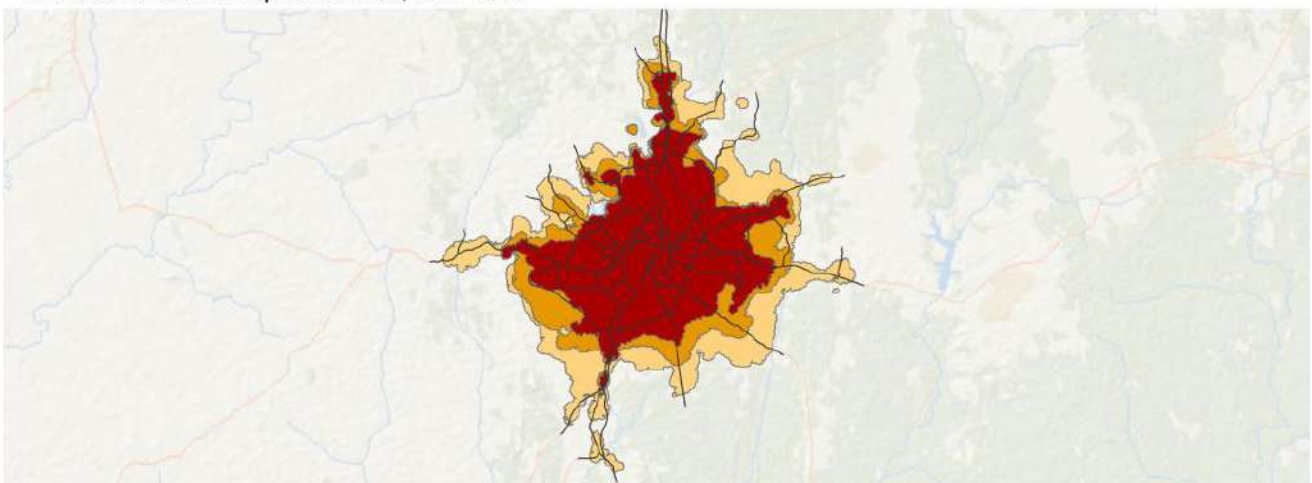
# Ibadan, Nigeria (Sub-Saharan Africa)



Selected Locales in Area Developed Before 1984



Selected Locales in Expansion Area, 1984-2013



## Ibadan, Nigeria 1984-2013



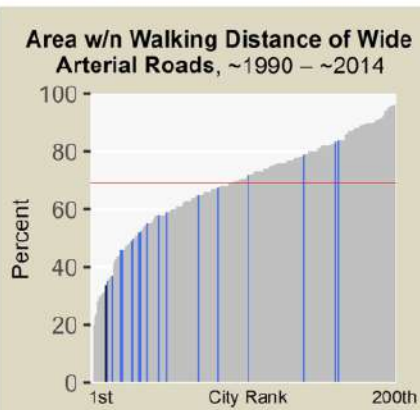
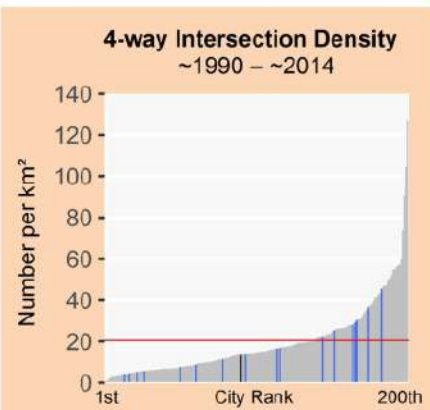
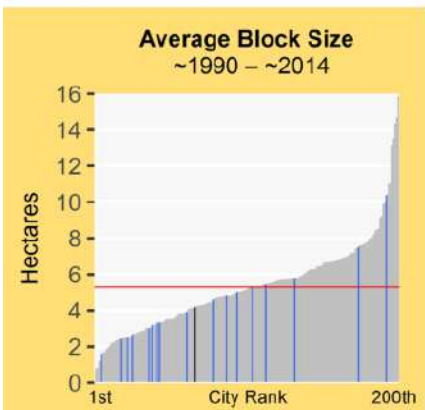
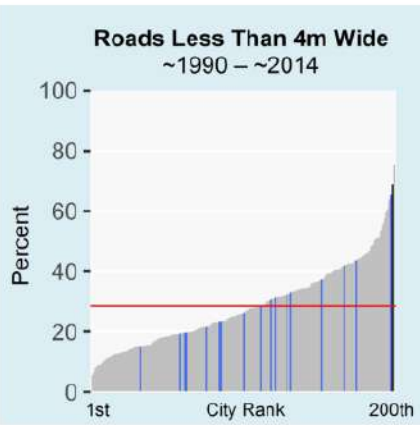
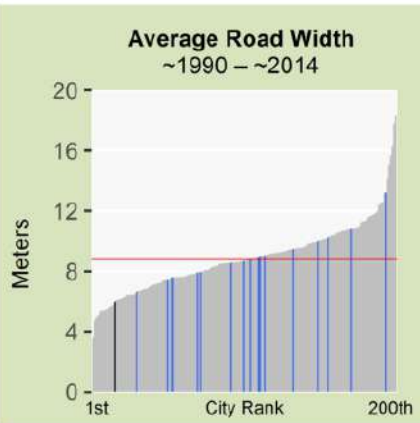
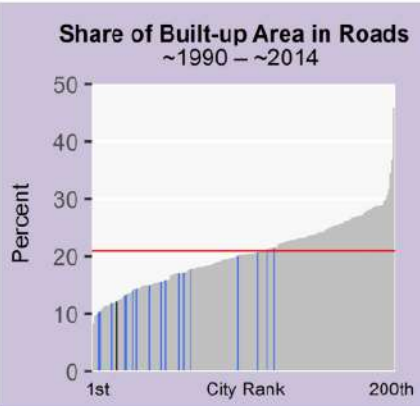
- Urban Extent in 1984
- Expansion, 1984 - 2000
- Expansion, 2000 - 2013

Arterial Roads

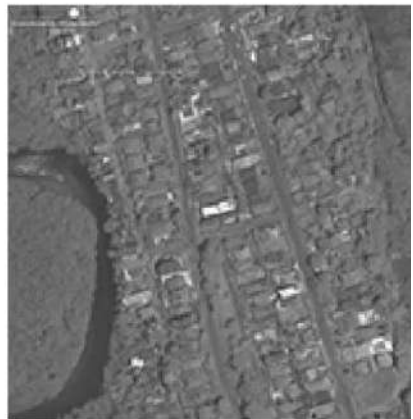
# Ibadan, Nigeria (Sub-Saharan Africa)



Legend for Charts			
	Ibadan	Other cities in region	All other cities
			Global average —
Metrics			
	Pre-1984	1984-2013	
Roads			
Share of Built-Up Area Occupied by Roads	11%	12%	
Share of Built-Up Area that is Gridded or Partially Gridded	5%	0%	
Average Road Width (m)	6.0	3.2	
Share of Roads less than 4m Wide	21%	68%	
Share of Roads more than 16m Wide	1%	0%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	1.0	0.7	
Average Beeline Distance to Arterial Roads (m)	353	596	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	81%	65%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	49%	33%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	4%	7%	
Average Block Size (ha)	5.7	4.2	
3-way Intersection Density (number per km <sup>2</sup> )	70	196	
4-way Intersection Density (number per km <sup>2</sup> )	5	14	
Walkability Ratio	1.8	1.7	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	677		
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	70%	75%	
Share of Residential Area Not Laid Out Before Occupation	35%	75%	
Share of Residential Area Laid Out Before Occupation	64%	24%	
Share of Residential Area in Informal Land Subdivisions	56%	24%	
Share of Residential Area in Formal Land Subdivisions	6%	0%	
Share of Residential Area in Housing Projects	1%	0%	



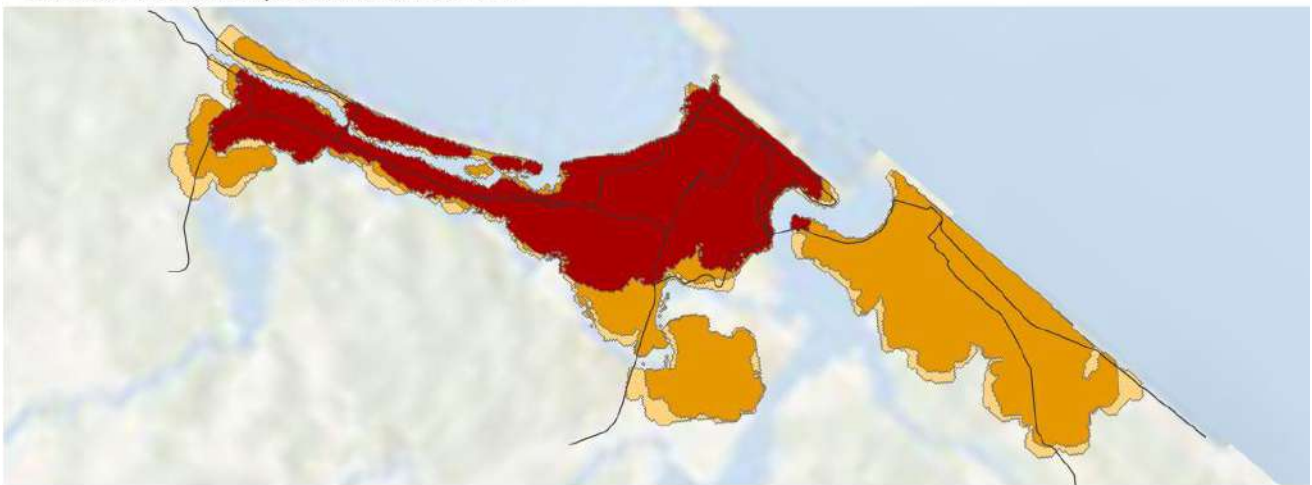
# Ilheus, Brazil (Latin America and the Caribbean)



Selected Locales in Area Developed Before 1993



Selected Locales in Expansion Area, 1993-2013



**Ilheus, Brazil**  
1993-2013

0 1 2 3 4 km

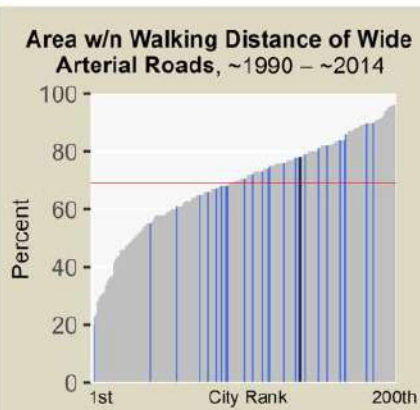
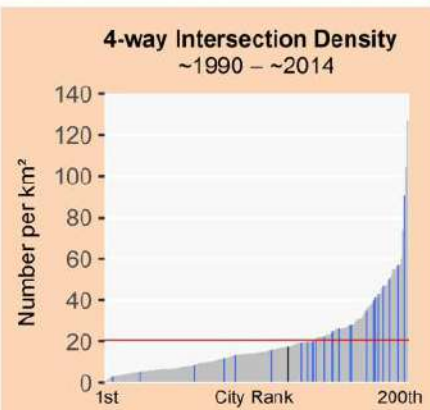
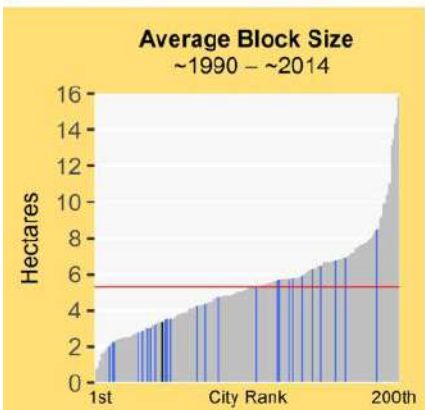
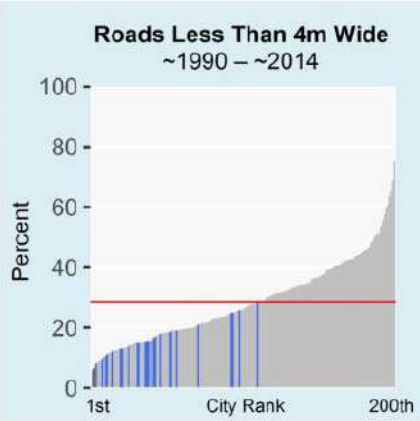
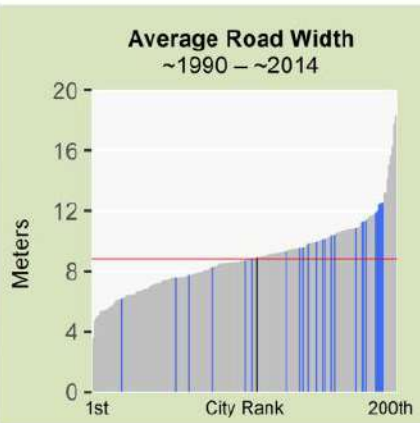
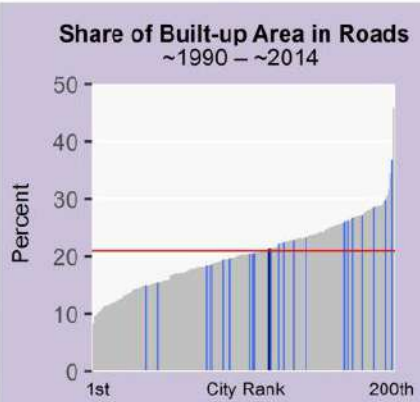
Urban Extent in 1993  
Expansion, 1993 - 2001  
Expansion, 2001 - 2013  
Arterial Roads



# Ilheus, Brazil (Latin America and the Caribbean)



Legend for Charts			
	Ilheus	Other cities in region	All other cities
			Global average —
Metrics			
	Pre-1993	1993-2013	
Roads			
Share of Built-Up Area Occupied by Roads	22%	21%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	10%	
Average Road Width (m)	9.0	8.7	
Share of Roads less than 4m Wide	13%	6%	
Share of Roads more than 16m Wide	9%	5%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	2.3	1.7	
Average Beeline Distance to Arterial Roads (m)	156	264	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	97%	88%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	94%	78%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	13%	14%	
Average Block Size (ha)	3.3	3.3	
3-way Intersection Density (number per km <sup>2</sup> )	107	79	
4-way Intersection Density (number per km <sup>2</sup> )	17	18	
Walkability Ratio	1.6	1.7	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		500	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		253	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	74%	78%	
Share of Residential Area Not Laid Out Before Occupation	3%	6%	
Share of Residential Area Laid Out Before Occupation	96%	93%	
Share of Residential Area in Informal Land Subdivisions	28%	50%	
Share of Residential Area in Formal Land Subdivisions	67%	42%	
Share of Residential Area in Housing Projects	1%	0%	



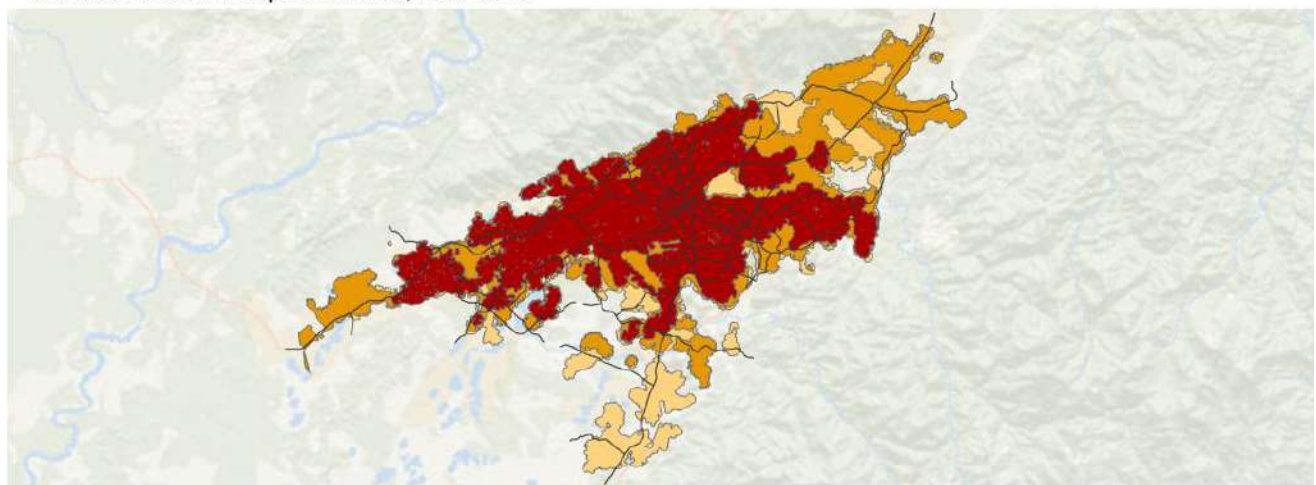
# Ipoh, Malaysia (Southeast Asia)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2015



**Ipoh, Malaysia**  
1990-2015

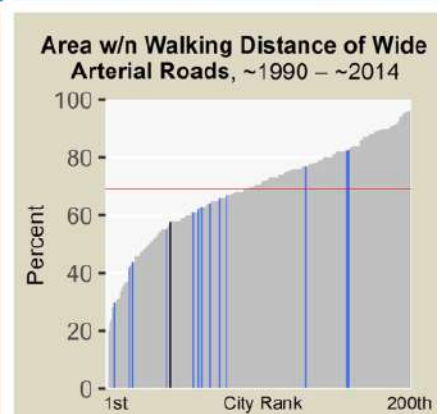
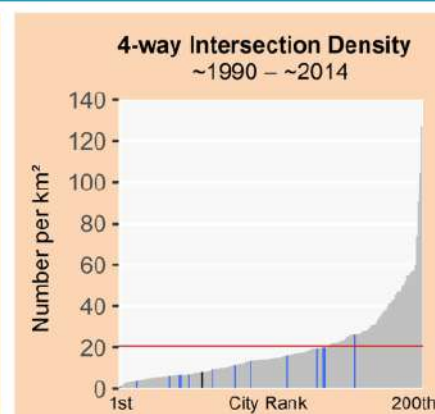
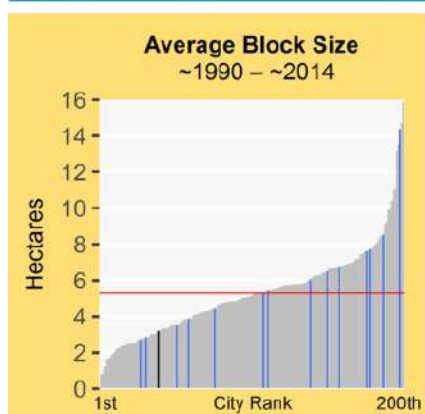
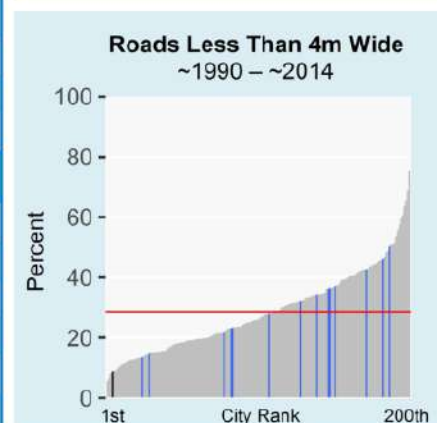
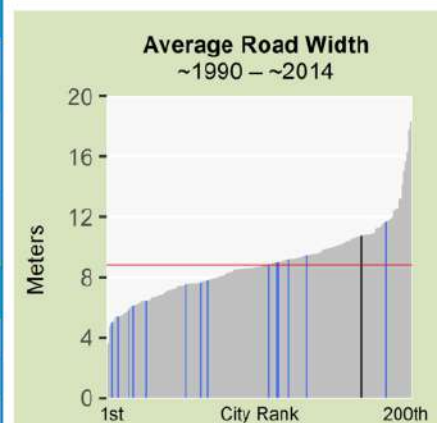
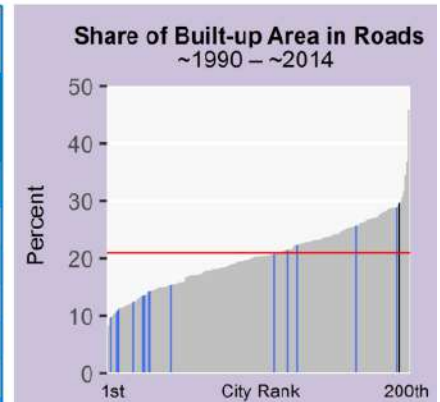
0 5 10 15 20 km

Urban Extent in 1990  
Expansion, 1990 - 2003  
Expansion, 2003 - 2015  
Arterial Roads

# Ipoh, Malaysia (Southeast Asia)



Legend for Charts		
Ipoh	Other cities in region	All other cities
		Global average
Metrics		
	Pre-1990	1990-2015
Roads		
Share of Built-Up Area Occupied by Roads	31%	29%
Share of Built-Up Area that is Gridded or Partially Gridded	2%	2%
Average Road Width (m)	10.8	8.6
Share of Roads less than 4m Wide	5%	8%
Share of Roads more than 16m Wide	14%	6%
Arterial Roads		
Density of Arterial Roads (km/km <sup>2</sup> )	1.1	0.8
Average Beeline Distance to Arterial Roads (m)	387	479
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	79%	71%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	68%	57%
Block Size, Plot Size, Intersection Density, and Walkability		
Share of Intersections that are 4-way	7%	3%
Average Block Size (ha)	2.7	3.2
3-way Intersection Density (number per km <sup>2</sup> )	151	146
4-way Intersection Density (number per km <sup>2</sup> )	16	8
Walkability Ratio	2.0	1.6
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	358	336
Stages in the Evolution of Residential Layouts		
Share of Built-Up Area in Residential Use	69%	82%
Share of Residential Area Not Laid Out Before Occupation	0%	10%
Share of Residential Area Laid Out Before Occupation	99%	89%
Share of Residential Area in Informal Land Subdivisions	4%	4%
Share of Residential Area in Formal Land Subdivisions	68%	28%
Share of Residential Area in Housing Projects	26%	56%



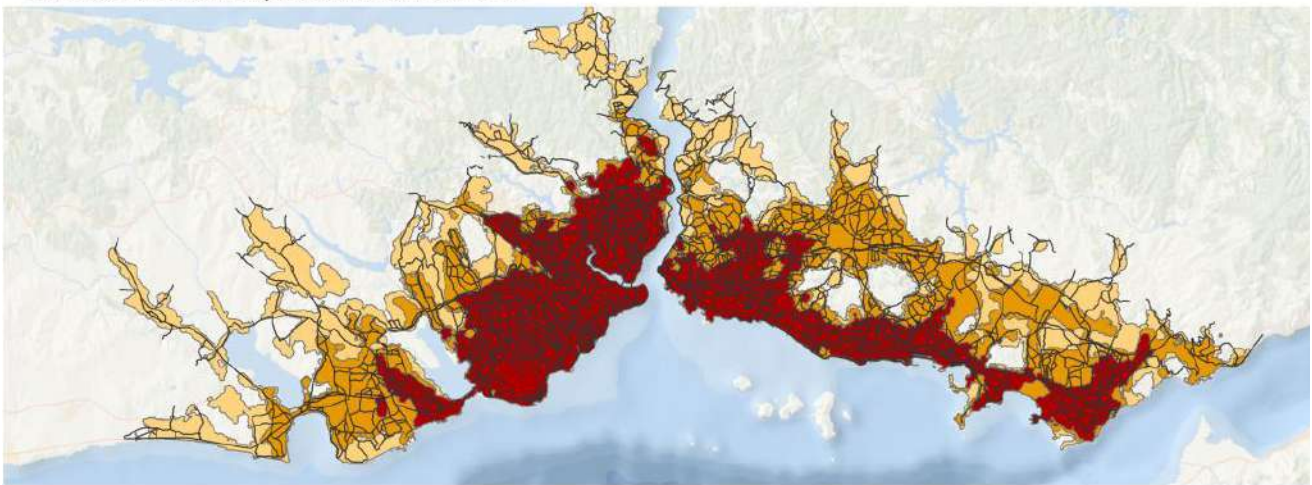
# Istanbul, Turkey (Western Asia and North Africa)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013




**Istanbul, Turkey**  
1990-2013

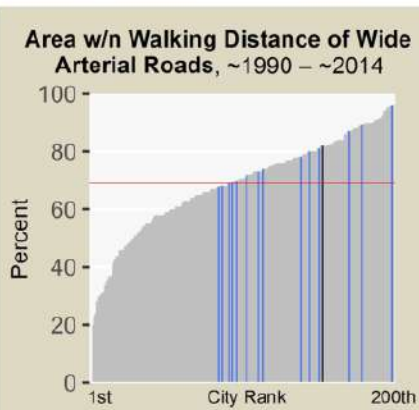
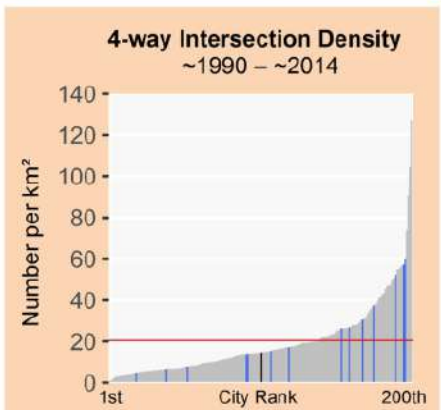
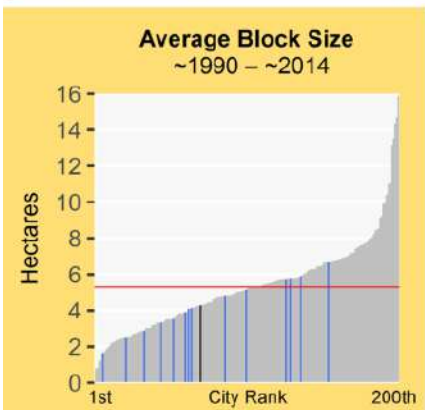
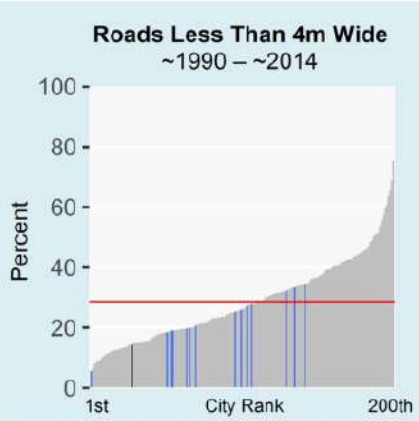
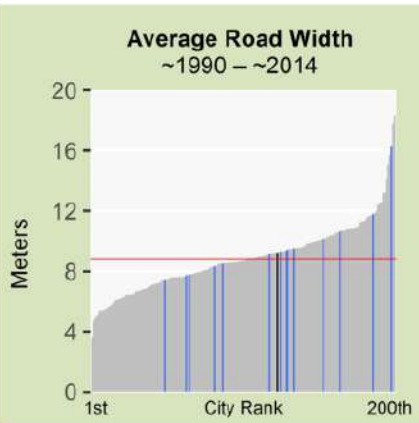
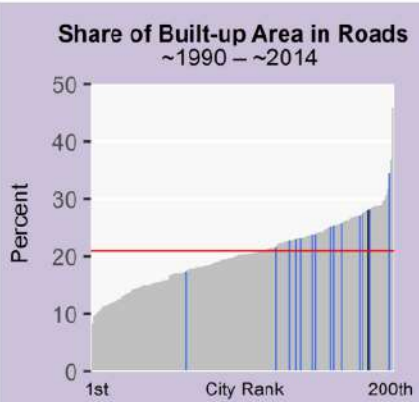
0 9 18 27 36 km

Urban Extent in 1990  
Expansion, 1990 - 2002  
Expansion, 2002 - 2013  
Arterial Roads

# Istanbul, Turkey (Western Asia and North Africa)



Legend for Charts			
	Istanbul	Other cities in region	All other cities
			Global average —
Metrics			
	Pre-1990	1990-2013	
Roads			
Share of Built-Up Area Occupied by Roads	26%	28%	
Share of Built-Up Area that is Gridded or Partially Gridded	10%	5%	
Average Road Width (m)	9.2	7.8	
Share of Roads less than 4m Wide	9%	14%	
Share of Roads more than 16m Wide	9%	5%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	3.3	2.3	
Average Beeline Distance to Arterial Roads (m)	115	202	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	98%	93%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	93%	81%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	17%	6%	
Average Block Size (ha)	2.0	4.3	
3-way Intersection Density (number per km <sup>2</sup> )	143	160	
4-way Intersection Density (number per km <sup>2</sup> )	30	15	
Walkability Ratio	1.7	2.0	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	355	318	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	73%	68%	
Share of Residential Area Not Laid Out Before Occupation	41%	24%	
Share of Residential Area Laid Out Before Occupation	52%	75%	
Share of Residential Area in Informal Land Subdivisions	0%	12%	
Share of Residential Area in Formal Land Subdivisions	50%	34%	
Share of Residential Area in Housing Projects	7%	28%	



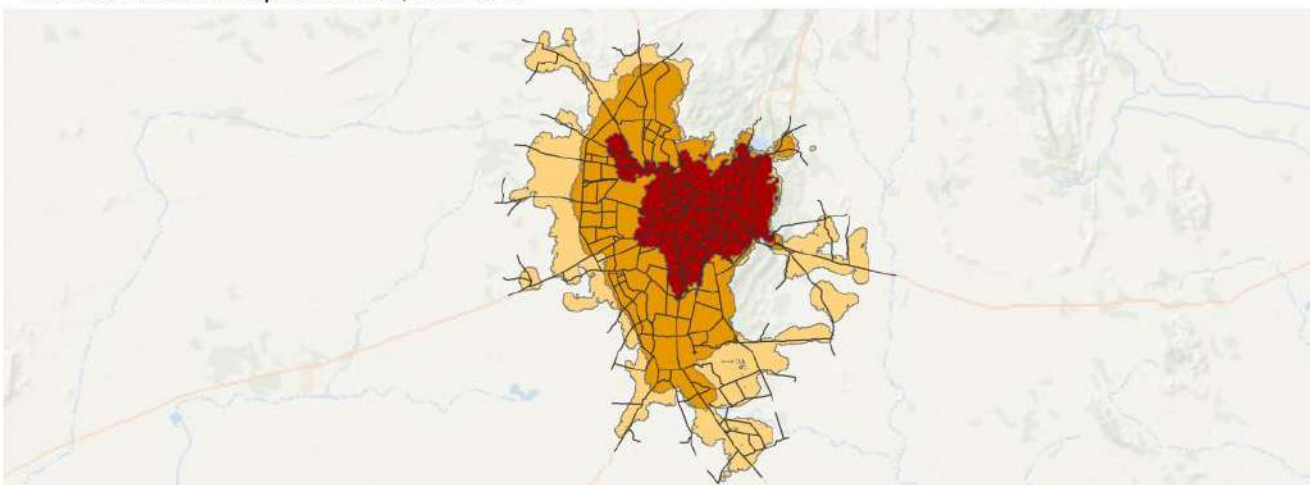
# Jaipur, India (South and Central Asia)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2014



**Jaipur, India**  
1989-2014

0 5 10 15 20 km

N

- Urban Extent in 1989
- Expansion, 1989 - 2000
- Expansion, 2000 - 2014
- Arterial Roads

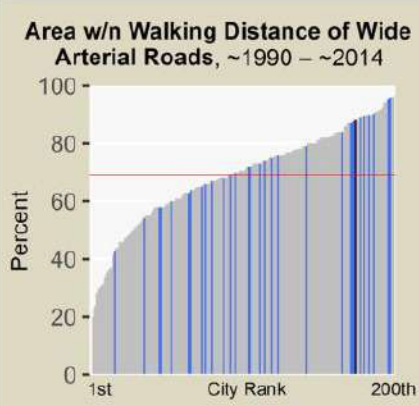
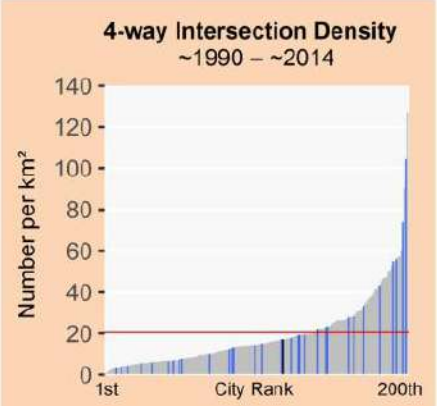
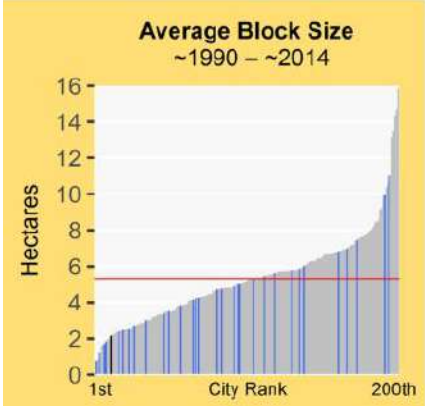
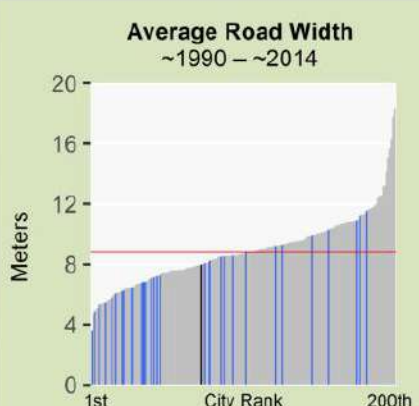
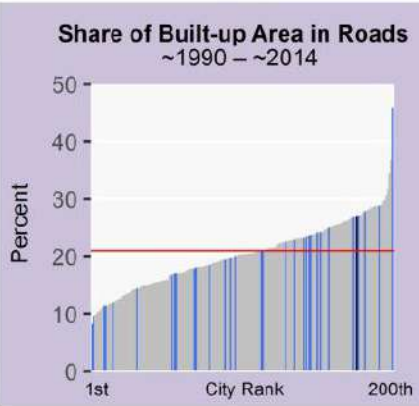
# Jaipur, India (South and Central Asia)



**Legend for Charts**

Jaipur | Other cities in region | All other cities | Global average

Metrics	Pre-1989	1989-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	21%	27%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	8.0	7.4
Share of Roads less than 4m Wide	19%	18%
Share of Roads more than 16m Wide	9%	7%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.9	1.4
Average Beeline Distance to Arterial Roads (m)	185	272
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	96%	90%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	94%	88%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	11%	6%
Average Block Size (ha)	2.4	2.2
3-way Intersection Density (number per km <sup>2</sup> )	197	242
4-way Intersection Density (number per km <sup>2</sup> )	19	17
Walkability Ratio	1.7	1.7
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	246	195
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	233	212
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	69%	75%
Share of Residential Area Not Laid Out Before Occupation	13%	15%
Share of Residential Area Laid Out Before Occupation	86%	84%
Share of Residential Area in Informal Land Subdivisions	40%	67%
Share of Residential Area in Formal Land Subdivisions	41%	11%
Share of Residential Area in Housing Projects	4%	5%



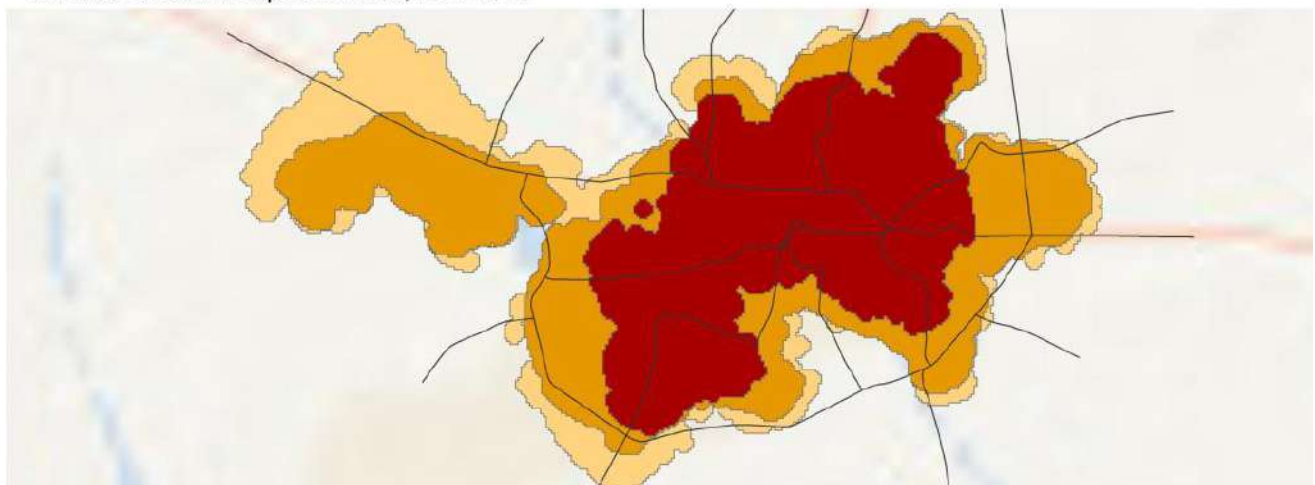
# Jalna, India (South and Central Asia)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2014



**Jalna, India**  
1989-2014

0 1 2 3 4 km

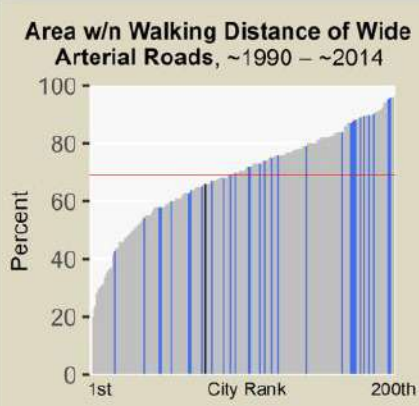
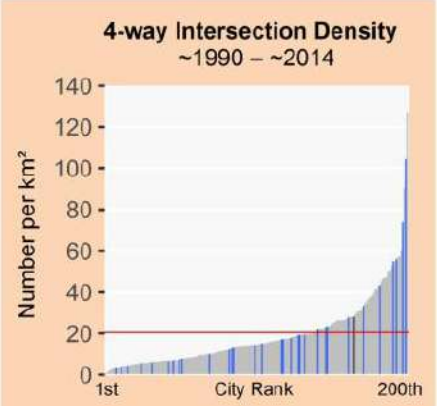
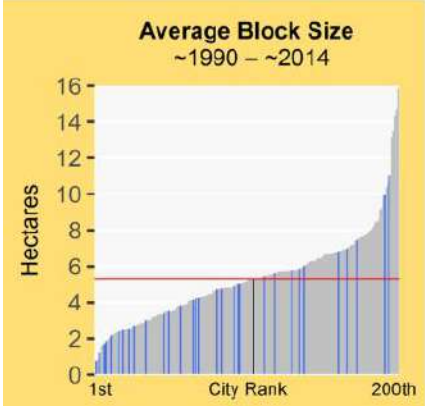
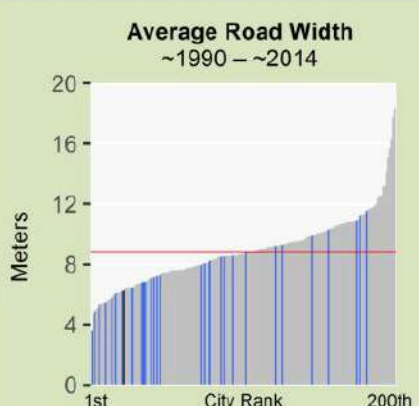
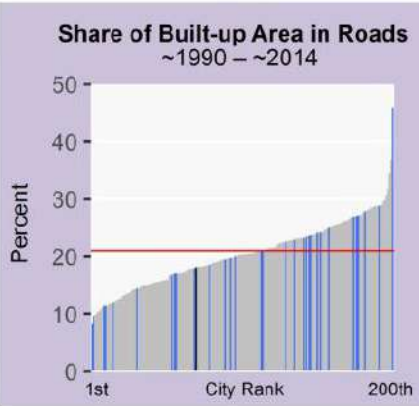
N

- Urban Extent in 1989
- Expansion, 1989 - 2000
- Expansion, 2000 - 2014
- Arterial Roads



# Jalna, India (South and Central Asia)

Legend for Charts			
	Jalna	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1989	1989-2014	
Roads			
Share of Built-Up Area Occupied by Roads	19%	18%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%	
Average Road Width (m)	6.3	7.2	
Share of Roads less than 4m Wide	20%	28%	
Share of Roads more than 16m Wide	1%	6%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	1.6	1.5	
Average Beeline Distance to Arterial Roads (m)	190	241	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	96%	93%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	63%	66%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	8%	10%	
Average Block Size (ha)	3.0	5.3	
3-way Intersection Density (number per km <sup>2</sup> )	162	179	
4-way Intersection Density (number per km <sup>2</sup> )	15	28	
Walkability Ratio	1.6	1.6	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	145		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	141		
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	54%	55%	
Share of Residential Area Not Laid Out Before Occupation	49%	30%	
Share of Residential Area Laid Out Before Occupation	50%	69%	
Share of Residential Area in Informal Land Subdivisions	31%	62%	
Share of Residential Area in Formal Land Subdivisions	17%	7%	
Share of Residential Area in Housing Projects	1%	0%	



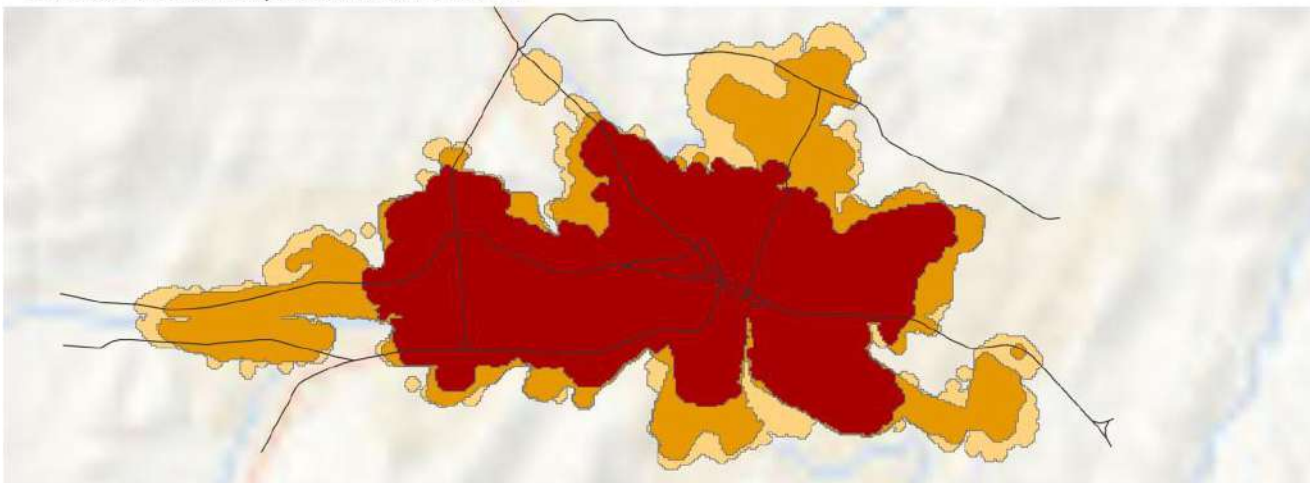
# Jequeie, Brazil (Latin America and the Caribbean)



Selected Locales in Area Developed Before 1992



Selected Locales in Expansion Area, 1992-2014



**Jequeie, Brazil**  
1992-2014

0 1 2 3 4 km

N

- Urban Extent in 1992
- Expansion, 1992 - 2001
- Expansion, 2001 - 2014
- Arterial Roads

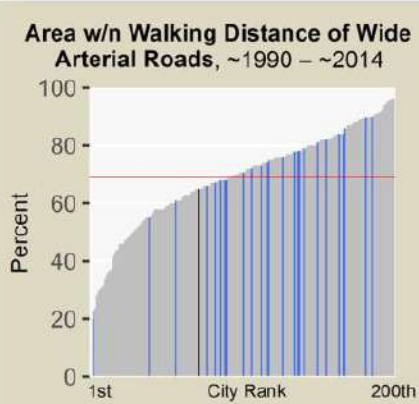
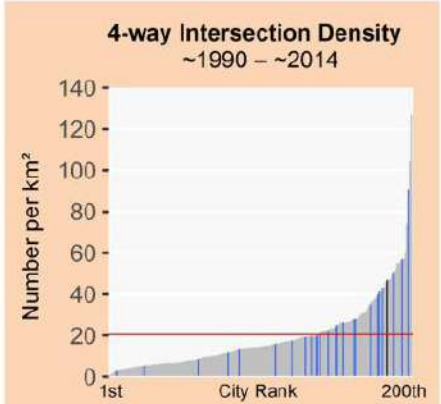
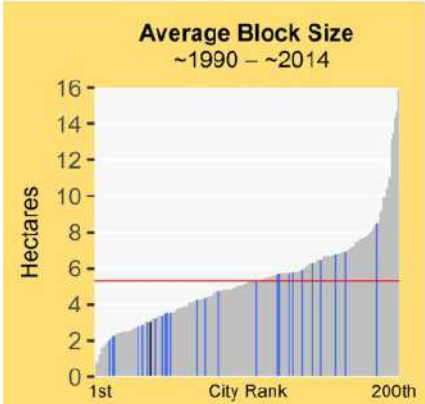
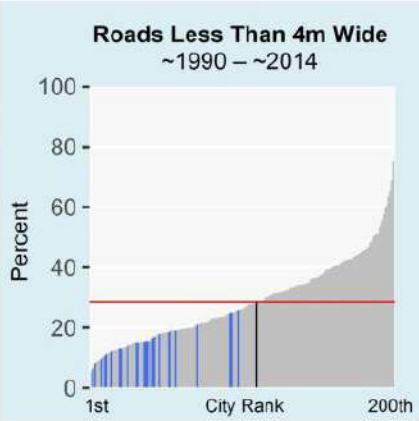
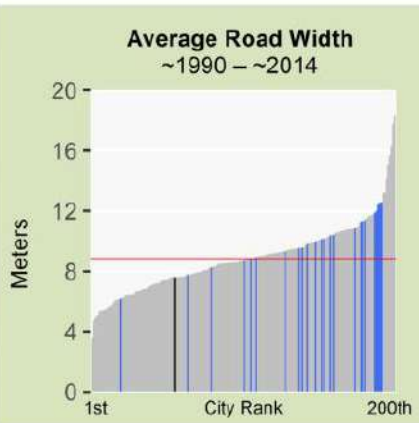
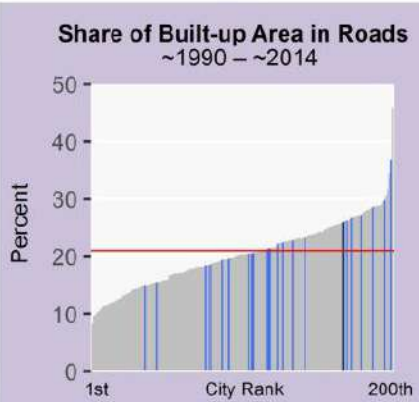
# Jequie, Brazil (Latin America and the Caribbean)



**Legend for Charts**

Jequie | Other cities in region | All other cities | Global average

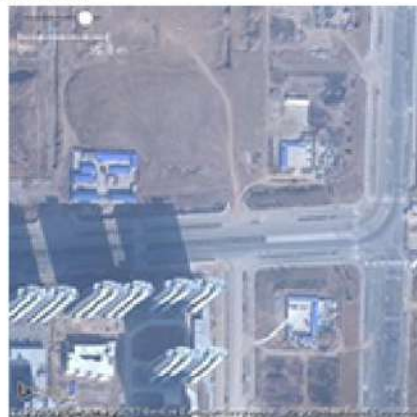
Metrics	Pre-1992	1992-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	24%	26%
Share of Built-Up Area that is Gridded or Partially Gridded	10%	11%
Average Road Width (m)	7.6	5.6
Share of Roads less than 4m Wide	20%	28%
Share of Roads more than 16m Wide	4%	1%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.2	1.0
Average Beeline Distance to Arterial Roads (m)	332	383
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	83%	79%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	68%	65%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	19%	17%
Average Block Size (ha)	2.3	3.1
3-way Intersection Density (number per km <sup>2</sup> )	181	254
4-way Intersection Density (number per km <sup>2</sup> )	38	47
Walkability Ratio	1.9	1.6
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	202	173
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	132	274
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	68%	69%
Share of Residential Area Not Laid Out Before Occupation	0%	15%
Share of Residential Area Laid Out Before Occupation	99%	84%
Share of Residential Area in Informal Land Subdivisions	59%	58%
Share of Residential Area in Formal Land Subdivisions	36%	15%
Share of Residential Area in Housing Projects	4%	10%



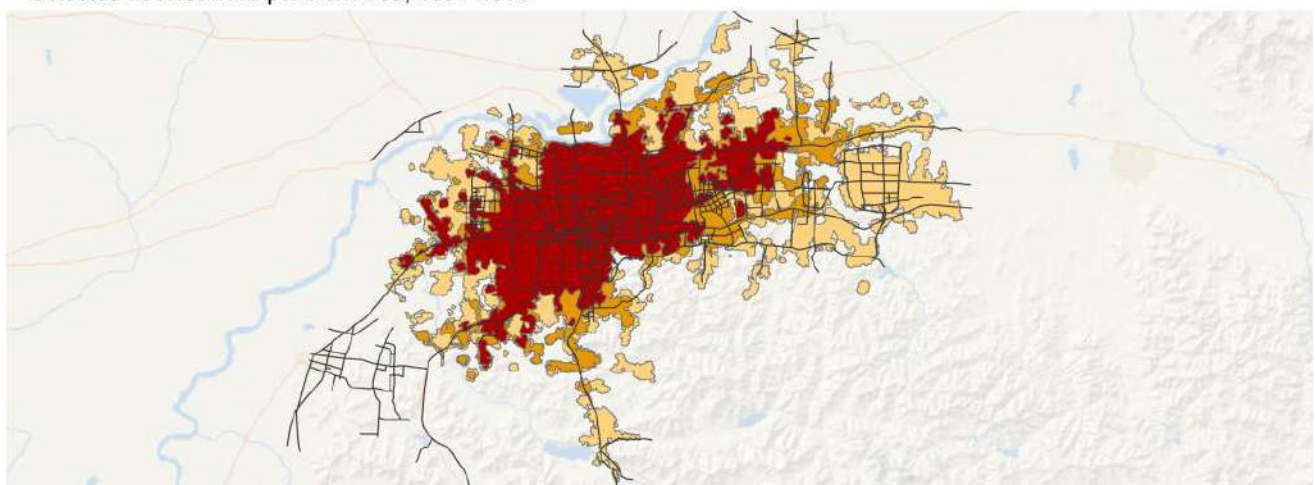
# Jinan, Shandong, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2013



Jinan, Shandong, China  
1991-2013

0 8 16 24 32 km

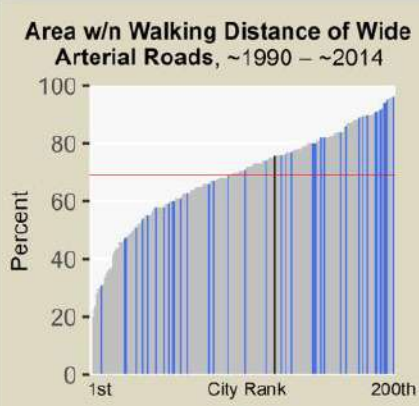
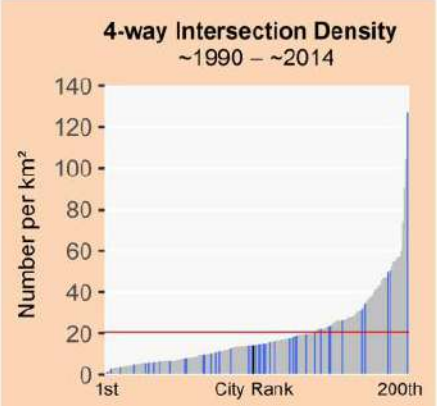
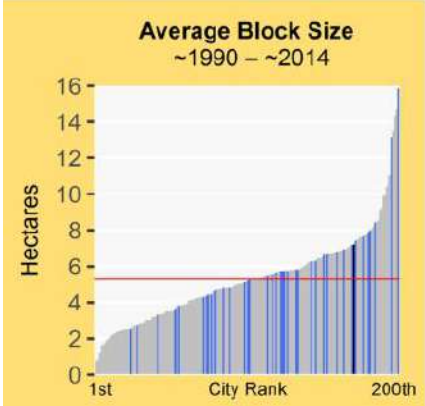
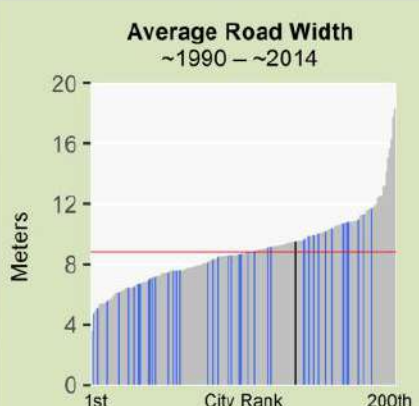
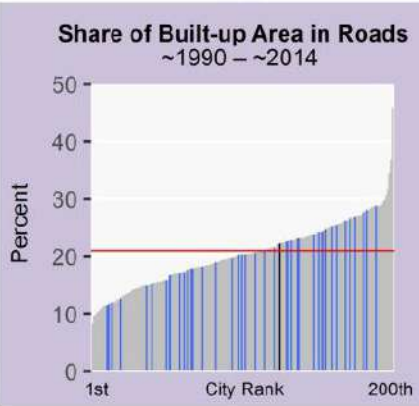
N

- Urban Extent in 1991
- Expansion, 1991 - 2000
- Expansion, 2000 - 2013
- Arterial Roads

# Jinan, Shandong, China (East Asia and the Pacific)



Legend for Charts		
Jinan	Other cities in region	All other cities
		Global average
Metrics		
	Pre-1991	1991-2013
Roads		
Share of Built-Up Area Occupied by Roads	25%	22%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	9.5	9.5
Share of Roads less than 4m Wide	35%	41%
Share of Roads more than 16m Wide	15%	16%
Arterial Roads		
Density of Arterial Roads (km/km <sup>2</sup> )	1.4	1.2
Average Beeline Distance to Arterial Roads (m)	332	500
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	86%	75%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	86%	75%
Block Size, Plot Size, Intersection Density, and Walkability		
Share of Intersections that are 4-way	5%	14%
Average Block Size (ha)	3.7	7.2
3-way Intersection Density (number per km <sup>2</sup> )	158	111
4-way Intersection Density (number per km <sup>2</sup> )	13	14
Walkability Ratio	2.0	1.6
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		
Stages in the Evolution of Residential Layouts		
Share of Built-Up Area in Residential Use	38%	48%
Share of Residential Area Not Laid Out Before Occupation	7%	13%
Share of Residential Area Laid Out Before Occupation	92%	86%
Share of Residential Area in Informal Land Subdivisions	21%	29%
Share of Residential Area in Formal Land Subdivisions	45%	12%
Share of Residential Area in Housing Projects	25%	45%



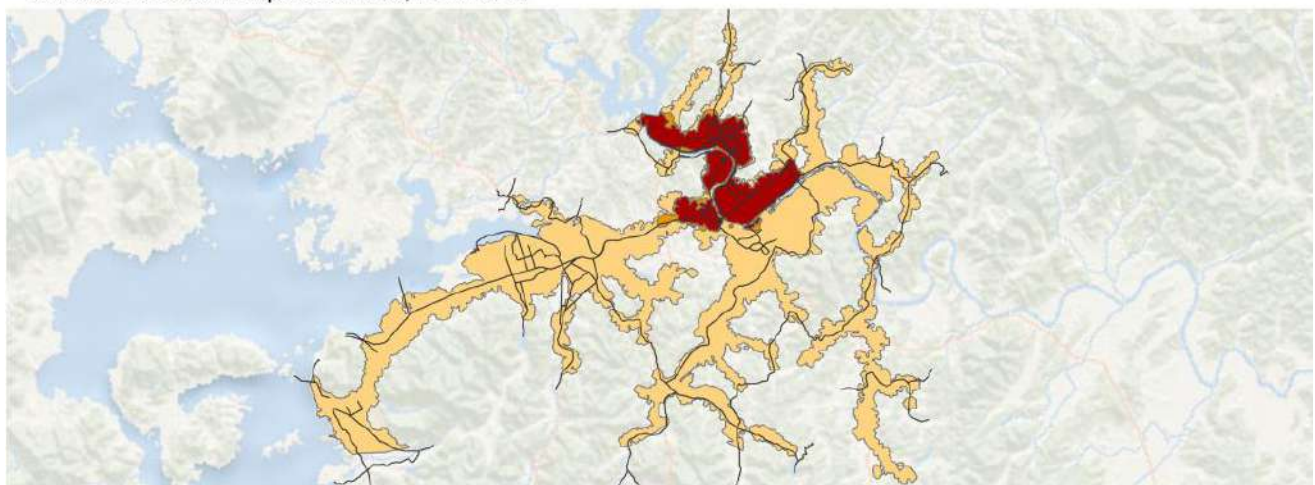
Jinju, Korea Rep. (East Asia and the Pacific)



Selected Locales in Area Developed Before 1988



Selected Locales in Expansion Area, 1988-2014



Jinju, Korea Rep.  
1988-2014



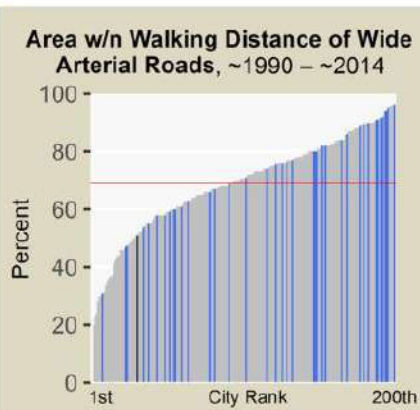
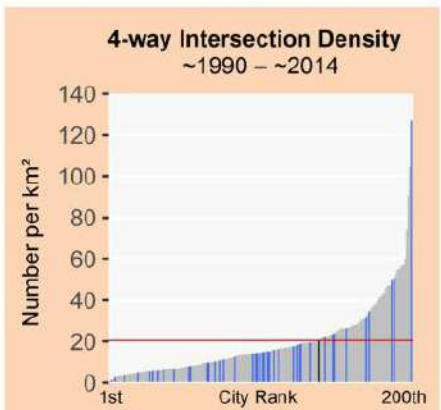
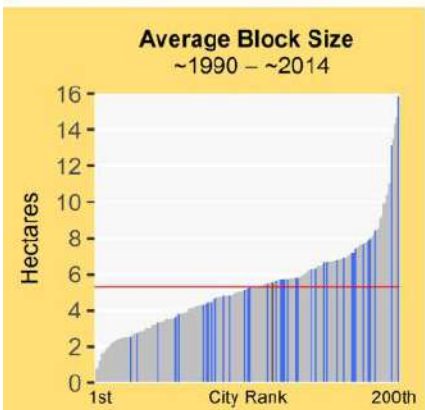
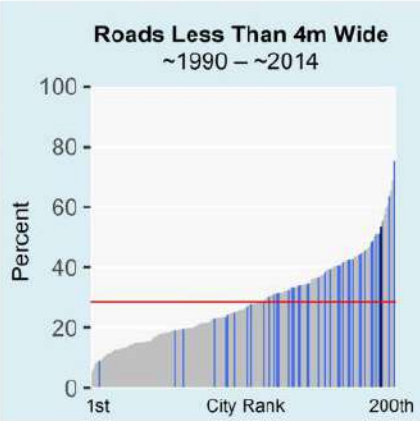
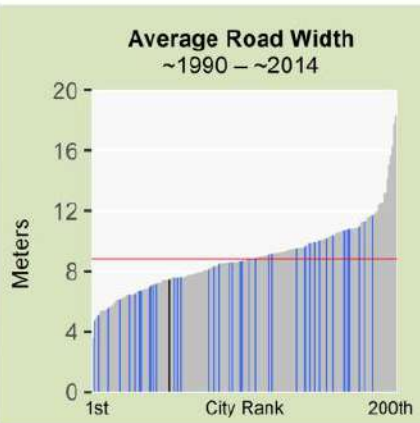
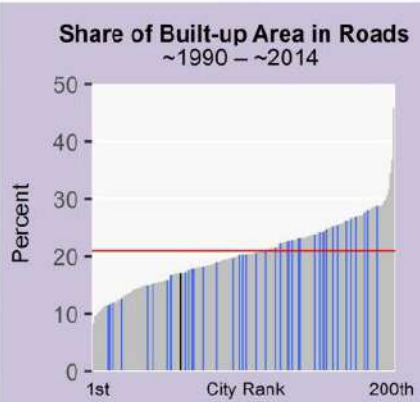
- Urban Extent in 1988
- Expansion, 1988 - 2000
- Expansion, 2000 - 2014

Arterial Roads

# Jinju, Korea Rep. (East Asia and the Pacific)



Legend for Charts		
	Jinju	Other cities in region   All other cities   Global average
Metrics		
	Pre-1988	1988-2014
Roads		
Share of Built-Up Area Occupied by Roads	24%	17%
Share of Built-Up Area that is Gridded or Partially Gridded	17%	0%
Average Road Width (m)	7.5	4.8
Share of Roads less than 4m Wide	30%	53%
Share of Roads more than 16m Wide	9%	1%
Arterial Roads		
Density of Arterial Roads (km/km <sup>2</sup> )	2.4	1.3
Average Beeline Distance to Arterial Roads (m)	172	404
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	97%	80%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	94%	51%
Block Size, Plot Size, Intersection Density, and Walkability		
Share of Intersections that are 4-way	20%	14%
Average Block Size (ha)	2.4	5.5
3-way Intersection Density (number per km <sup>2</sup> )	159	108
4-way Intersection Density (number per km <sup>2</sup> )	41	21
Walkability Ratio	1.4	1.6
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		
Stages in the Evolution of Residential Layouts		
Share of Built-Up Area in Residential Use	58%	30%
Share of Residential Area Not Laid Out Before Occupation	19%	76%
Share of Residential Area Laid Out Before Occupation	80%	23%
Share of Residential Area in Informal Land Subdivisions	0%	0%
Share of Residential Area in Formal Land Subdivisions	55%	3%
Share of Residential Area in Housing Projects	24%	19%



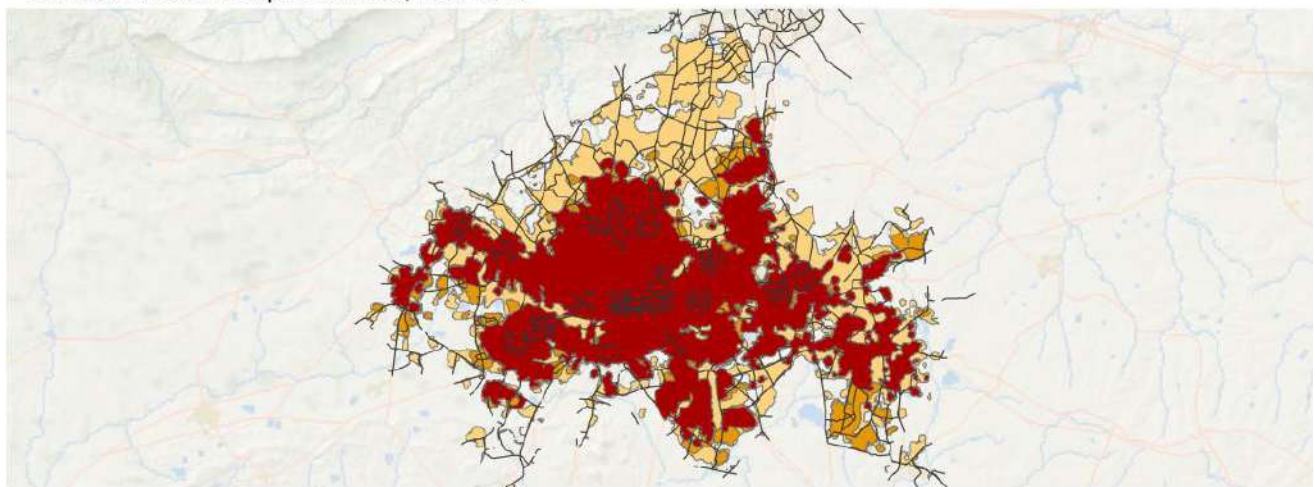
# Johannesburg, South Africa (Sub-Saharan Africa)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013



Johannesburg, South Africa  
1990-2013


0 10 20 30 40 km

N

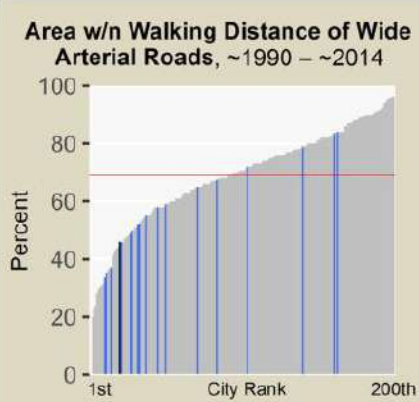
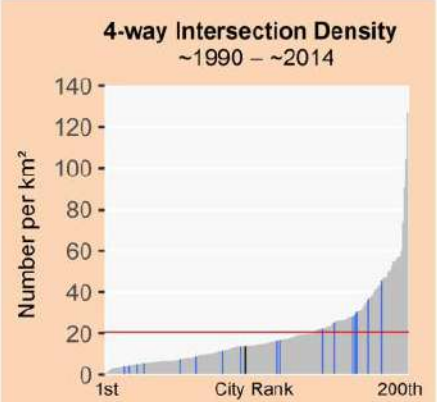
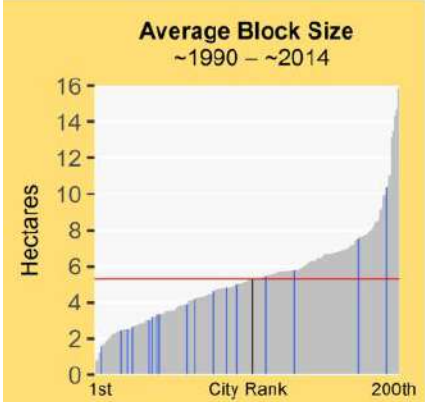
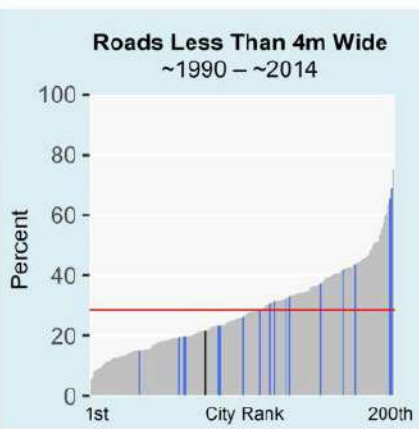
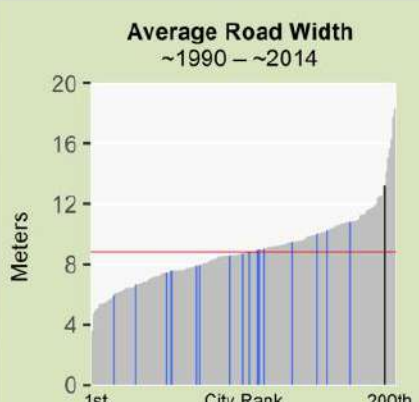
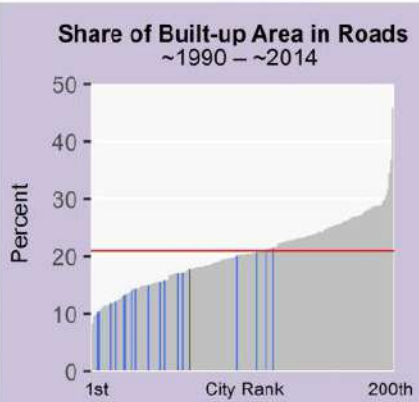
- Urban Extent in 1990
- Expansion, 1990 - 1998
- Expansion, 1998 - 2013
- Arterial Roads



# Johannesburg, South Africa (Sub-Saharan Africa)



Legend for Charts			
	Johannesburg	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1990	1990-2013	
Roads			
Share of Built-Up Area Occupied by Roads	24%	17%	
Share of Built-Up Area that is Gridded or Partially Gridded	25%	2%	
Average Road Width (m)	13.2	7.4	
Share of Roads less than 4m Wide	6%	21%	
Share of Roads more than 16m Wide	31%	7%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	1.5	0.5	
Average Beeline Distance to Arterial Roads (m)	238	835	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	93%	49%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	93%	46%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	23%	10%	
Average Block Size (ha)	7.6	5.3	
3-way Intersection Density (number per km <sup>2</sup> )	48	109	
4-way Intersection Density (number per km <sup>2</sup> )	18	14	
Walkability Ratio	1.6	2.2	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	230	290	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	965	509	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	84%	82%	
Share of Residential Area Not Laid Out Before Occupation	0%	13%	
Share of Residential Area Laid Out Before Occupation	92%	86%	
Share of Residential Area in Informal Land Subdivisions	4%	45%	
Share of Residential Area in Formal Land Subdivisions	87%	38%	
Share of Residential Area in Housing Projects	7%	1%	



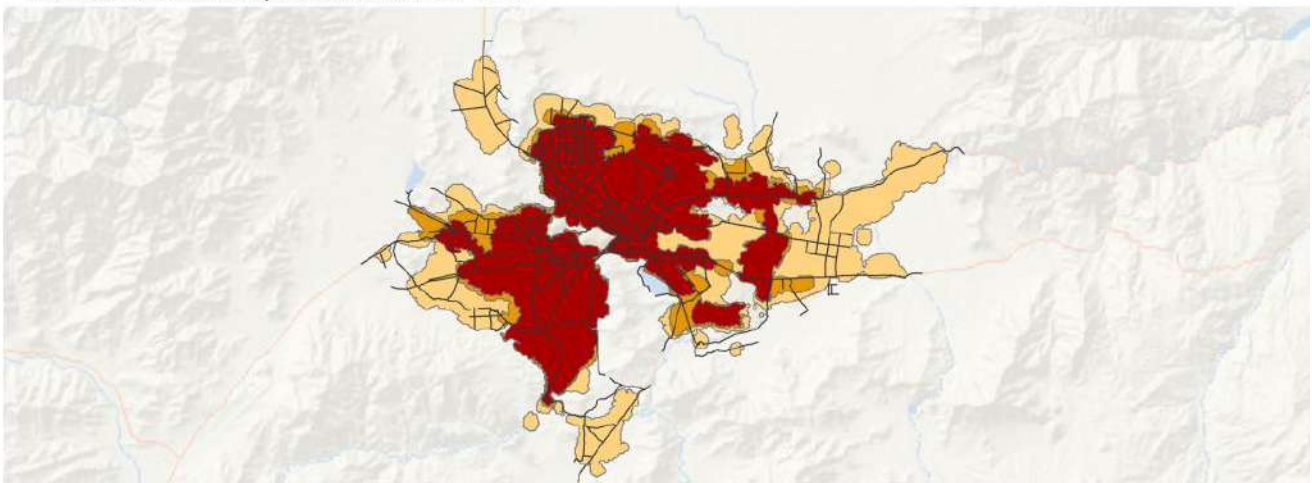
# Kabul, Afghanistan (South and Central Asia)



Selected Locales in Area Developed Before 1987



Selected Locales in Expansion Area, 1987-2014



**Kabul, Afghanistan**  
1987-2014

0 5 10 15 20 km

N

- Urban Extent in 1987
- Expansion, 1987 - 2000
- Expansion, 2000 - 2014
- Arterial Roads

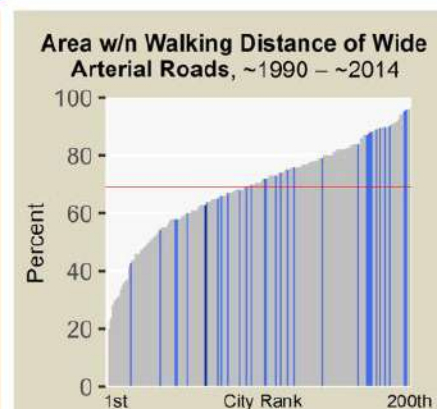
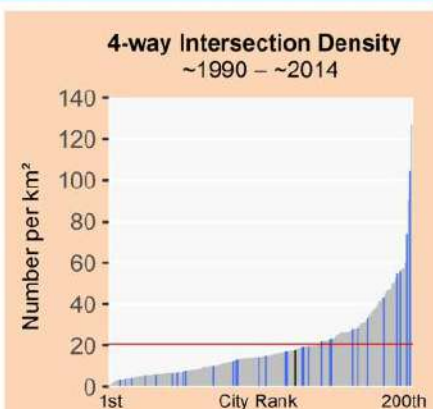
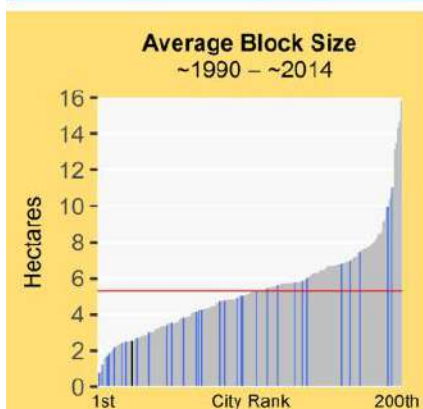
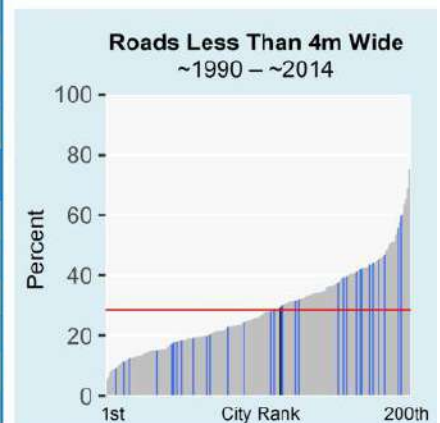
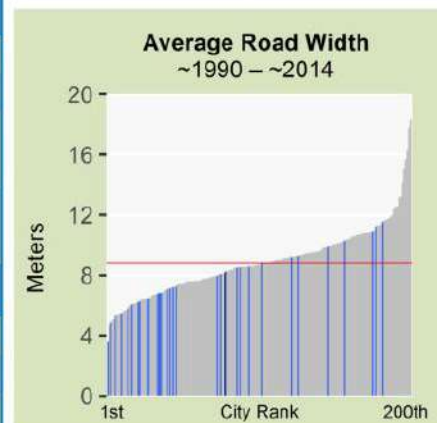
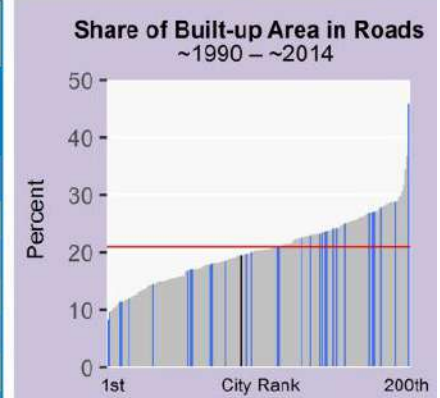
# Kabul, Afghanistan (South and Central Asia)



### Legend for Charts

Kabul | Other cities in region | All other cities | Global average

Metrics	Pre-1987	1987-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	17%	19%
Share of Built-Up Area that is Gridded or Partially Gridded	7%	5%
Average Road Width (m)	8.2	6.3
Share of Roads less than 4m Wide	34%	29%
Share of Roads more than 16m Wide	9%	3%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.6	1.2
Average Beeline Distance to Arterial Roads (m)	301	346
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	85%	82%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	68%	63%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	10%	9%
Average Block Size (ha)	3.1	2.5
3-way Intersection Density (number per km <sup>2</sup> )	108	172
4-way Intersection Density (number per km <sup>2</sup> )	12	18
Walkability Ratio	1.7	1.9
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	548	339
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	366	
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	73%	75%
Share of Residential Area Not Laid Out Before Occupation	32%	17%
Share of Residential Area Laid Out Before Occupation	67%	82%
Share of Residential Area in Informal Land Subdivisions	52%	82%
Share of Residential Area in Formal Land Subdivisions	11%	0%
Share of Residential Area in Housing Projects	3%	0%



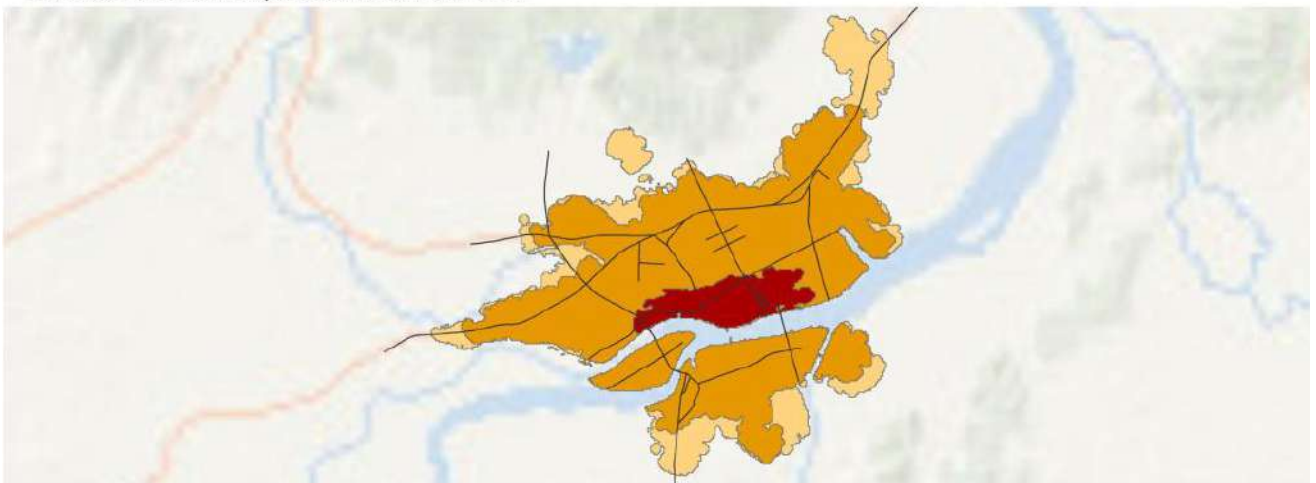
# Kaiping, Guangdong, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



## Kaiping, Guangdong, China 1990-2014



- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2014

Arterial Roads

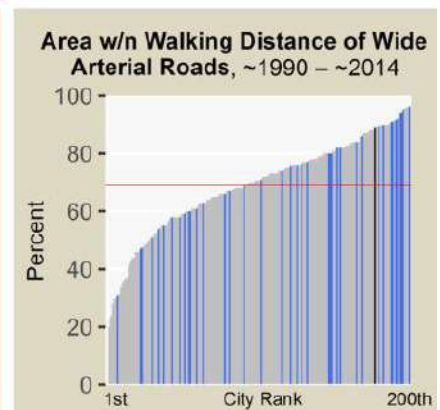
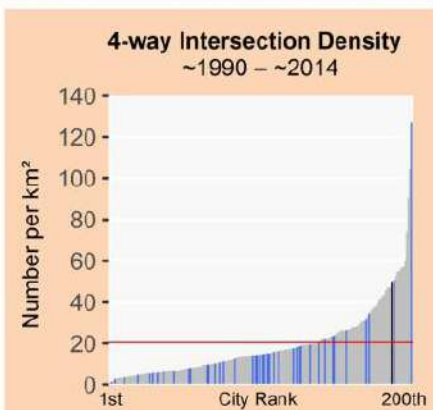
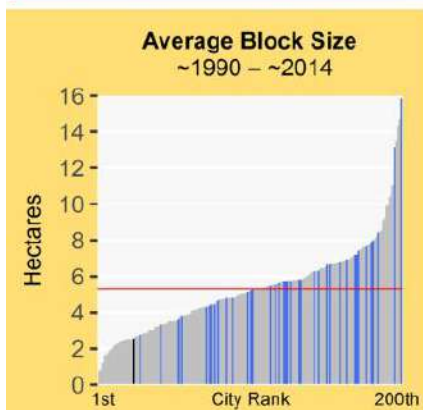
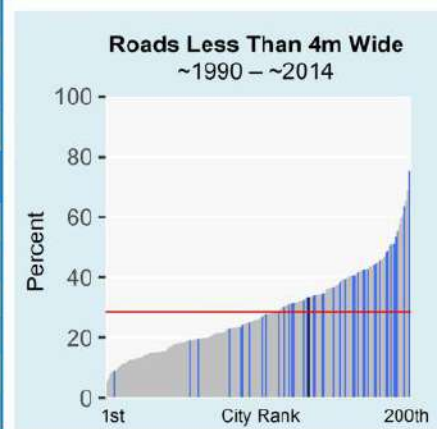
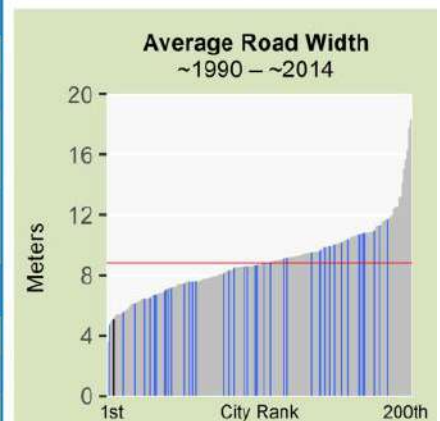
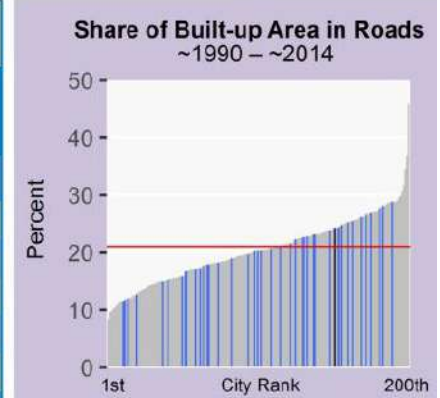
# Kaiping, Guangdong, China (East Asia and the Pacific)



### Legend for Charts

Kaiping | Other cities in region | All other cities | Global average

Metrics	Pre-1990	1990-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	18%	24%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	5.1	8.4
Share of Roads less than 4m Wide	52%	33%
Share of Roads more than 16m Wide	5%	12%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.0	1.4
Average Beeline Distance to Arterial Roads (m)	161	235
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	100%	92%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	100%	89%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	16%	8%
Average Block Size (ha)	1.0	2.5
3-way Intersection Density (number per km <sup>2</sup> )	311	267
4-way Intersection Density (number per km <sup>2</sup> )	84	49
Walkability Ratio	1.5	1.6
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	82%	48%
Share of Residential Area Not Laid Out Before Occupation	6%	9%
Share of Residential Area Laid Out Before Occupation	93%	90%
Share of Residential Area in Informal Land Subdivisions	31%	56%
Share of Residential Area in Formal Land Subdivisions	49%	10%
Share of Residential Area in Housing Projects	12%	22%



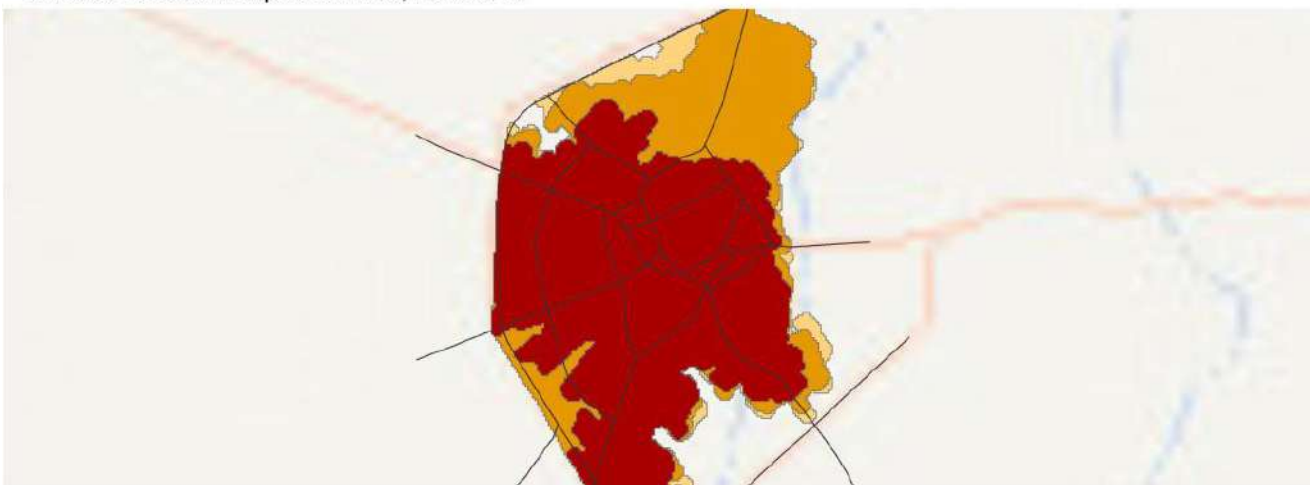
# Kairouan, Tunisia (Western Asia and North Africa)



Selected Locales in Area Developed Before 1992



Selected Locales in Expansion Area, 1992-2010



**Kairouan, Tunisia**  
1992-2010

0 1 2 3 4 km

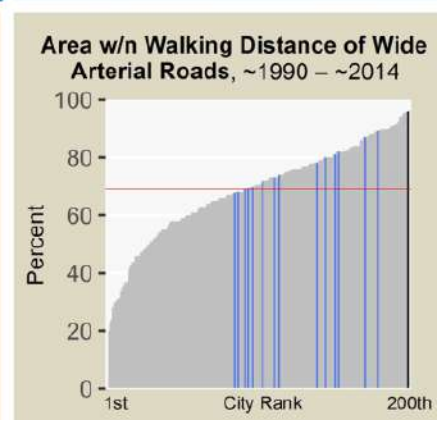
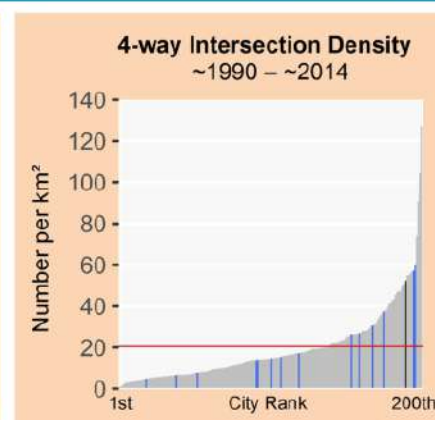
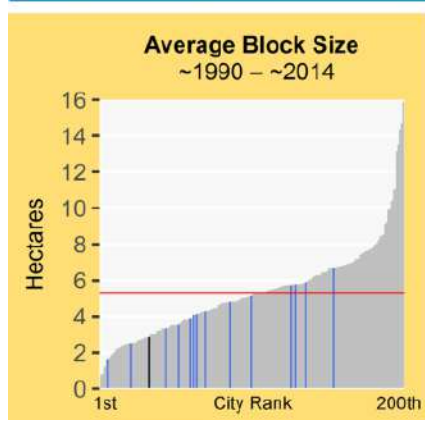
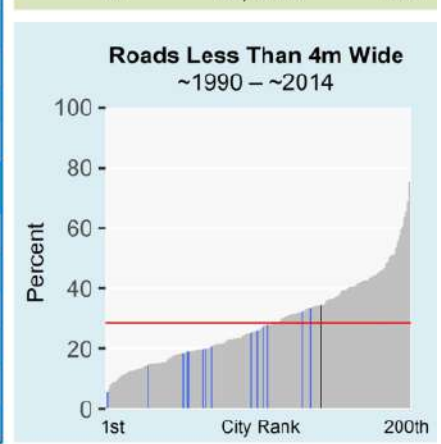
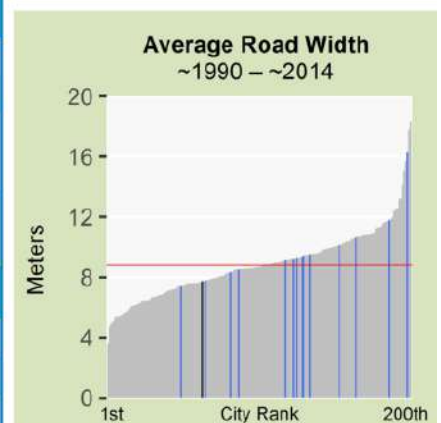
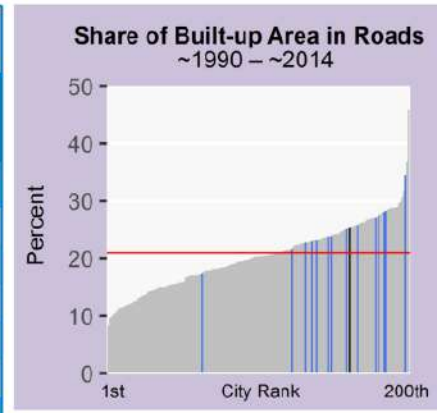
N

- Urban Extent in 1992
- Expansion, 1992 - 2000
- Expansion, 2000 - 2010
- Arterial Roads

# Kairouan, Tunisia (Western Asia and North Africa)



Legend for Charts			
	Kairouan	Other cities in region	All other cities
			Global average —
Metrics			
	Pre-1992	1992-2010	
Roads			
Share of Built-Up Area Occupied by Roads	26%	25%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%	
Average Road Width (m)	7.7	5.8	
Share of Roads less than 4m Wide	13%	34%	
Share of Roads more than 16m Wide	8%	3%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	2.3	1.9	
Average Beeline Distance to Arterial Roads (m)	156	196	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	98%	96%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	98%	96%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	11%	9%	
Average Block Size (ha)	1.7	2.9	
3-way Intersection Density (number per km <sup>2</sup> )	305	348	
4-way Intersection Density (number per km <sup>2</sup> )	44	52	
Walkability Ratio	1.5	1.7	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	422	168	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	79%	61%	
Share of Residential Area Not Laid Out Before Occupation	6%	17%	
Share of Residential Area Laid Out Before Occupation	93%	82%	
Share of Residential Area in Informal Land Subdivisions	21%	35%	
Share of Residential Area in Formal Land Subdivisions	68%	47%	
Share of Residential Area in Housing Projects	3%	0%	



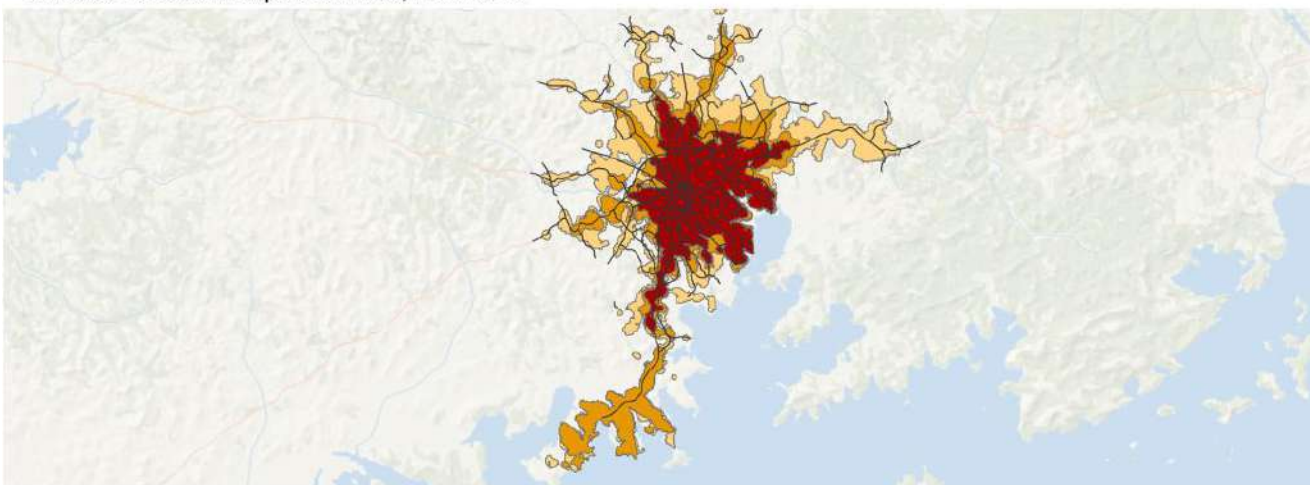
# Kampala, Uganda (Sub-Saharan Africa)



Selected Locales in Area Developed Before 1988



Selected Locales in Expansion Area, 1988-2015



**Kampala, Uganda**  
1988-2015

0 9 18 27 36 km

N

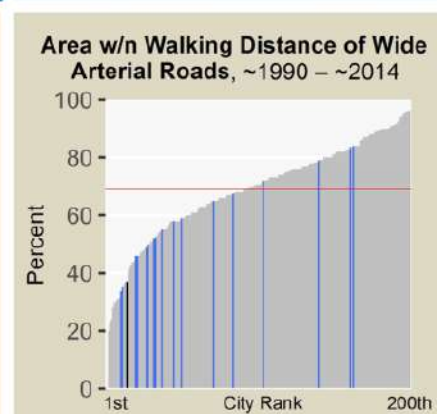
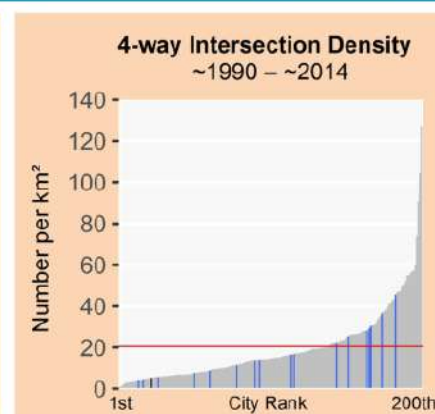
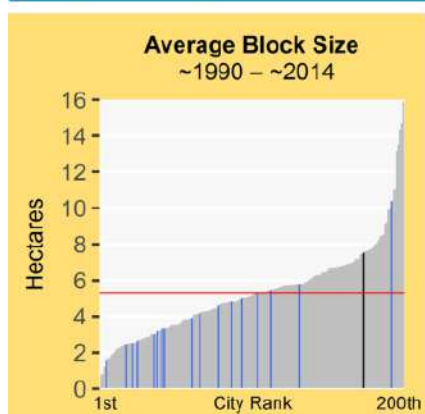
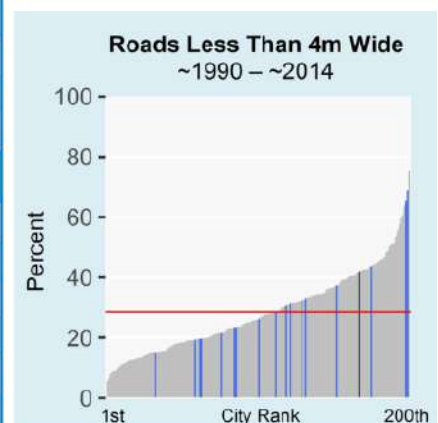
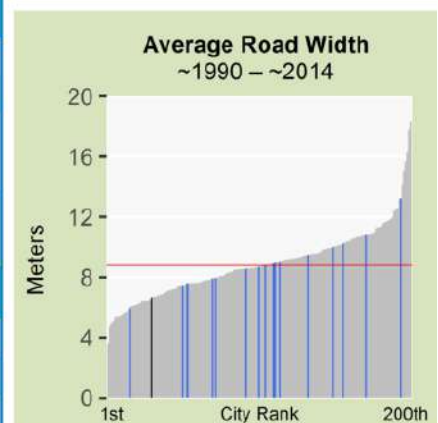
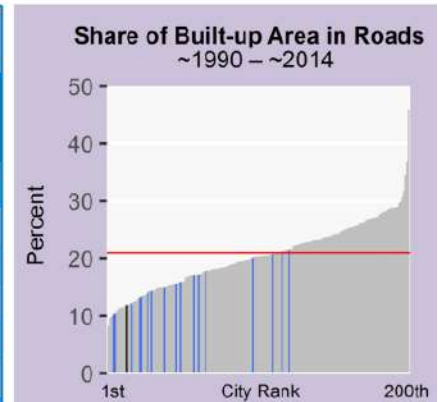
- Urban Extent in 1988
- Expansion, 1988 - 2003
- Expansion, 2003 - 2015
- Arterial Roads



# Kampala, Uganda (Sub-Saharan Africa)



Legend for Charts			
	Kampala	Other cities in region	All other cities
<b>Global average</b> —			
Metrics	Pre-1988	1988-2015	
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	12%	11%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%	
Average Road Width (m)	6.7	4.5	
Share of Roads less than 4m Wide	20%	41%	
Share of Roads more than 16m Wide	3%	0%	
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	2.1	1.1	
Average Beeline Distance to Arterial Roads (m)	157	346	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	98%	83%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	58%	37%	
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	6%	3%	
Average Block Size (ha)	6.0	7.5	
3-way Intersection Density (number per km <sup>2</sup> )	74	105	
4-way Intersection Density (number per km <sup>2</sup> )	6	5	
Walkability Ratio	1.8	1.6	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )			
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	71%	68%	
Share of Residential Area Not Laid Out Before Occupation	48%	67%	
Share of Residential Area Laid Out Before Occupation	51%	32%	
Share of Residential Area in Informal Land Subdivisions	47%	32%	
Share of Residential Area in Formal Land Subdivisions	1%	0%	
Share of Residential Area in Housing Projects	2%	0%	



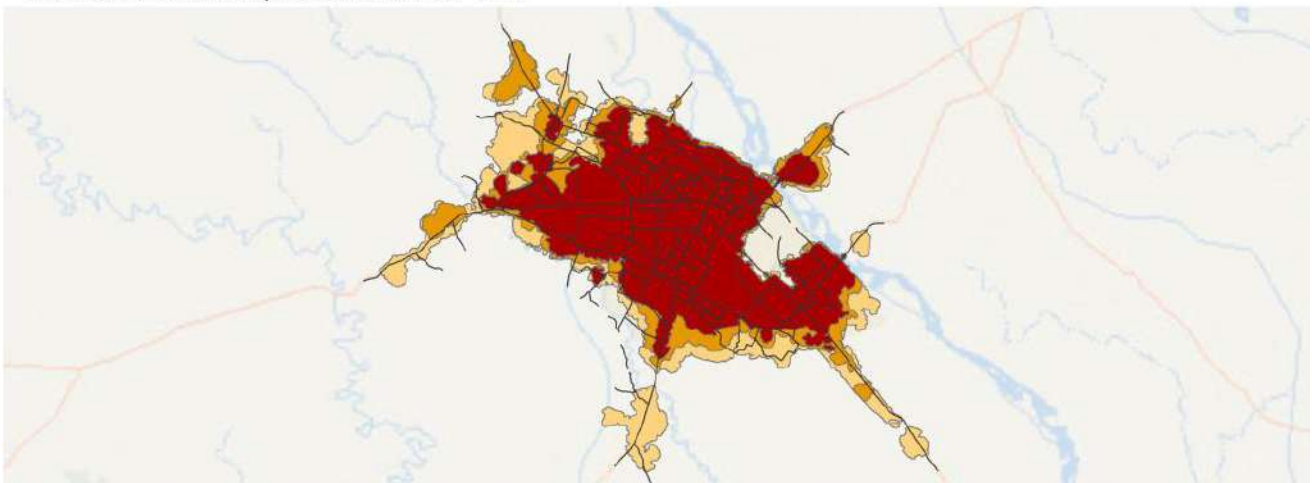
# Kanpur, India (South and Central Asia)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2014



**Kanpur, India**  
1991-2014

0 5 10 15 20 km

N

- Urban Extent in 1991
- Expansion, 1991 - 1999
- Expansion, 1999 - 2014
- Arterial Roads

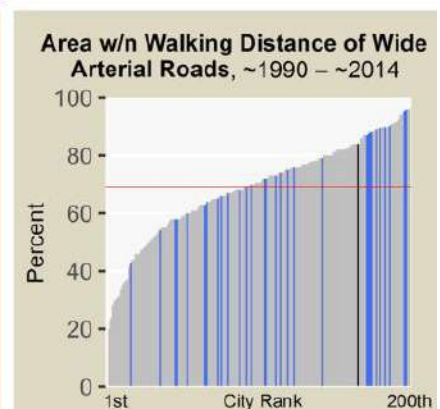
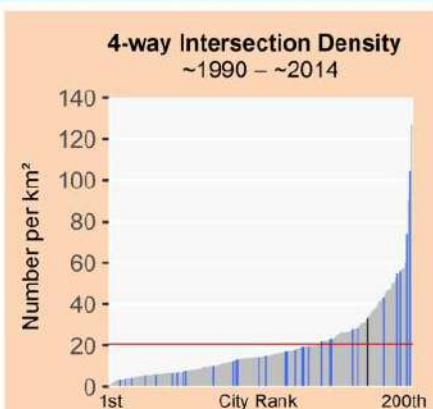
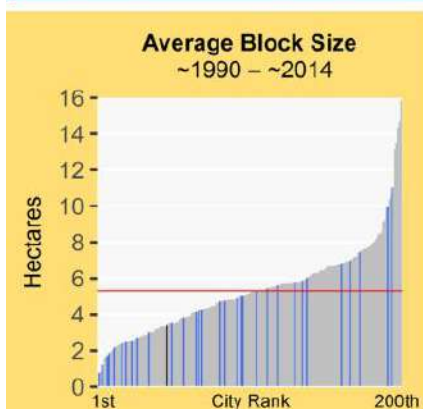
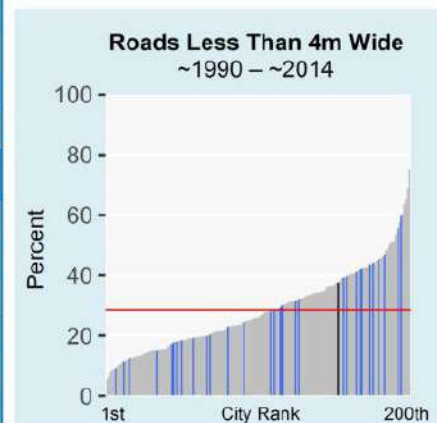
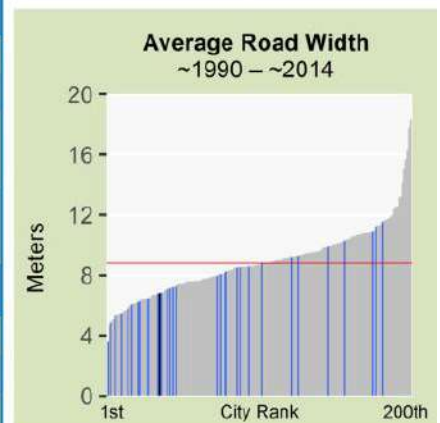
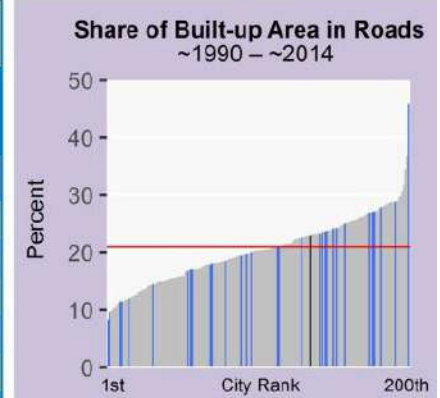
# Kanpur, India (South and Central Asia)



### Legend for Charts

Kanpur | Other cities in region | All other cities | Global average

Metrics	Pre-1991	1991-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	19%	22%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	2%
Average Road Width (m)	6.8	5.7
Share of Roads less than 4m Wide	23%	37%
Share of Roads more than 16m Wide	5%	4%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.8	1.5
Average Beeline Distance to Arterial Roads (m)	187	261
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	97%	91%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	94%	84%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	8%	8%
Average Block Size (ha)	3.3	3.4
3-way Intersection Density (number per km <sup>2</sup> )	206	289
4-way Intersection Density (number per km <sup>2</sup> )	22	33
Walkability Ratio	1.6	1.6
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	158	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	262	169
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	73%	73%
Share of Residential Area Not Laid Out Before Occupation	19%	47%
Share of Residential Area Laid Out Before Occupation	80%	52%
Share of Residential Area in Informal Land Subdivisions	48%	46%
Share of Residential Area in Formal Land Subdivisions	21%	3%
Share of Residential Area in Housing Projects	10%	1%



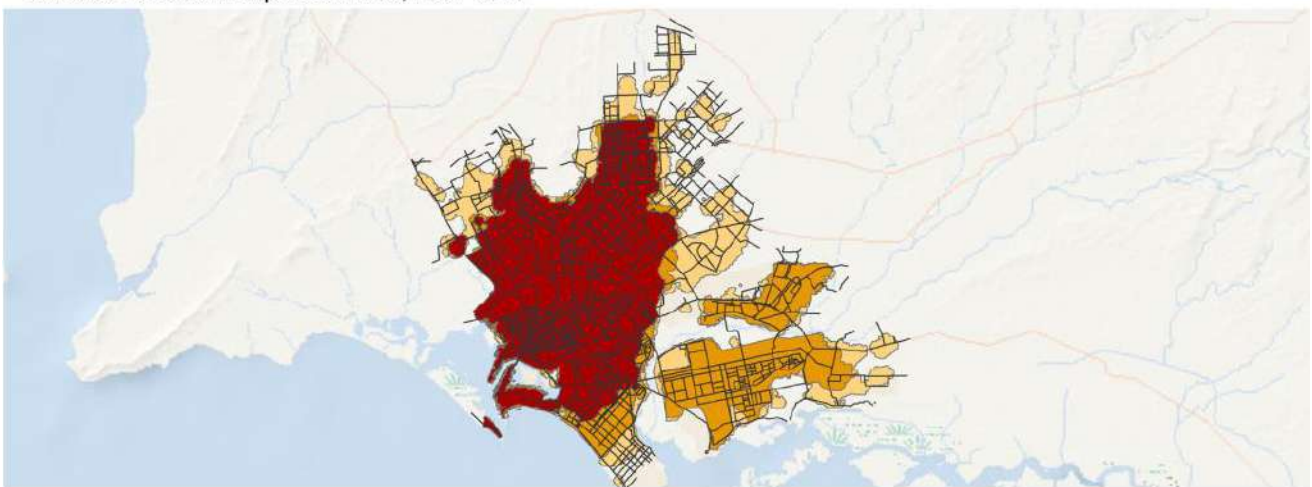
# Karachi, Pakistan (South and Central Asia)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2013



**Karachi, Pakistan**  
1991-2013

0 5 10 15 20 km

N

- Urban Extent in 1991
- Expansion, 1991 - 2000
- Expansion, 2000 - 2013
- Arterial Roads

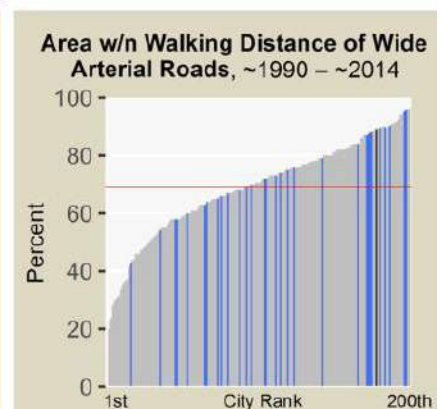
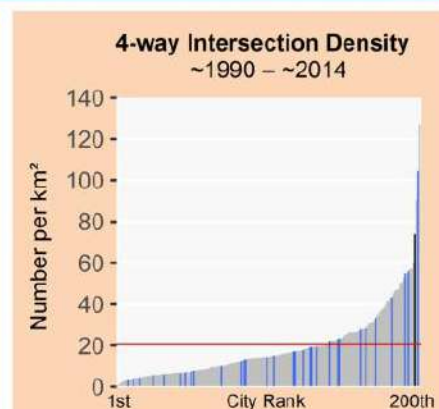
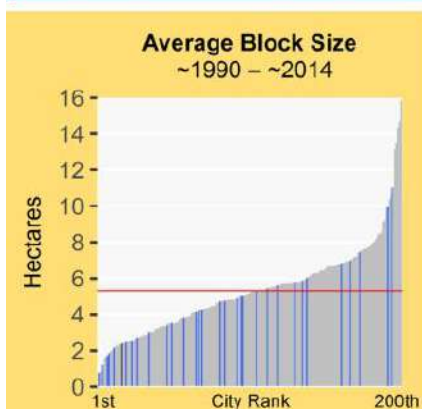
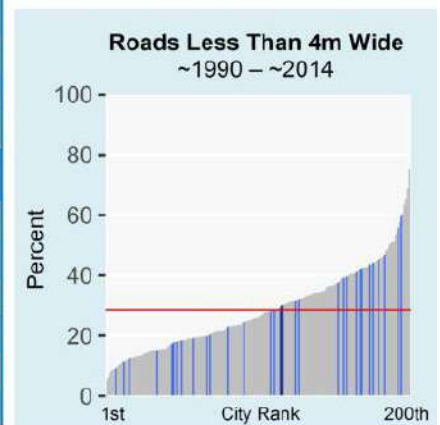
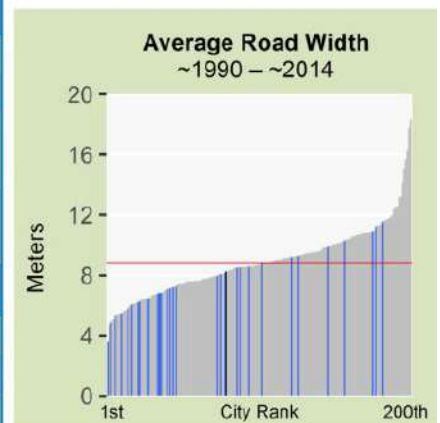
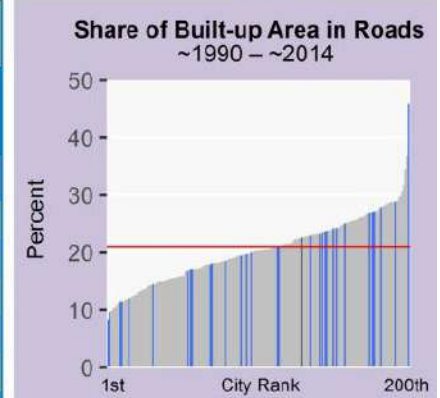
# Karachi, Pakistan (South and Central Asia)



### Legend for Charts

Karachi | Other cities in region | All other cities | Global average

Metrics	Pre-1991	1991-2013
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	21%	22%
Share of Built-Up Area that is Gridded or Partially Gridded	5%	12%
Average Road Width (m)	8.3	7.4
Share of Roads less than 4m Wide	29%	30%
Share of Roads more than 16m Wide	12%	8%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	3.1	2.6
Average Beeline Distance to Arterial Roads (m)	130	158
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	99%	98%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	94%	89%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	12%	21%
Average Block Size (ha)	3.2	2.4
3-way Intersection Density (number per km <sup>2</sup> )	220	226
4-way Intersection Density (number per km <sup>2</sup> )	50	74
Walkability Ratio	1.7	1.7
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	83	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	464	343
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	71%	70%
Share of Residential Area Not Laid Out Before Occupation	24%	27%
Share of Residential Area Laid Out Before Occupation	75%	72%
Share of Residential Area in Informal Land Subdivisions	26%	60%
Share of Residential Area in Formal Land Subdivisions	46%	6%
Share of Residential Area in Housing Projects	2%	4%



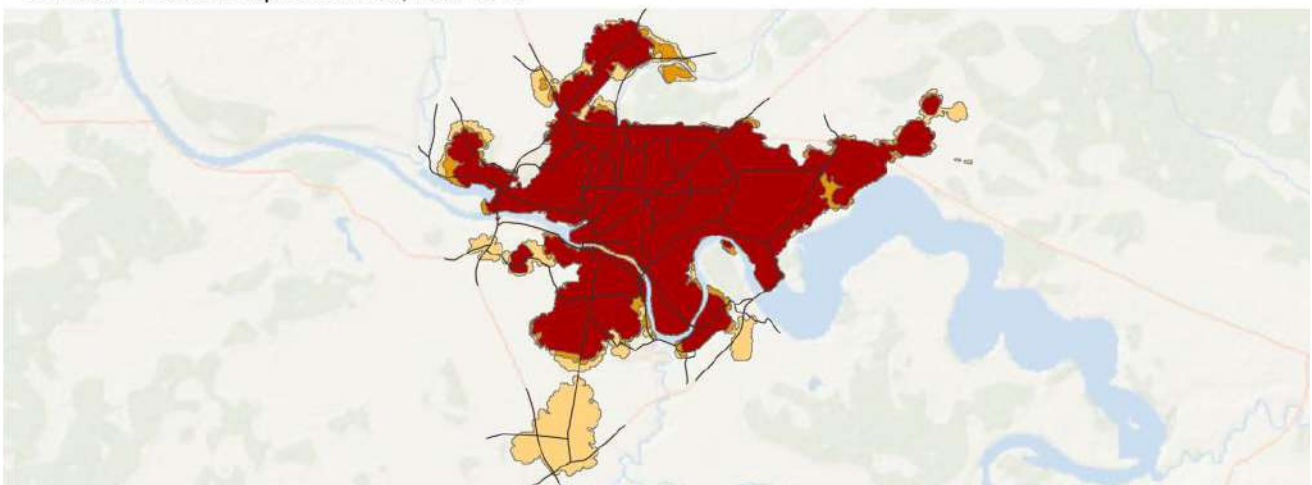
# Kaunas, Lithuania (Europe and Japan)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



**Kaunas, Lithuania**  
1990-2014

0 4 8 12 16 km

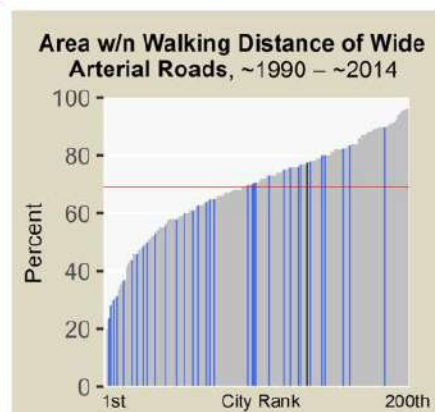
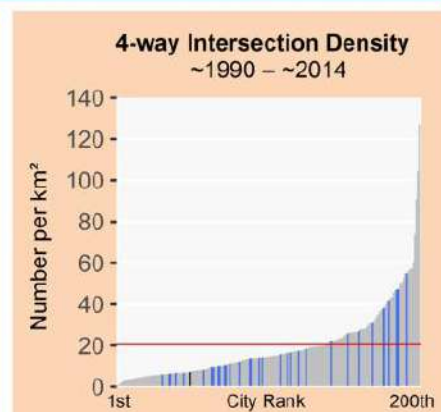
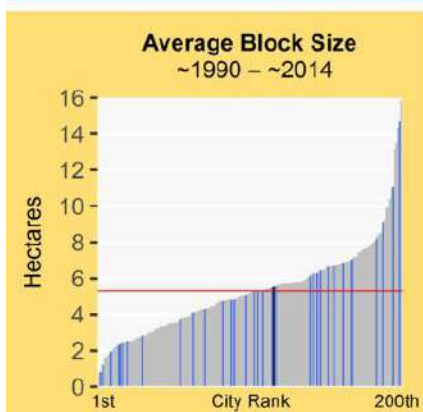
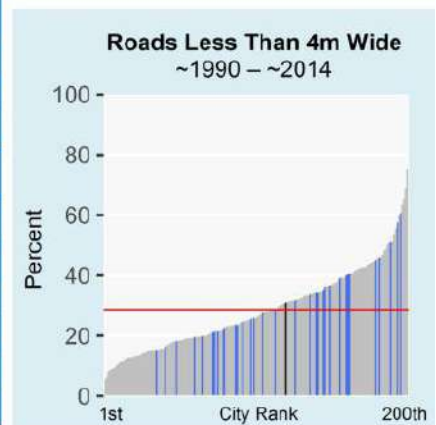
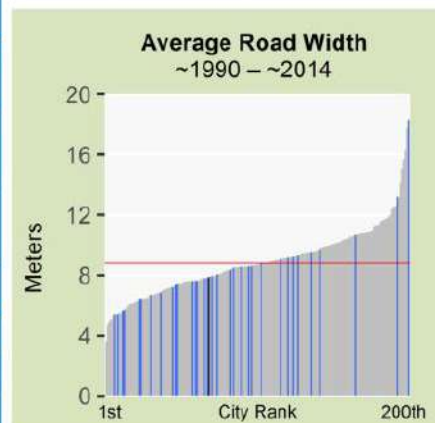
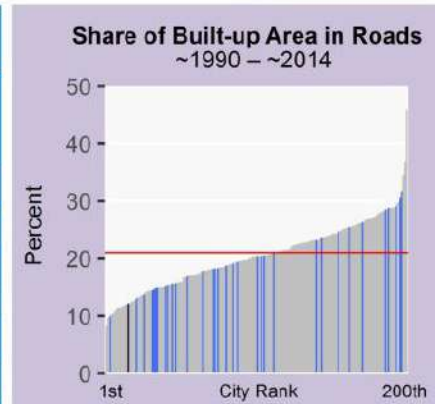
N

- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2014
- Arterial Roads

# Kaunas, Lithuania (Europe and Japan)



Legend for Charts			
	Kaunas	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1990	1990-2014	
Roads			
Share of Built-Up Area Occupied by Roads	17%	12%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%	
Average Road Width (m)	7.9	5.4	
Share of Roads less than 4m Wide	26%	31%	
Share of Roads more than 16m Wide	10%	1%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	1.3	1.2	
Average Beeline Distance to Arterial Roads (m)	275	281	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	90%	89%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	80%	77%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	13%	8%	
Average Block Size (ha)	4.9	5.5	
3-way Intersection Density (number per km <sup>2</sup> )	90	80	
4-way Intersection Density (number per km <sup>2</sup> )	17	7	
Walkability Ratio	2.0	1.5	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	1567	990	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	741	784	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	61%	73%	
Share of Residential Area Not Laid Out Before Occupation	25%	24%	
Share of Residential Area Laid Out Before Occupation	74%	75%	
Share of Residential Area in Informal Land Subdivisions	17%	27%	
Share of Residential Area in Formal Land Subdivisions	40%	38%	
Share of Residential Area in Housing Projects	16%	9%	



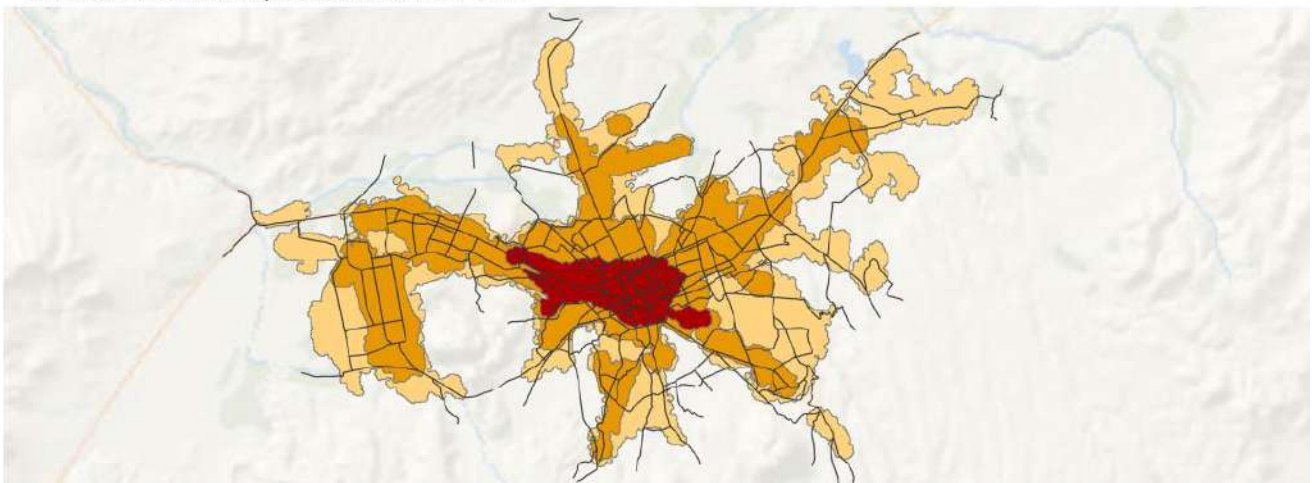
# Kayseri, Turkey (Western Asia and North Africa)



Selected Locales in Area Developed Before 1987



Selected Locales in Expansion Area, 1987-2013



**Kayseri, Turkey**  
1987-2013

0 4 8 12 16 km

N

- Urban Extent in 1987
- Expansion, 1987 - 2000
- Expansion, 2000 - 2013
- Arterial Roads



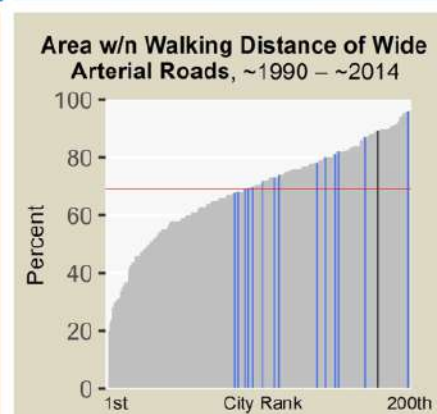
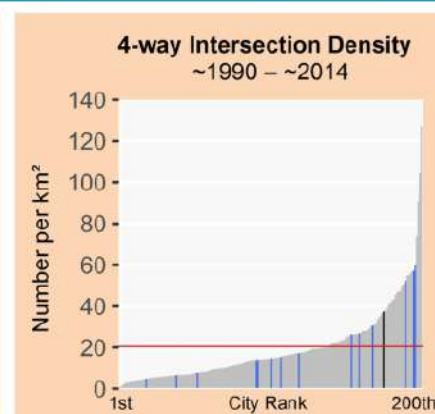
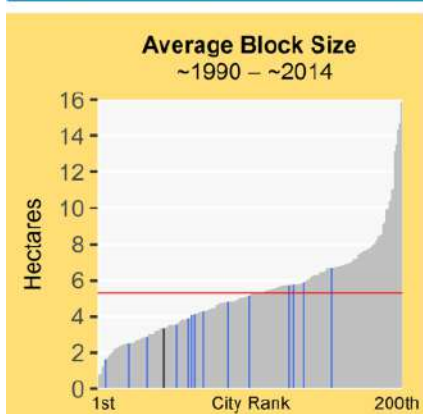
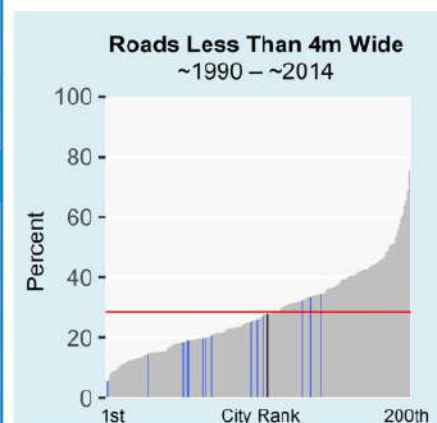
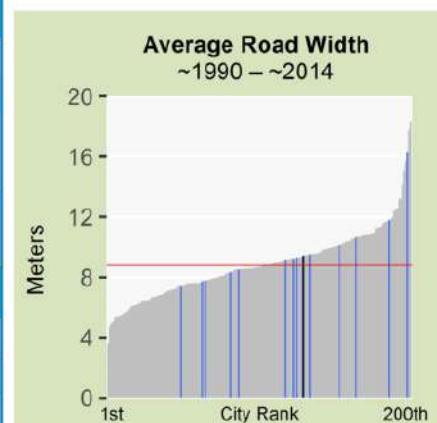
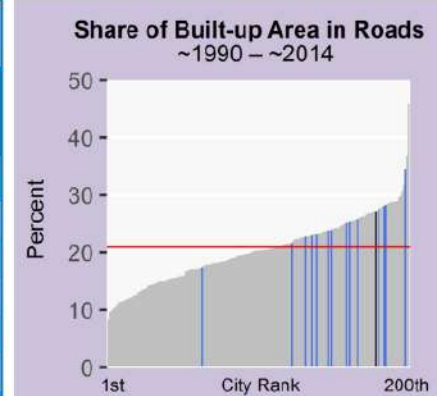
# Kayseri, Turkey (Western Asia and North Africa)



### Legend for Charts

Kayseri | Other cities in region | All other cities | Global average

Metrics	Pre-1987	1987-2013
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	31%	27%
Share of Built-Up Area that is Gridded or Partially Gridded	5%	0%
Average Road Width (m)	9.4	9.1
Share of Roads less than 4m Wide	16%	27%
Share of Roads more than 16m Wide	12%	17%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.9	1.8
Average Beeline Distance to Arterial Roads (m)	125	218
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	99%	92%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	99%	89%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	14%	12%
Average Block Size (ha)	1.7	3.3
3-way Intersection Density (number per km <sup>2</sup> )	205	201
4-way Intersection Density (number per km <sup>2</sup> )	26	37
Walkability Ratio	1.6	1.6
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	561	275
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	48%	68%
Share of Residential Area Not Laid Out Before Occupation	9%	23%
Share of Residential Area Laid Out Before Occupation	90%	76%
Share of Residential Area in Informal Land Subdivisions	10%	18%
Share of Residential Area in Formal Land Subdivisions	76%	27%
Share of Residential Area in Housing Projects	3%	30%



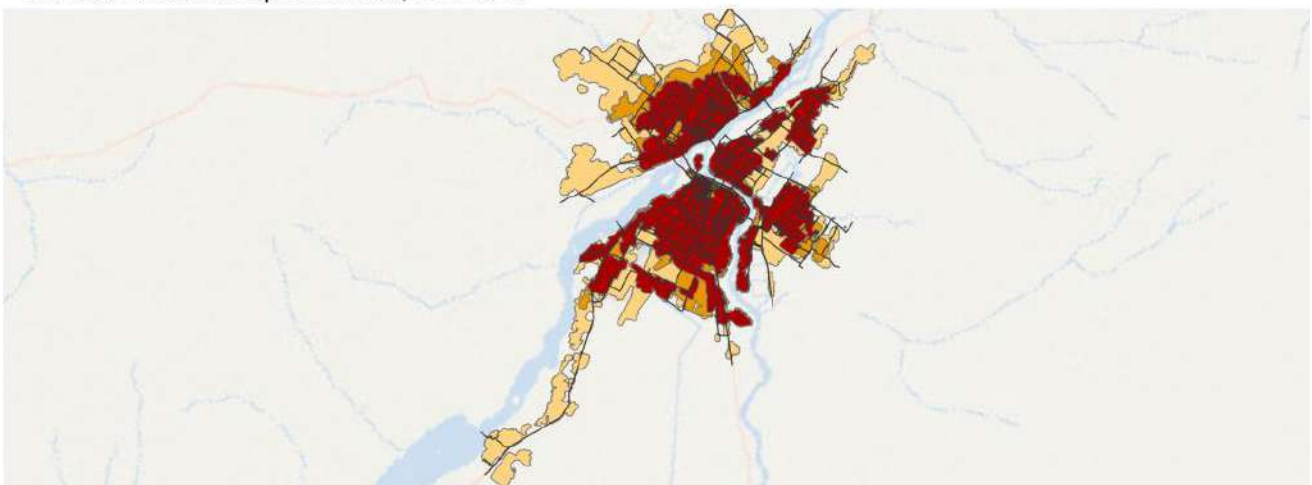
# Khartoum, Sudan (Western Asia and North Africa)



Selected Locales in Area Developed Before 1988



Selected Locales in Expansion Area, 1988-2014



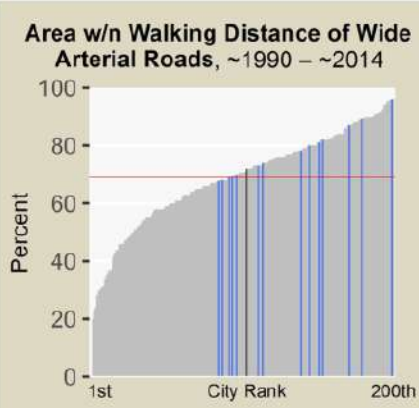
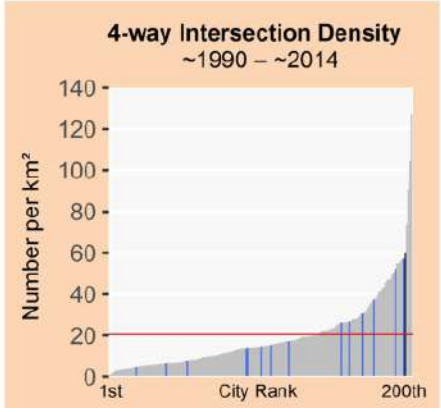
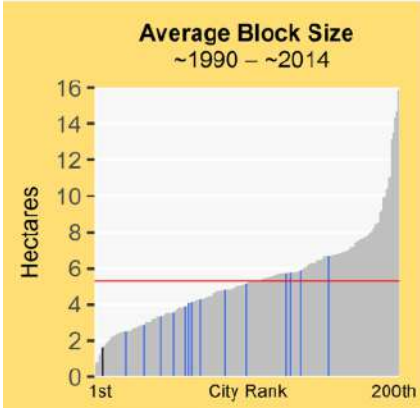
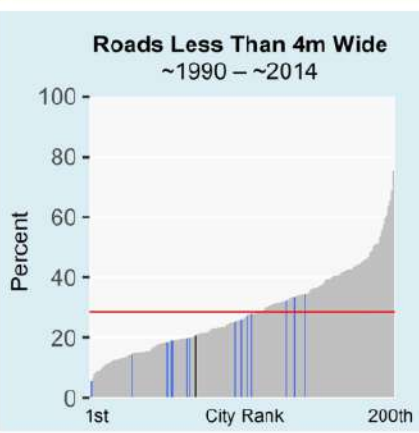
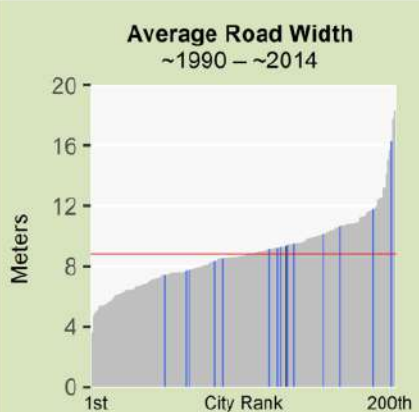
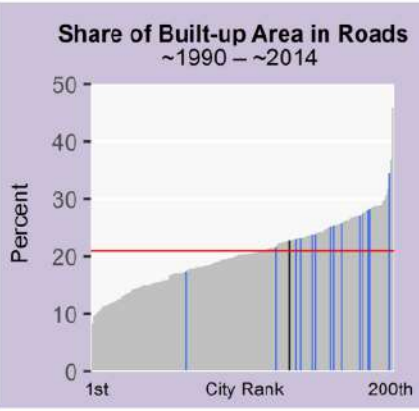
**Khartoum, Sudan**  
1988-2014

0 10 20 30 40 km

Urban Extent in 1988  
Expansion, 1988 - 2000  
Expansion, 2000 - 2014  
Arterial Roads

# Khartoum, Sudan (Western Asia and North Africa)

Legend for Charts		
	Khartoum	Other cities in region
	All other cities	Global average —
Metrics	Pre-1988	1988-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	23%	22%
Share of Built-Up Area that is Gridded or Partially Gridded		7%
Average Road Width (m)	9.3	7.3
Share of Roads less than 4m Wide	4%	20%
Share of Roads more than 16m Wide	8%	6%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.8	1.2
Average Beeline Distance to Arterial Roads (m)	281	516
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	89%	74%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	88%	72%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	20%	18%
Average Block Size (ha)	1.4	1.7
3-way Intersection Density (number per km <sup>2</sup> )	168	226
4-way Intersection Density (number per km <sup>2</sup> )	51	60
Walkability Ratio	1.5	1.5
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	534	345
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	74%	86%
Share of Residential Area Not Laid Out Before Occupation	3%	5%
Share of Residential Area Laid Out Before Occupation	96%	94%
Share of Residential Area in Informal Land Subdivisions	87%	94%
Share of Residential Area in Formal Land Subdivisions	5%	0%
Share of Residential Area in Housing Projects	4%	0%



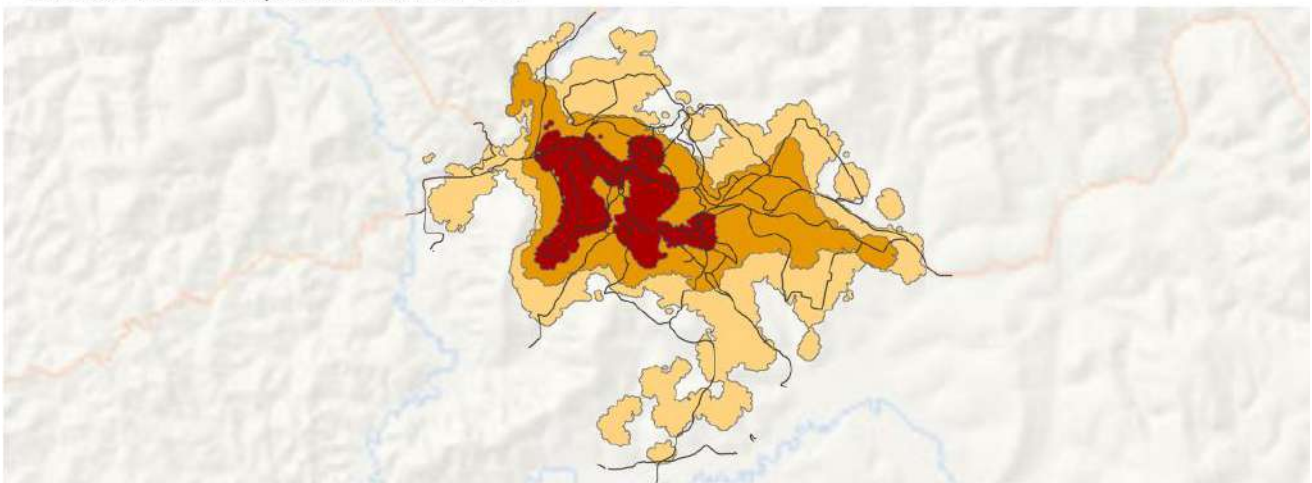
# Kigali, Rwanda (Sub-Saharan Africa)



Selected Locales in Area Developed Before 1987



Selected Locales in Expansion Area, 1987-2014



**Kigali, Rwanda**  
1987-2014

0 4 8 12 16 km

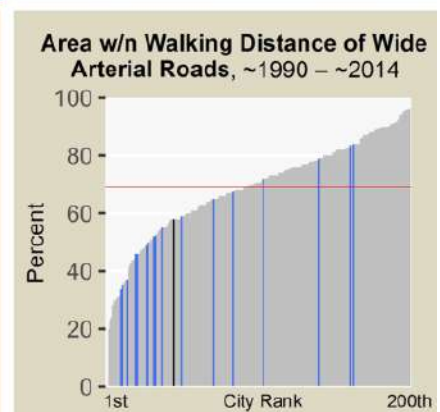
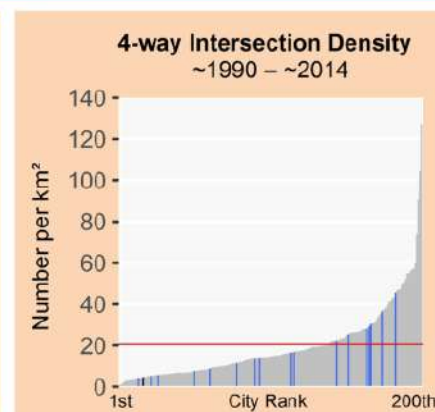
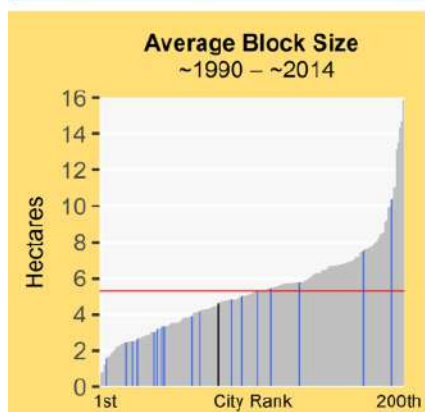
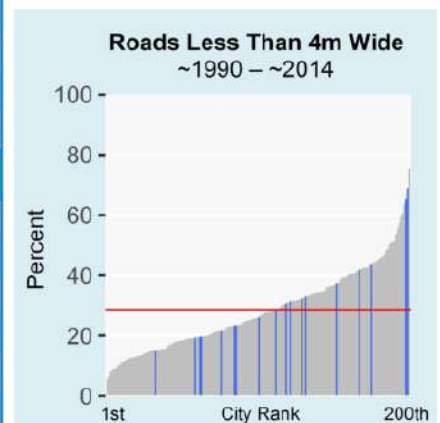
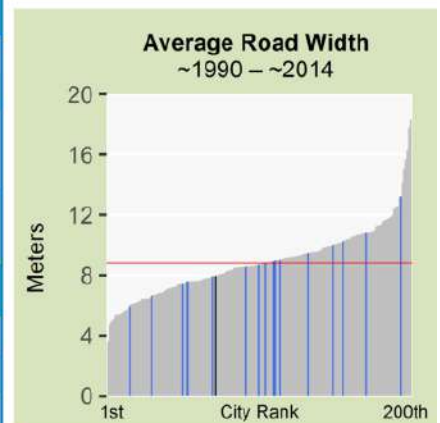
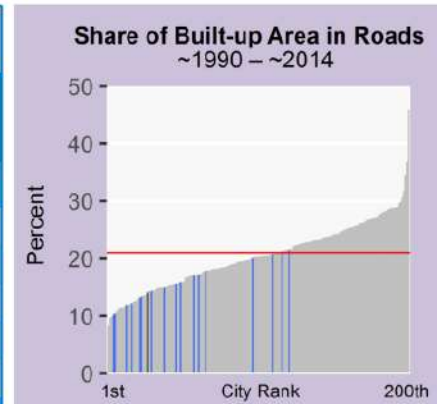
N

- Urban Extent in 1987
- Expansion, 1987 - 1999
- Expansion, 1999 - 2014
- Arterial Roads

# Kigali, Rwanda (Sub-Saharan Africa)



Legend for Charts				
	Kigali	Other cities in region	All other cities	Global average
<b>Roads</b>				
Share of Built-Up Area Occupied by Roads	17%			14%
Share of Built-Up Area that is Gridded or Partially Gridded	0%			0%
Average Road Width (m)	7.9			5.5
Share of Roads less than 4m Wide	18%			32%
Share of Roads more than 16m Wide	7%			1%
<b>Arterial Roads</b>				
Density of Arterial Roads (km/km <sup>2</sup> )	2.2			1.2
Average Beeline Distance to Arterial Roads (m)	179			318
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	95%			86%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	72%			57%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>				
Share of Intersections that are 4-way	6%			3%
Average Block Size (ha)	5.7			4.6
3-way Intersection Density (number per km <sup>2</sup> )	65			99
4-way Intersection Density (number per km <sup>2</sup> )	7			5
Walkability Ratio	2.3			1.7
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )				444
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )				
<b>Stages in the Evolution of Residential Layouts</b>				
Share of Built-Up Area in Residential Use	58%			78%
Share of Residential Area Not Laid Out Before Occupation	43%			69%
Share of Residential Area Laid Out Before Occupation	56%			30%
Share of Residential Area in Informal Land Subdivisions	34%			29%
Share of Residential Area in Formal Land Subdivisions	22%			0%
Share of Residential Area in Housing Projects	0%			0%



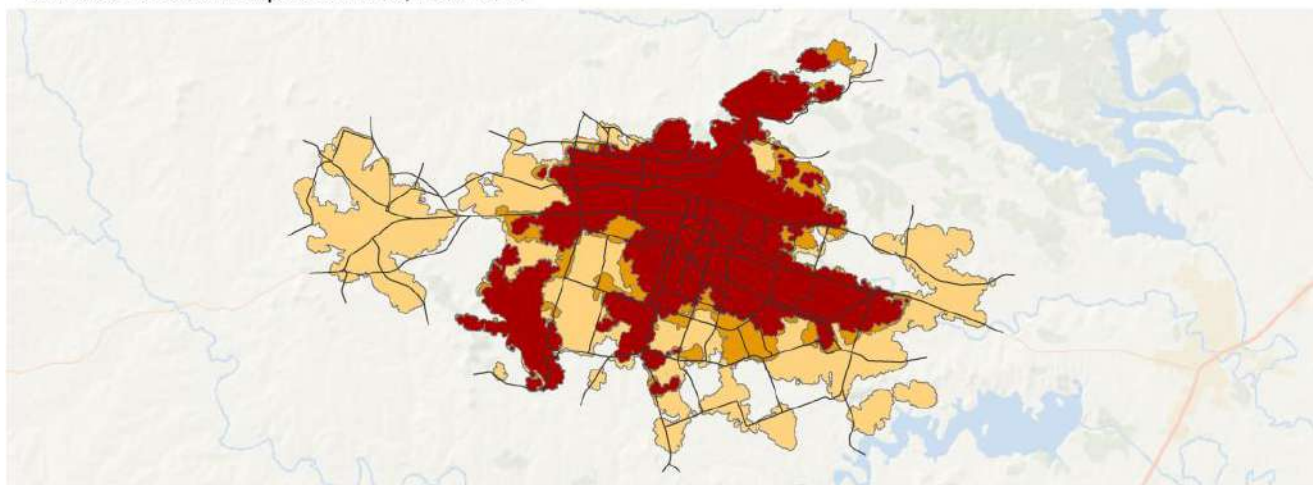
# Killeen, United States (Land-Rich Developed Countries)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013



**Killeen, United States**  
1990-2013

0 5 10 15 20 km

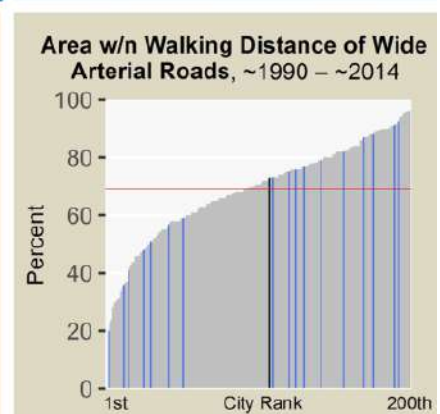
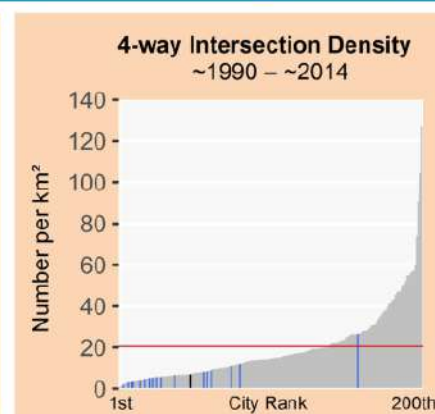
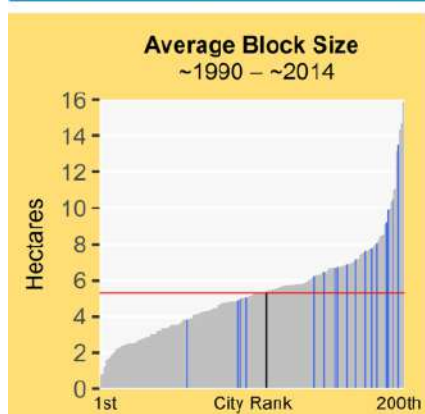
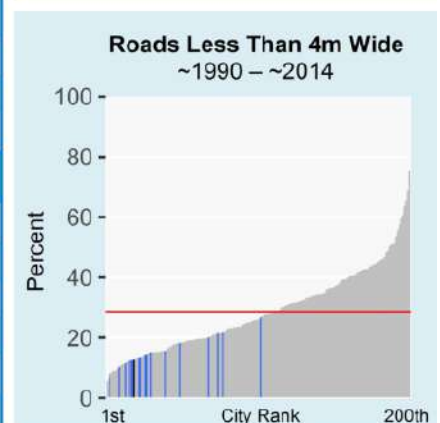
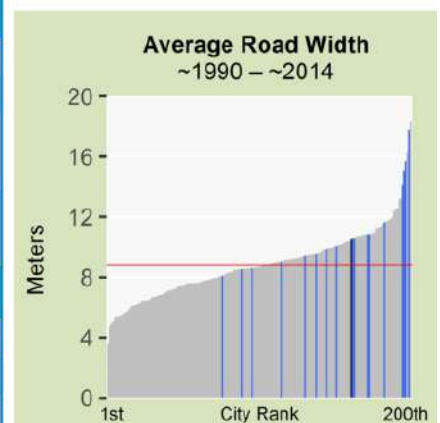
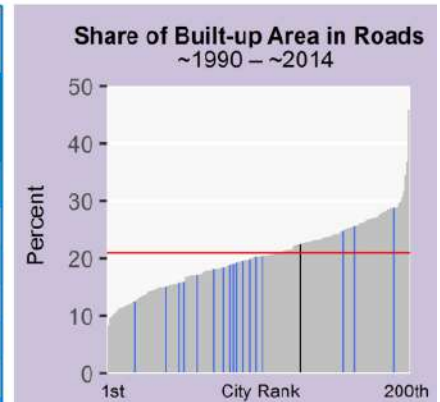
N

- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2013
- Arterial Roads

# Killeen, United States (Land-Rich Developed Countries)



Legend for Charts			
	Killeen	Other cities in region	All other cities
			Global average
Metrics	Pre-1990	1990-2013	
Roads			
Share of Built-Up Area Occupied by Roads	24%	22%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	2%	
Average Road Width (m)	10.6	18.8	
Share of Roads less than 4m Wide	11%	12%	
Share of Roads more than 16m Wide	23%	30%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	1.1	0.9	
Average Beeline Distance to Arterial Roads (m)	470	472	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	76%	74%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	74%	72%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	18%	8%	
Average Block Size (ha)	2.9	5.4	
3-way Intersection Density (number per km <sup>2</sup> )	109	52	
4-way Intersection Density (number per km <sup>2</sup> )	20	7	
Walkability Ratio	1.8	1.7	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	742	770	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	73%	93%	
Share of Residential Area Not Laid Out Before Occupation	0%	9%	
Share of Residential Area Laid Out Before Occupation	99%	90%	
Share of Residential Area in Informal Land Subdivisions	0%	0%	
Share of Residential Area in Formal Land Subdivisions	67%	85%	
Share of Residential Area in Housing Projects	32%	5%	



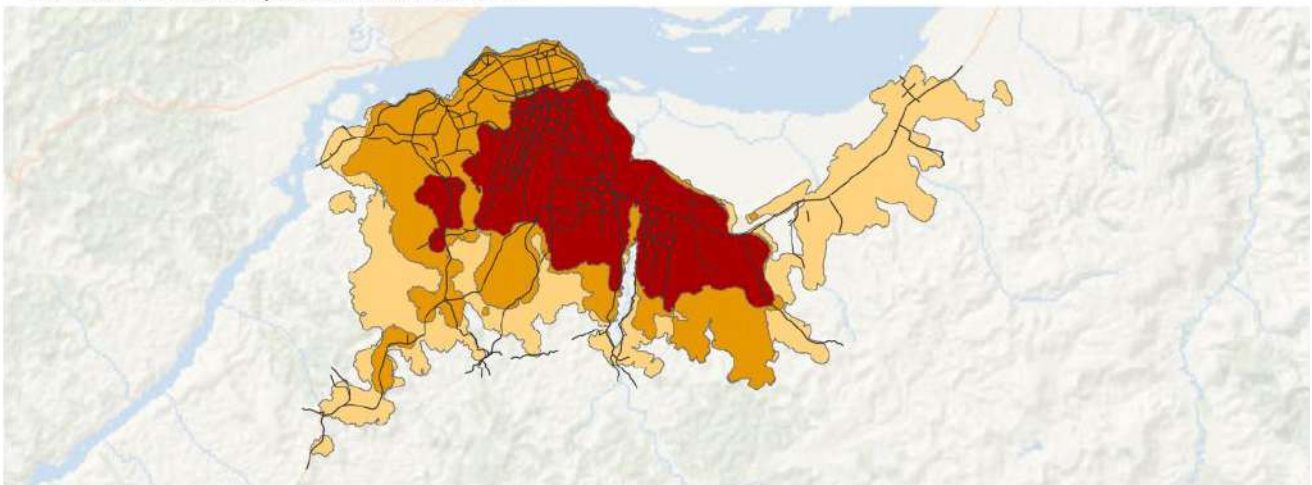
# Kinshasa, Congo Dem. Rep. (Sub-Saharan Africa)



Selected Locales in Area Developed Before 1994



Selected Locales in Expansion Area, 1994-2013



**Kinshasa, Congo Dem. Rep. 1994-2013**

0 5 10 15 20 km

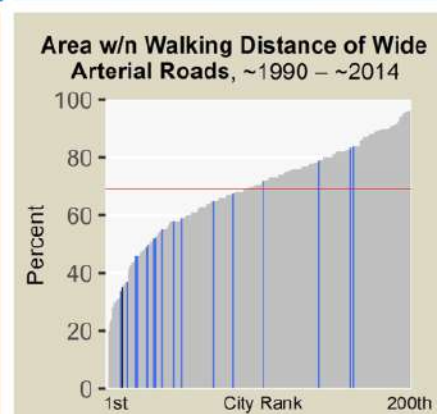
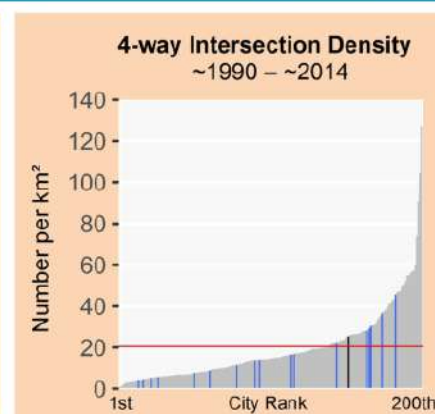
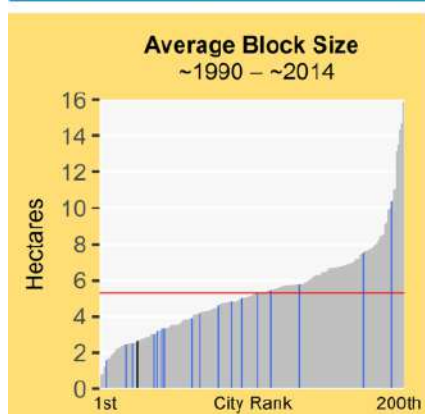
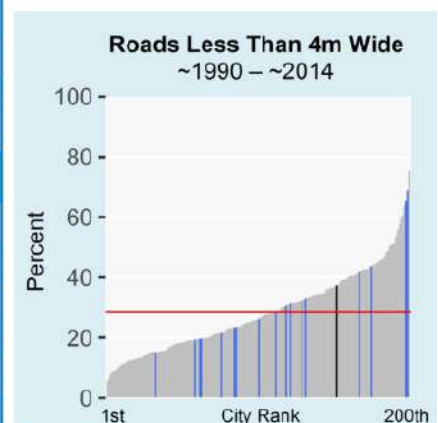
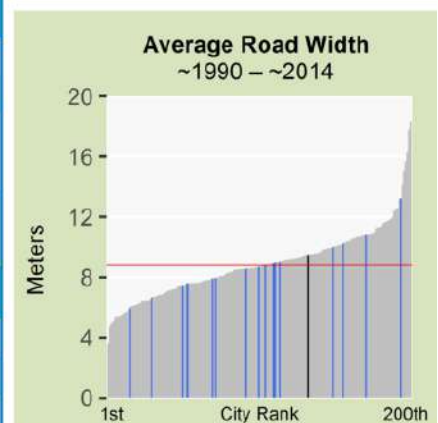
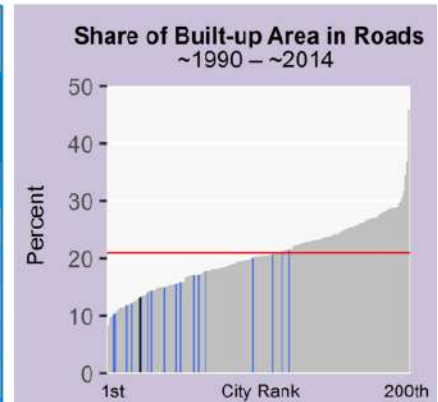
Urban Extent in 1994  
Expansion, 1994 - 2000  
Expansion, 2000 - 2013  
Arterial Roads



# Kinshasa, Congo Dem. Rep. (Sub-Saharan Africa)



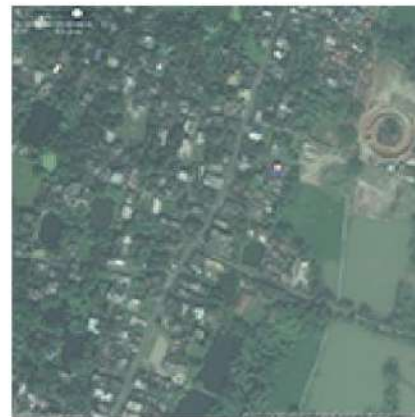
Legend for Charts			
	Kinshasa	Other cities in region	All other cities
<b>Metrics</b>			Global average —
			Pre-1994
			1994-2013
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	14%	13%	
Share of Built-Up Area that is Gridded or Partially Gridded	10%	5%	
Average Road Width (m)	9.5	5.2	
Share of Roads less than 4m Wide	28%	37%	
Share of Roads more than 16m Wide	4%	2%	
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	1.3	0.8	
Average Beeline Distance to Arterial Roads (m)	327	709	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	84%	65%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	41%	35%	
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	22%	12%	
Average Block Size (ha)	2.1	2.7	
3-way Intersection Density (number per km <sup>2</sup> )	123	116	
4-way Intersection Density (number per km <sup>2</sup> )	36	25	
Walkability Ratio	1.7	1.7	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	444	124	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )			
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	84%	85%	
Share of Residential Area Not Laid Out Before Occupation	18%	36%	
Share of Residential Area Laid Out Before Occupation	81%	63%	
Share of Residential Area in Informal Land Subdivisions	72%	58%	
Share of Residential Area in Formal Land Subdivisions	8%	1%	
Share of Residential Area in Housing Projects	0%	2%	



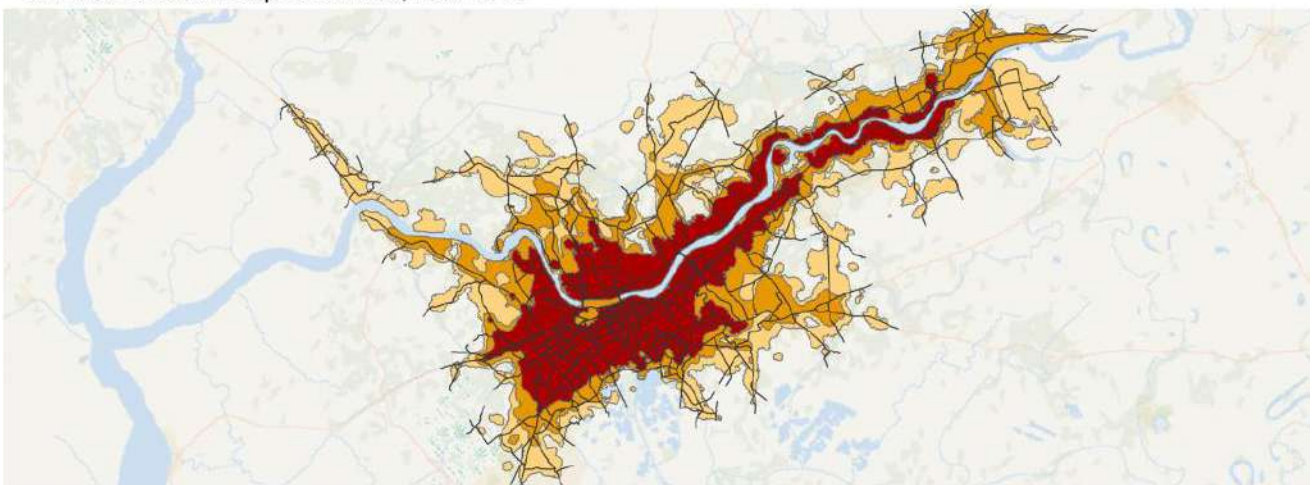
# Kolkata, India (South and Central Asia)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



**Kolkata, India**  
1990-2014

0 8 16 24 32 km

Urban Extent in 1990  
Expansion, 1990 - 2003  
Expansion, 2003 - 2014  
Arterial Roads

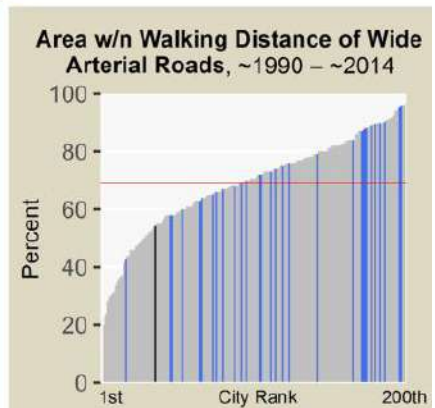
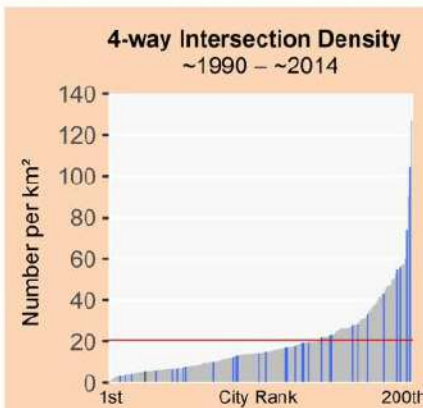
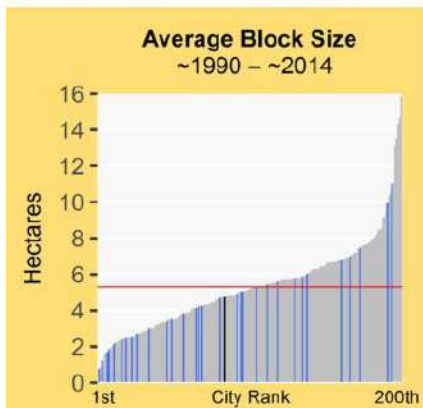
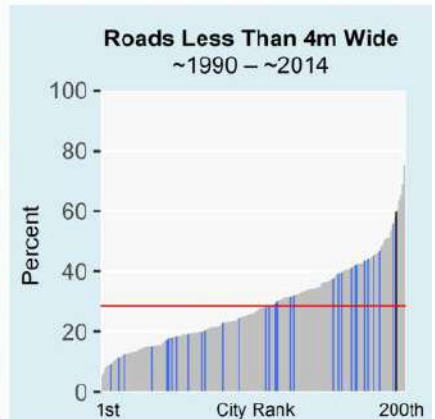
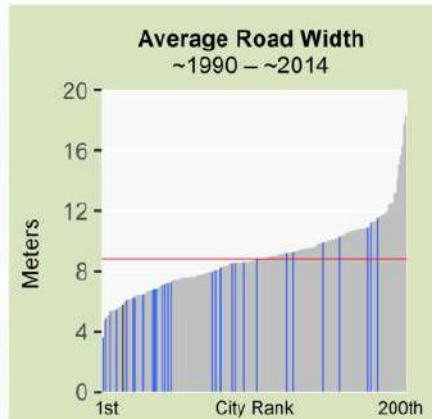
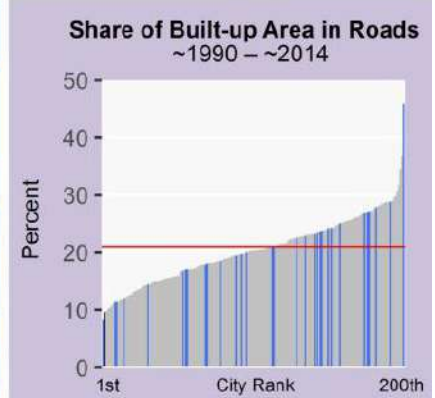
# Kolkata, India (South and Central Asia)



### Legend for Charts

Kolkata | Other cities in region | All other cities | Global average

Metrics	Pre-1990	1990-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	12%	9%
Share of Built-Up Area that is Gridded or Partially Gridded	1%	2%
Average Road Width (m)	5.8	4.0
Share of Roads less than 4m Wide	38%	59%
Share of Roads more than 16m Wide	4%	1%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.6	1.1
Average Beeline Distance to Arterial Roads (m)	245	335
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	91%	84%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	62%	54%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	8%	3%
Average Block Size (ha)	5.2	4.8
3-way Intersection Density (number per km <sup>2</sup> )	85	108
4-way Intersection Density (number per km <sup>2</sup> )	9	6
Walkability Ratio	1.6	1.6
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		217
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	271	
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	76%	84%
Share of Residential Area Not Laid Out Before Occupation	83%	73%
Share of Residential Area Laid Out Before Occupation	15%	26%
Share of Residential Area in Informal Land Subdivisions	6%	15%
Share of Residential Area in Formal Land Subdivisions	6%	2%
Share of Residential Area in Housing Projects	2%	8%



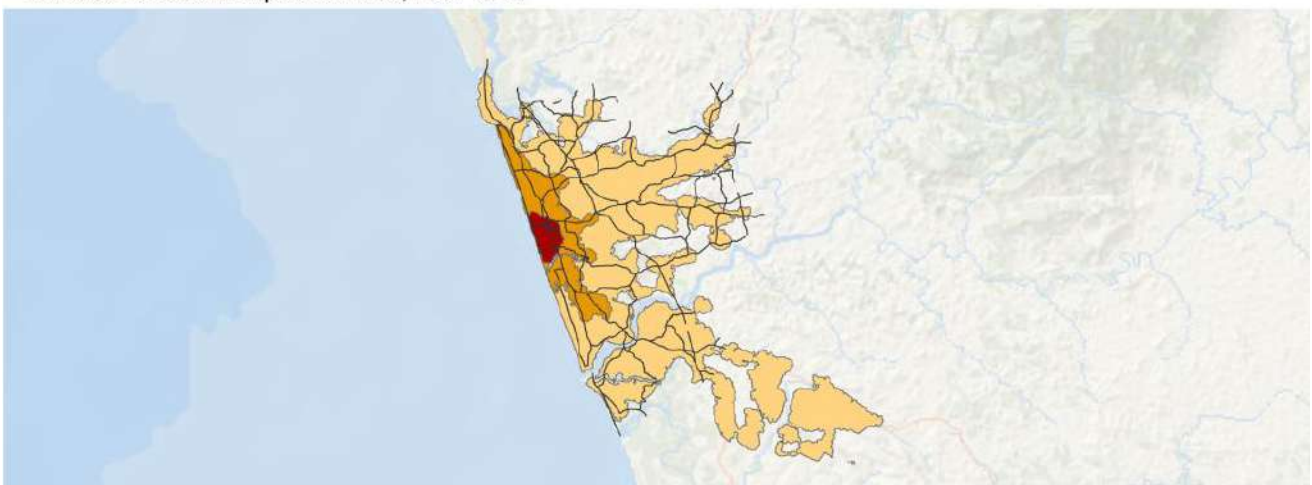
# Kozhikode, India (South and Central Asia)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2014



## Kozhikode, India 1991-2014



- Urban Extent in 1991
- Expansion, 1991 - 2001
- Expansion, 2001 - 2014

Arterial Roads

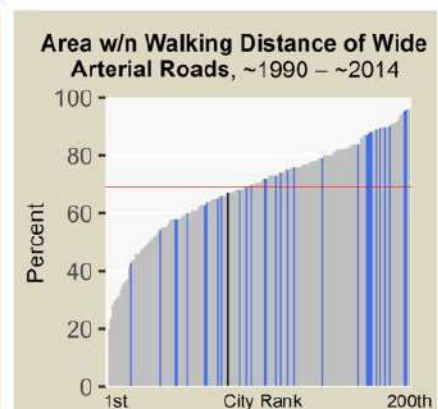
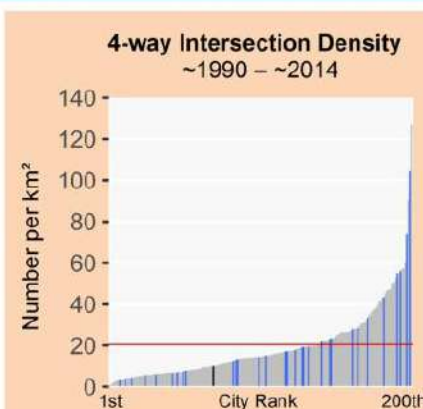
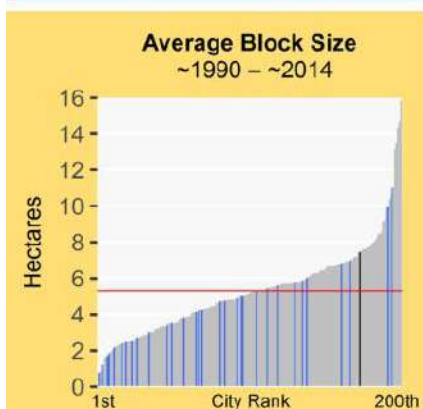
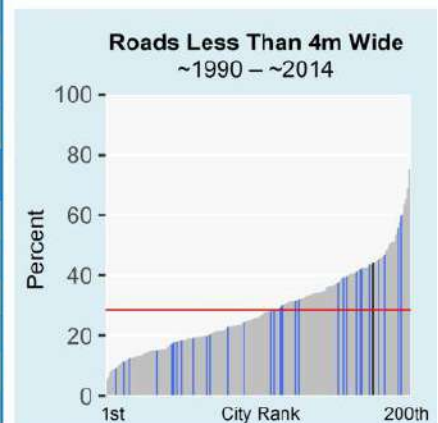
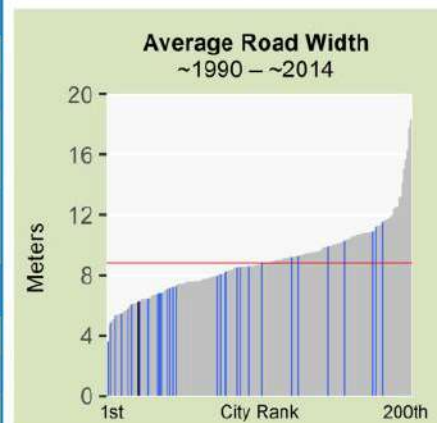
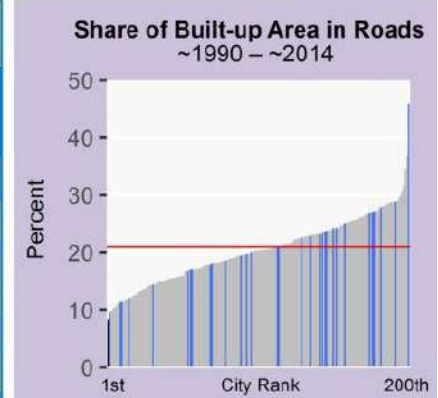
# Kozhikode, India (South and Central Asia)



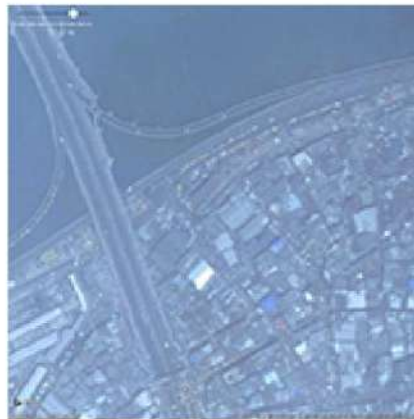
### Legend for Charts

Kozhikode | Other cities in region | All other cities | Global average

Metrics	Pre-1991	1991-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	14%	8%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	6.3	4.8
Share of Roads less than 4m Wide	26%	44%
Share of Roads more than 16m Wide	3%	3%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.2	0.7
Average Beeline Distance to Arterial Roads (m)	189	314
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	98%	88%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	100%	67%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	4%	5%
Average Block Size (ha)	1.7	7.5
3-way Intersection Density (number per km <sup>2</sup> )	176	111
4-way Intersection Density (number per km <sup>2</sup> )	9	10
Walkability Ratio	1.4	1.6
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	44%	87%
Share of Residential Area Not Laid Out Before Occupation	100%	54%
Share of Residential Area Laid Out Before Occupation	0%	45%
Share of Residential Area in Informal Land Subdivisions	0%	44%
Share of Residential Area in Formal Land Subdivisions	0%	0%
Share of Residential Area in Housing Projects	0%	0%



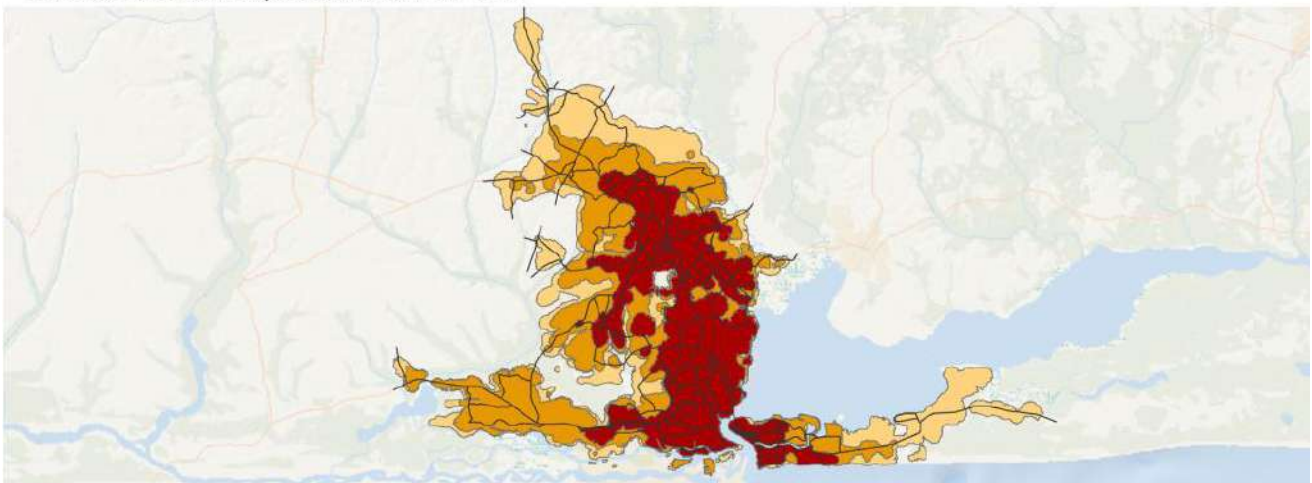
# Lagos, Nigeria (Sub-Saharan Africa)



Selected Locales in Area Developed Before 1984



Selected Locales in Expansion Area, 1984-2013



**Lagos, Nigeria**  
1984-2013

0 10 20 30 40 km

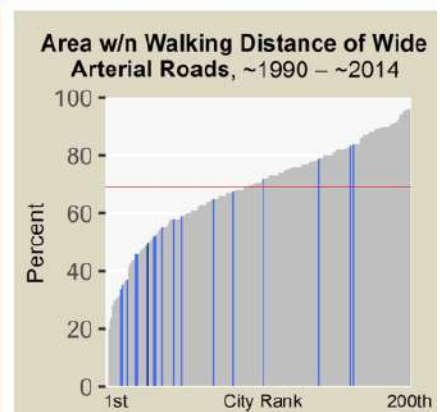
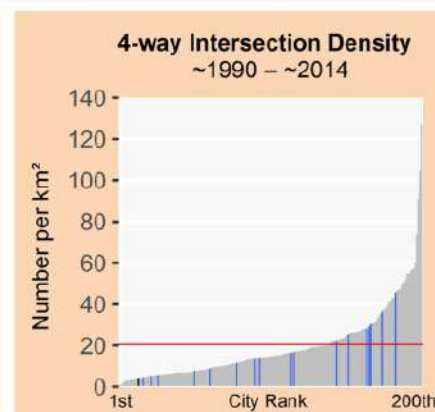
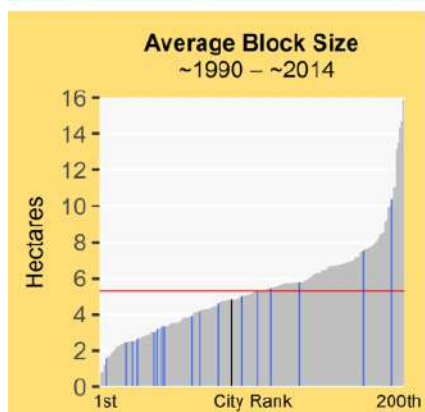
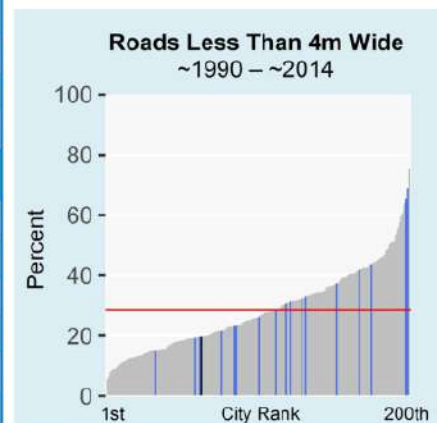
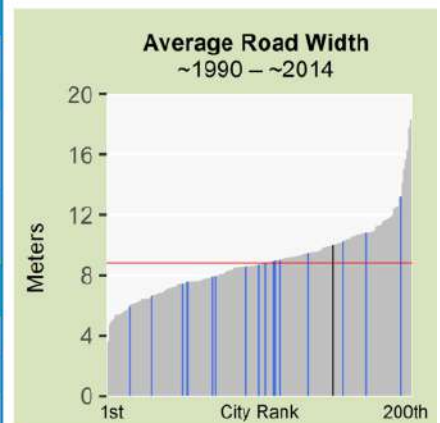
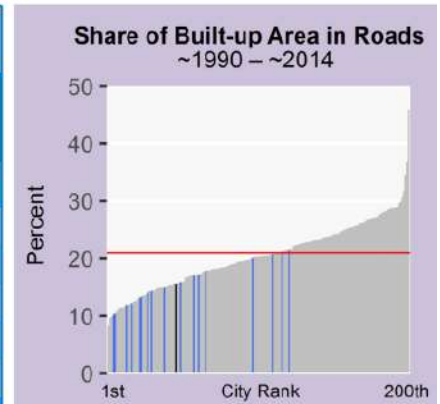
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- Urban Extent in 1984
- Expansion, 1984 - 2000
- Expansion, 2000 - 2013
- Arterial Roads

# Lagos, Nigeria (Sub-Saharan Africa)



Legend for Charts			
	Lagos	Other cities in region	All other cities
			Global average —
Metrics			
	Pre-1984	1984-2013	
Roads			
Share of Built-Up Area Occupied by Roads	16%	15%	
Share of Built-Up Area that is Gridded or Partially Gridded	13%	0%	
Average Road Width (m)	10.1	7.1	
Share of Roads less than 4m Wide	5%	19%	
Share of Roads more than 16m Wide	9%	3%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	1.2	0.8	
Average Beeline Distance to Arterial Roads (m)	336	543	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	85%	70%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	73%	50%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	10%	4%	
Average Block Size (ha)	5.8	4.8	
3-way Intersection Density (number per km <sup>2</sup> )	61	83	
4-way Intersection Density (number per km <sup>2</sup> )	12	4	
Walkability Ratio	1.7	1.7	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	28	669	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	538	679	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	69%	76%	
Share of Residential Area Not Laid Out Before Occupation	47%	38%	
Share of Residential Area Laid Out Before Occupation	50%	61%	
Share of Residential Area in Informal Land Subdivisions	28%	53%	
Share of Residential Area in Formal Land Subdivisions	19%	3%	
Share of Residential Area in Housing Projects	4%	4%	



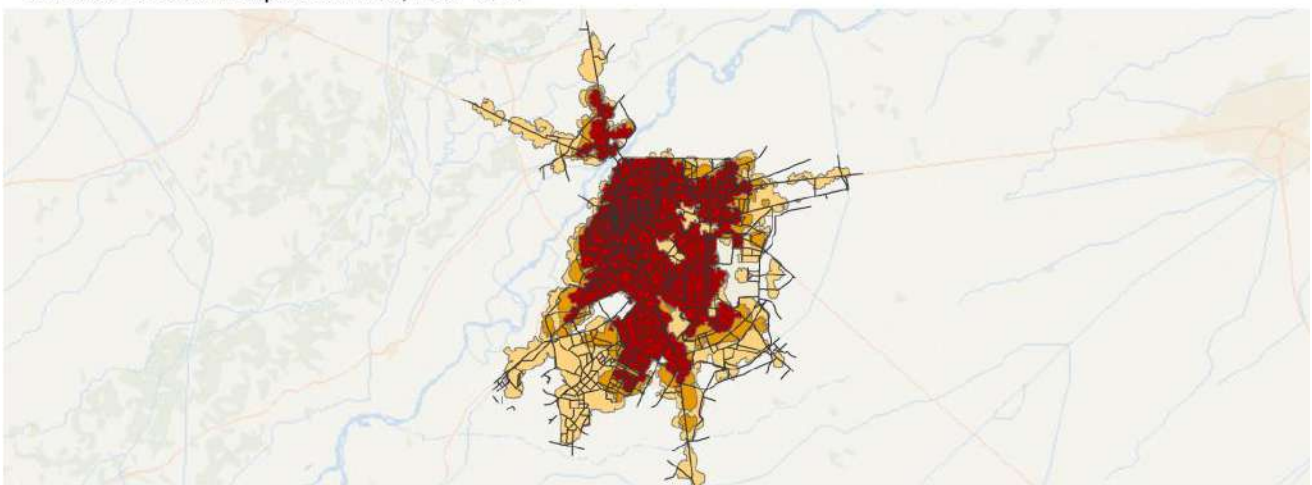
# Lahore, Pakistan (South and Central Asia)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2013



## Lahore, Pakistan 1991-2013



- Urban Extent in 1991
- Expansion, 1991 - 2000
- Expansion, 2000 - 2013

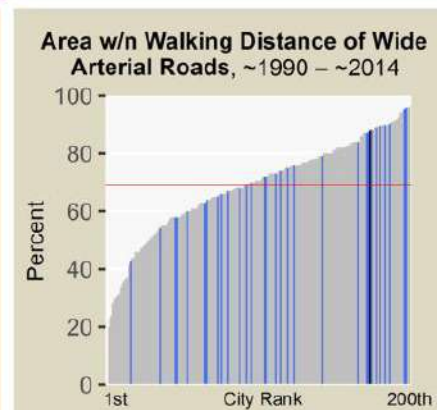
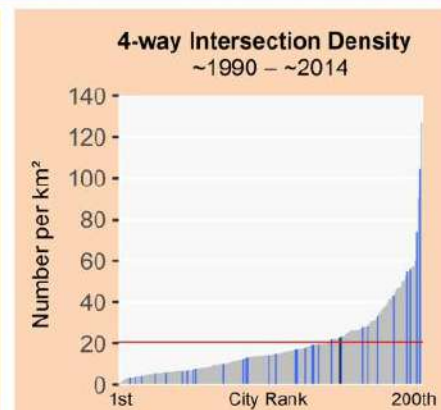
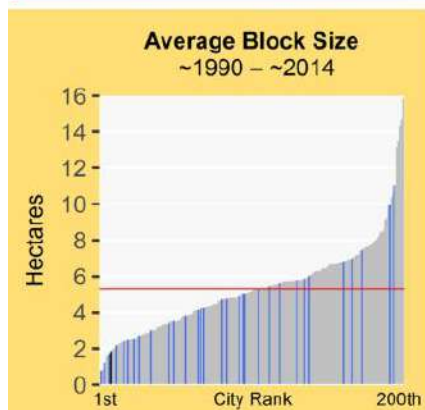
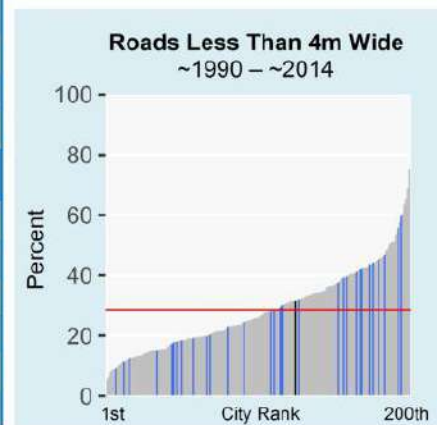
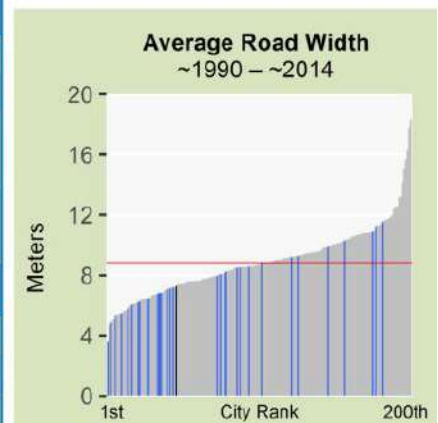
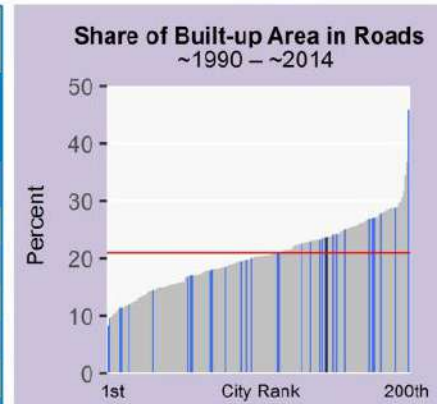
Arterial Roads



# Lahore, Pakistan (South and Central Asia)



Legend for Charts			
	Lahore	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1991	1991-2013	
Roads			
Share of Built-Up Area Occupied by Roads	19%	23%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%	
Average Road Width (m)	7.3	6.4	
Share of Roads less than 4m Wide	31%	31%	
Share of Roads more than 16m Wide	8%	6%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	3.2	2.5	
Average Beeline Distance to Arterial Roads (m)	119	167	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	99%	97%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	93%	87%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	11%	10%	
Average Block Size (ha)	2.3	1.9	
3-way Intersection Density (number per km <sup>2</sup> )	208	209	
4-way Intersection Density (number per km <sup>2</sup> )	31	23	
Walkability Ratio	1.5	1.9	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	394	440	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	81%	70%	
Share of Residential Area Not Laid Out Before Occupation	35%	11%	
Share of Residential Area Laid Out Before Occupation	64%	88%	
Share of Residential Area in Informal Land Subdivisions	20%	31%	
Share of Residential Area in Formal Land Subdivisions	42%	54%	
Share of Residential Area in Housing Projects	0%	2%	



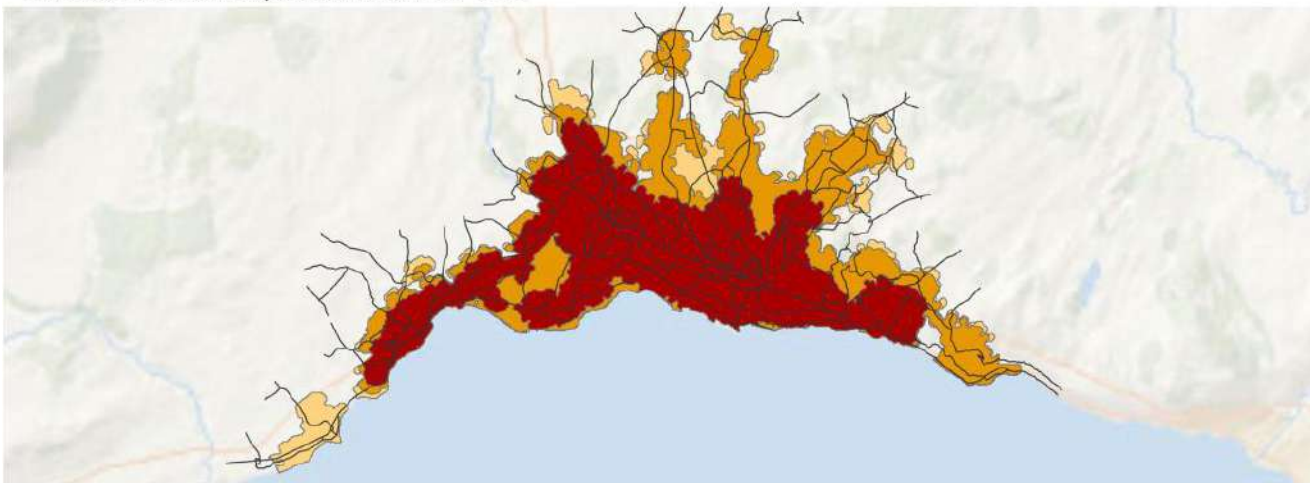
# Lausanne, Switzerland (Europe and Japan)



Selected Locales in Area Developed Before 1987



Selected Locales in Expansion Area, 1987-2015



**Lausanne, Switzerland**  
1987-2015

0 3 6 9 12 km

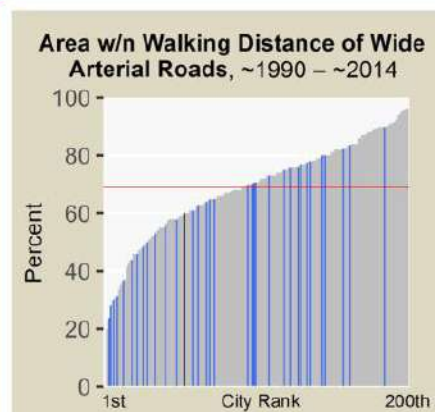
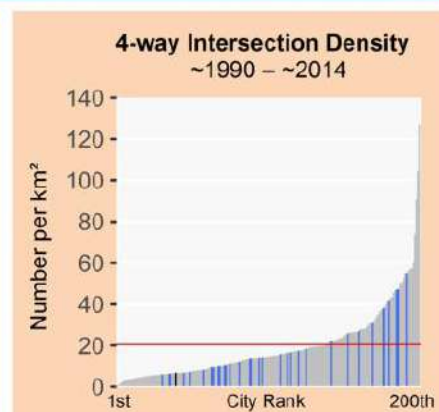
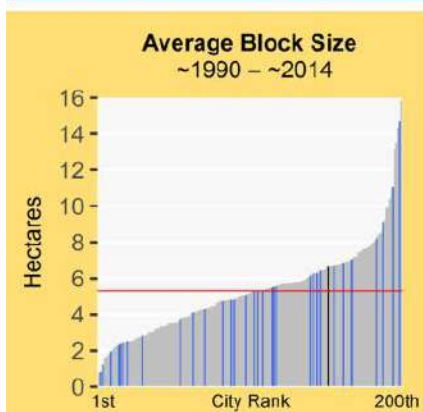
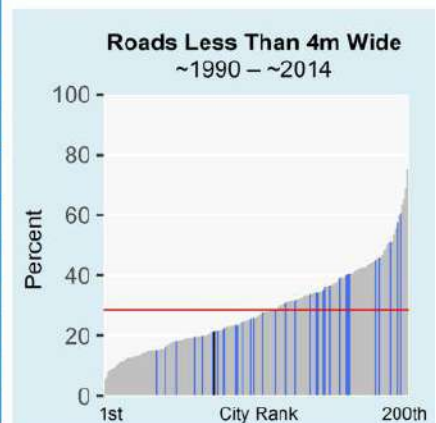
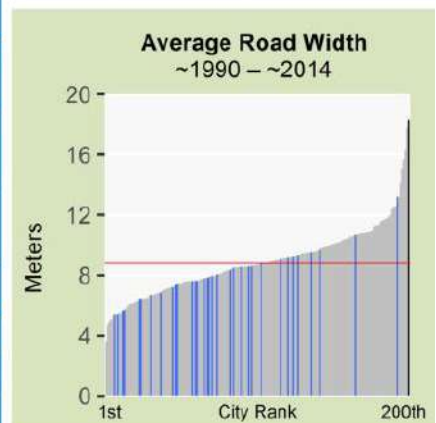
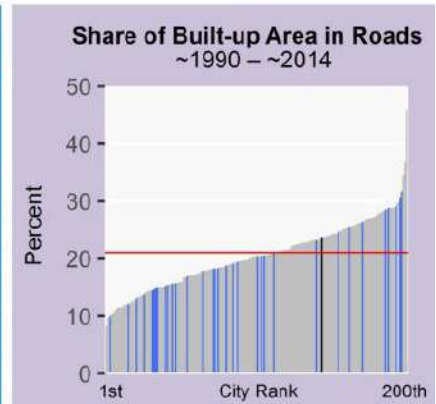
N

- Urban Extent in 1987
- Expansion, 1987 - 2001
- Expansion, 2001 - 2015
- Arterial Roads

# Lausanne, Switzerland (Europe and Japan)



Legend for Charts			
	Lausanne	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1987	1987-2015	
Roads			
Share of Built-Up Area Occupied by Roads	20%	23%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%	
Average Road Width (m)	18.3	6.2	
Share of Roads less than 4m Wide	17%	21%	
Share of Roads more than 16m Wide	13%	1%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	3.1	2.6	
Average Beeline Distance to Arterial Roads (m)	95	125	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	100%	99%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	73%	60%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	13%	4%	
Average Block Size (ha)	4.1	6.6	
3-way Intersection Density (number per km <sup>2</sup> )	120	107	
4-way Intersection Density (number per km <sup>2</sup> )	14	7	
Walkability Ratio	1.9	1.6	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		1231	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	64%	77%	
Share of Residential Area Not Laid Out Before Occupation	7%	27%	
Share of Residential Area Laid Out Before Occupation	92%	72%	
Share of Residential Area in Informal Land Subdivisions	0%	0%	
Share of Residential Area in Formal Land Subdivisions	78%	68%	
Share of Residential Area in Housing Projects	14%	4%	



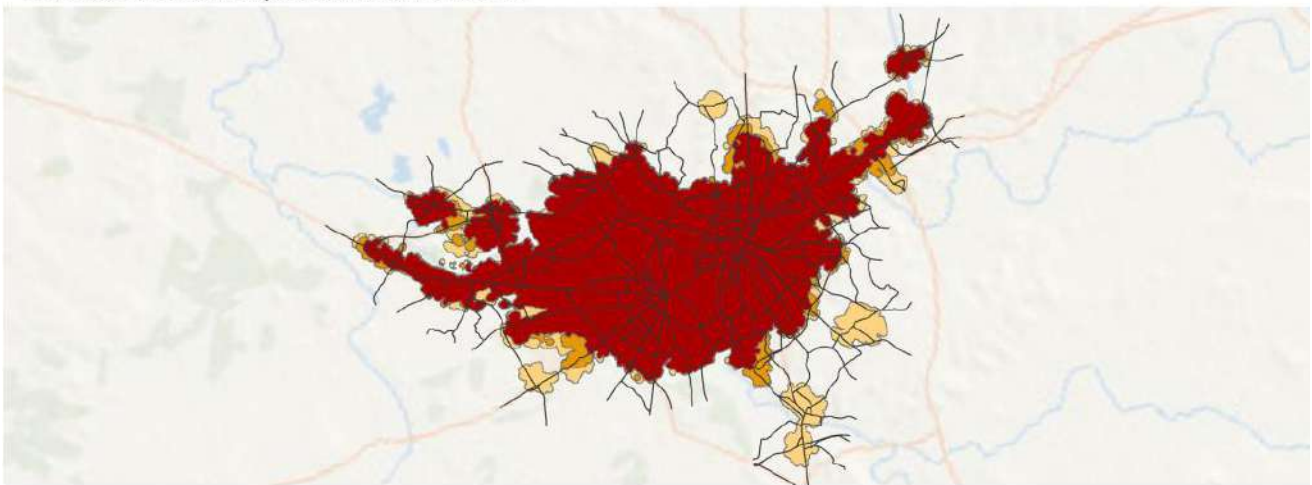
# Le Mans, France (Europe and Japan)



Selected Locales in Area Developed Before 1992



Selected Locales in Expansion Area, 1992-2013



**Le Mans, France**  
1992-2013

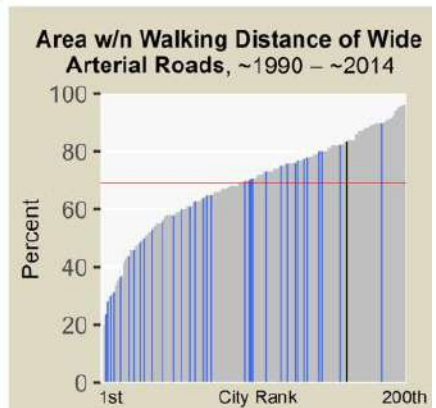
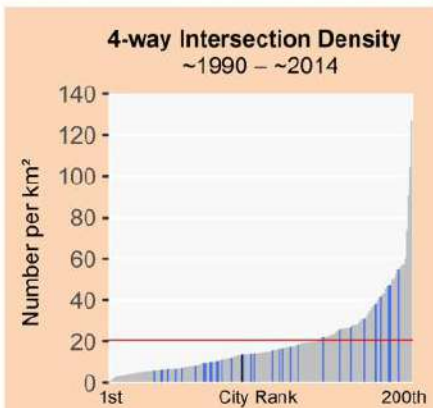
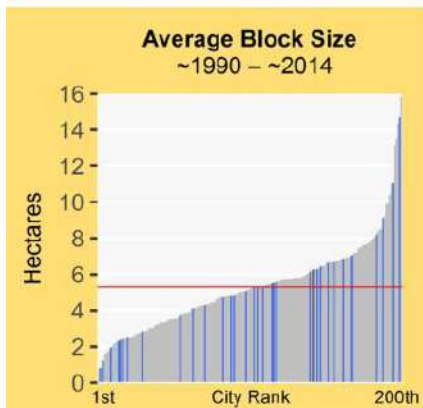
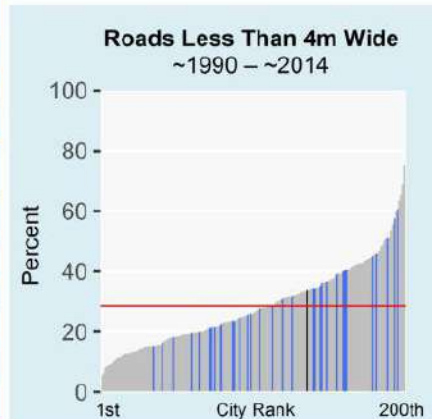
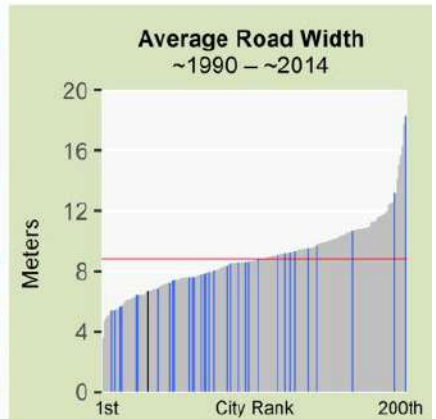
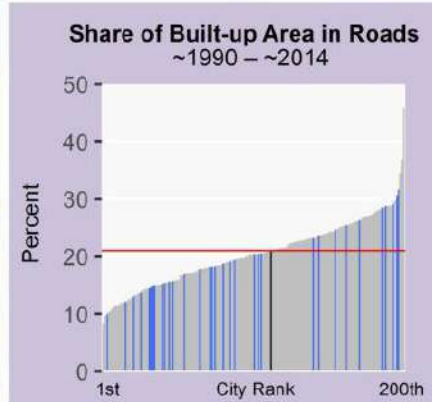
0 3 6 9 12 km

Urban Extent in 1992  
Expansion, 1992 - 1999  
Expansion, 1999 - 2013  
Arterial Roads

# Le Mans, France (Europe and Japan)



Legend for Charts			
	Le Mans	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1992	1992-2013	
Roads			
Share of Built-Up Area Occupied by Roads	20%	20%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%	
Average Road Width (m)	6.7	5.5	
Share of Roads less than 4m Wide	24%	33%	
Share of Roads more than 16m Wide	3%	2%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	2.9	2.8	
Average Beeline Distance to Arterial Roads (m)	117	122	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	99%	99%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	84%	83%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	8%	7%	
Average Block Size (ha)	2.7	6.3	
3-way Intersection Density (number per km <sup>2</sup> )	184	138	
4-way Intersection Density (number per km <sup>2</sup> )	22	14	
Walkability Ratio	2.0	1.7	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	647	720	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	61%	54%	
Share of Residential Area Not Laid Out Before Occupation	13%	44%	
Share of Residential Area Laid Out Before Occupation	86%	55%	
Share of Residential Area in Informal Land Subdivisions	0%	0%	
Share of Residential Area in Formal Land Subdivisions	71%	53%	
Share of Residential Area in Housing Projects	14%	2%	



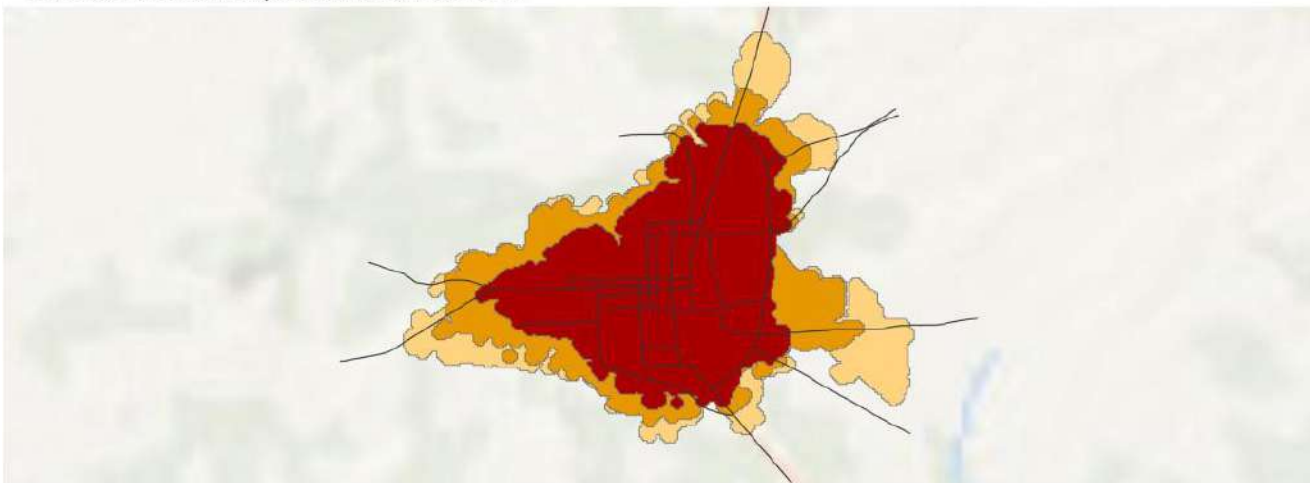
# Leon, Nicaragua (Latin America and the Caribbean)



Selected Locales in Area Developed Before 1993



Selected Locales in Expansion Area, 1993-2010



Leon, Nicaragua  
1993-2010

0 1 2 3 4 km

N

- Urban Extent in 1993
- Expansion, 1993 - 2000
- Expansion, 2000 - 2010
- Arterial Roads

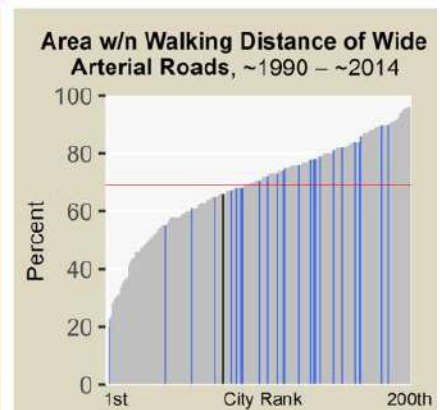
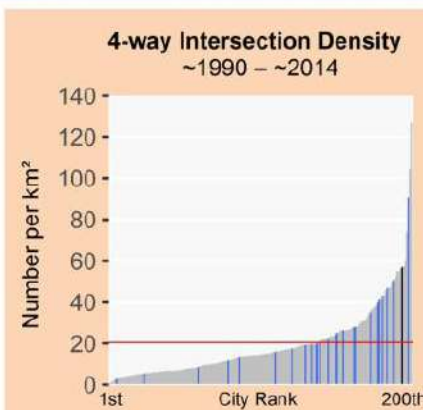
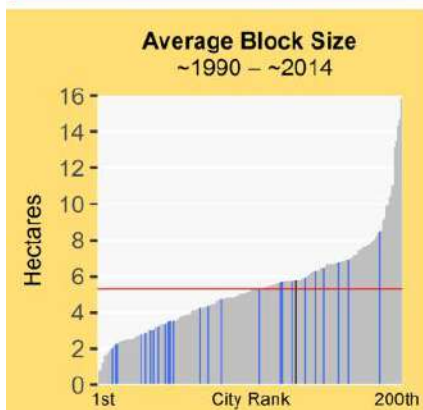
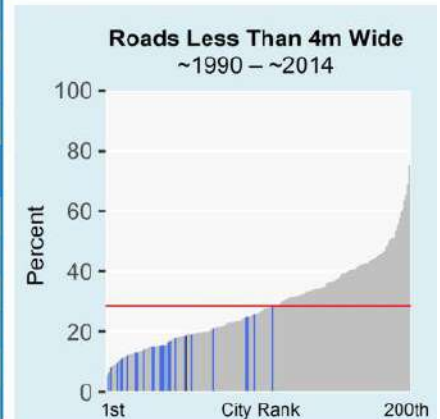
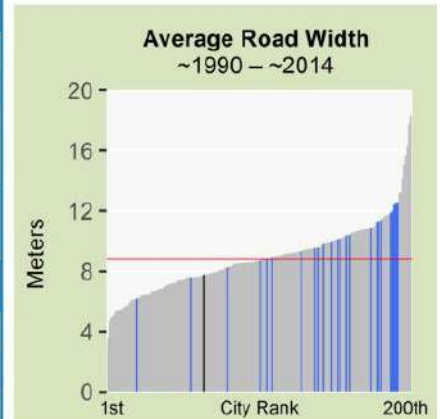
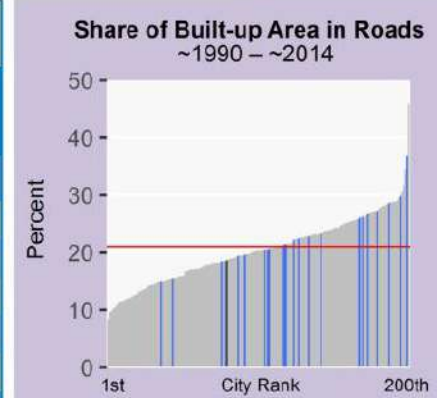
# Leon, Nicaragua (Latin America and the Caribbean)



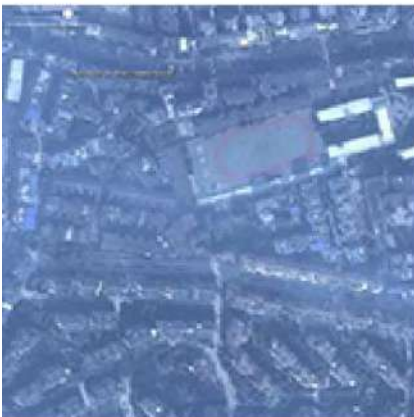
### Legend for Charts

Leon | Other cities in region | All other cities | Global average

Metrics	Pre-1993	1993-2010
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	18%	18%
Share of Built-Up Area that is Gridded or Partially Gridded	22%	12%
Average Road Width (m)	7.8	5.5
Share of Roads less than 4m Wide	8%	18%
Share of Roads more than 16m Wide	2%	0%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	3.0	2.0
Average Beeline Distance to Arterial Roads (m)	119	188
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	99%	96%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	66%	66%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	36%	19%
Average Block Size (ha)	2.7	5.8
3-way Intersection Density (number per km <sup>2</sup> )	79	155
4-way Intersection Density (number per km <sup>2</sup> )	34	57
Walkability Ratio	1.6	1.6
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	143	355
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	74%	81%
Share of Residential Area Not Laid Out Before Occupation	6%	10%
Share of Residential Area Laid Out Before Occupation	93%	89%
Share of Residential Area in Informal Land Subdivisions	15%	62%
Share of Residential Area in Formal Land Subdivisions	78%	24%
Share of Residential Area in Housing Projects	0%	1%



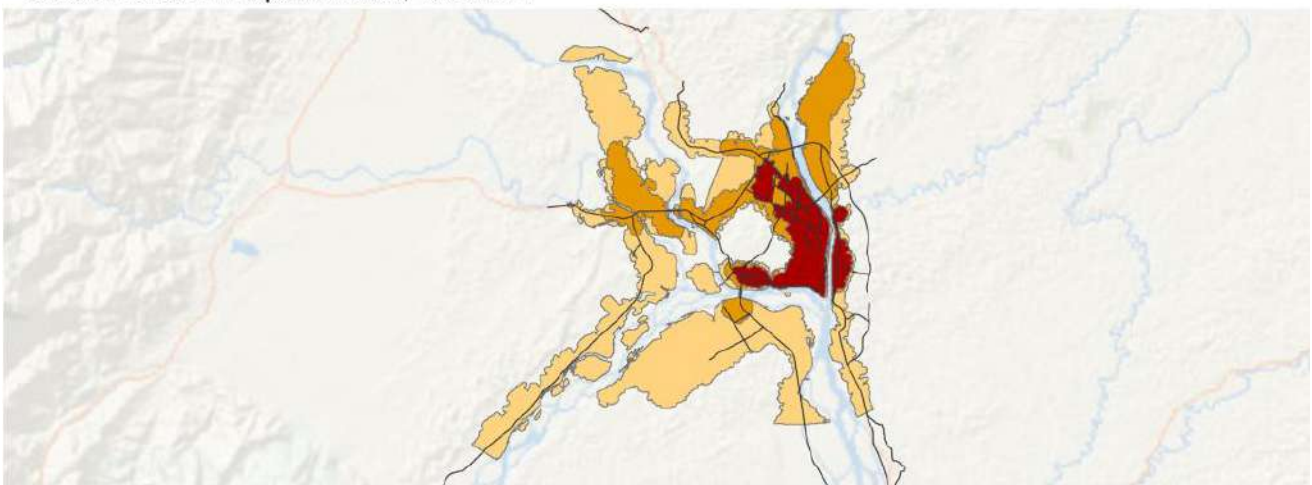
# Leshan, Sichuan, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



## Leshan, Sichuan, China 1990-2014



- Urban Extent in 1990
- Expansion, 1990 - 2001
- Expansion, 2001 - 2014

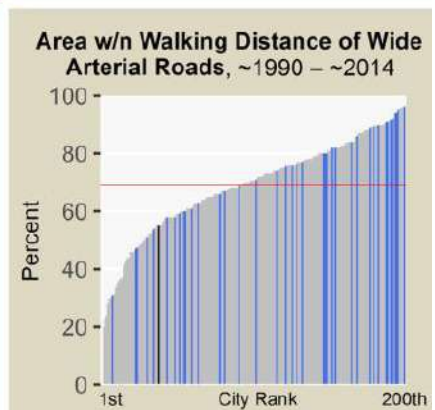
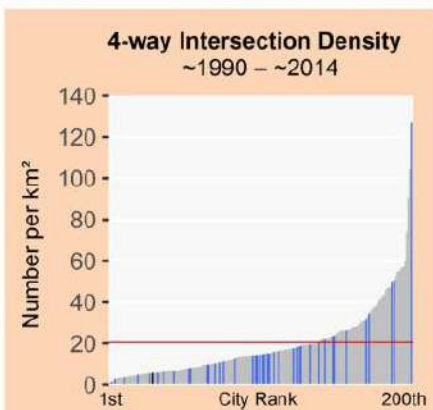
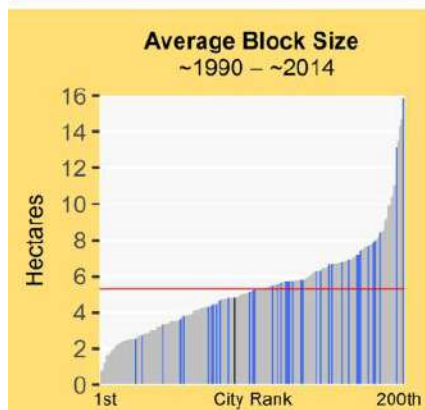
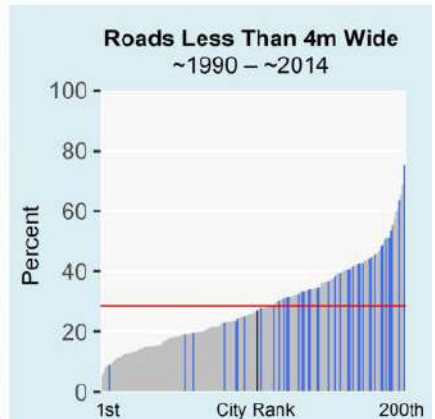
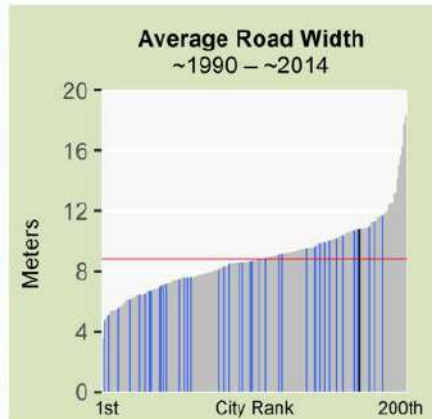
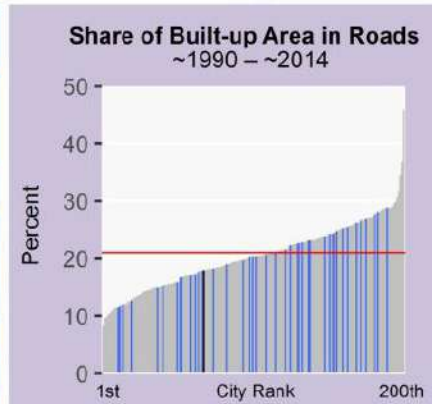
Arterial Roads



# Leshan, Sichuan, China (East Asia and the Pacific)



Legend for Charts		
	Leshan	Other cities in region   All other cities   Global average
Metrics	Pre-1990	1990-2014
Roads		
Share of Built-Up Area Occupied by Roads	26%	18%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	10.8	7.6
Share of Roads less than 4m Wide	10%	26%
Share of Roads more than 16m Wide	18%	7%
Arterial Roads		
Density of Arterial Roads (km/km <sup>2</sup> )	2.4	0.8
Average Beeline Distance to Arterial Roads (m)	166	747
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	97%	61%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	85%	55%
Block Size, Plot Size, Intersection Density, and Walkability		
Share of Intersections that are 4-way	15%	2%
Average Block Size (ha)	3.3	4.9
3-way Intersection Density (number per km <sup>2</sup> )	99	78
4-way Intersection Density (number per km <sup>2</sup> )	17	6
Walkability Ratio	1.7	1.4
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		
Stages in the Evolution of Residential Layouts		
Share of Built-Up Area in Residential Use	66%	52%
Share of Residential Area Not Laid Out Before Occupation	40%	75%
Share of Residential Area Laid Out Before Occupation	59%	24%
Share of Residential Area in Informal Land Subdivisions	4%	7%
Share of Residential Area in Formal Land Subdivisions	30%	10%
Share of Residential Area in Housing Projects	24%	6%



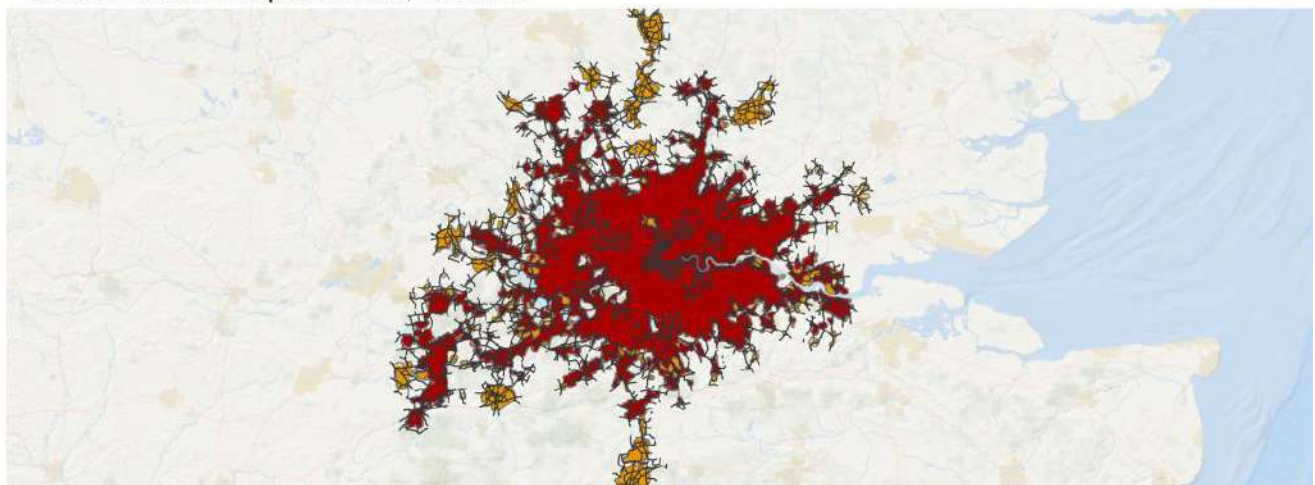
# London, United Kingdom (Europe and Japan)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2013



## London, United Kingdom 1989-2013



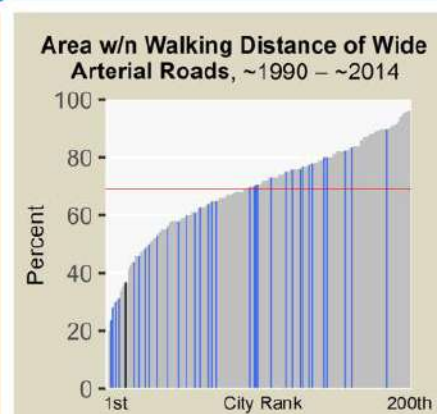
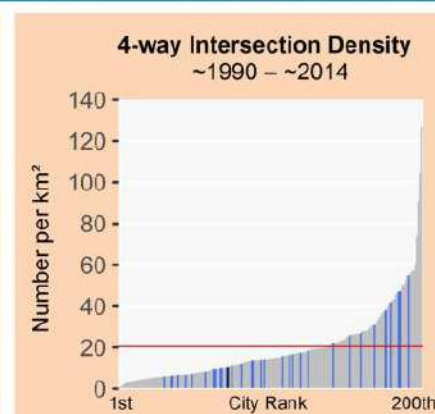
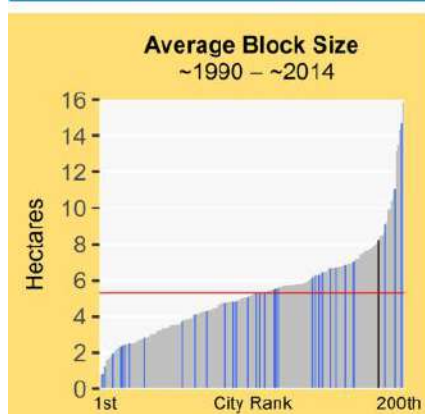
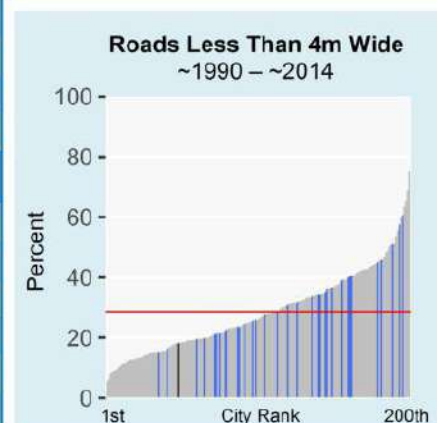
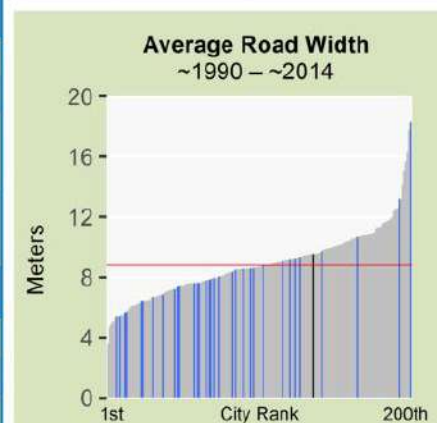
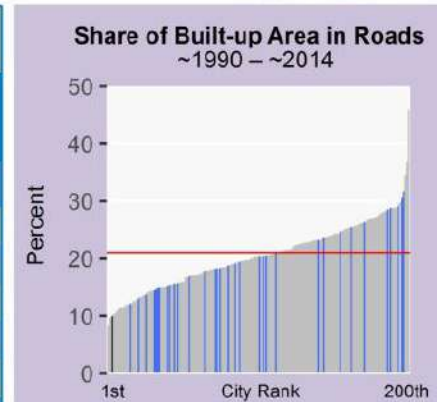
- Urban Extent in 1989
- Expansion, 1989 - 2000
- Expansion, 2000 - 2013

Arterial Roads

# London, United Kingdom (Europe and Japan)



Legend for Charts			
	London	Other cities in region	Global average
<b>Legend for Charts</b>			
	London	Other cities in region	Global average
Metrics	Pre-1989	1989-2013	
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	19%	9%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%	
Average Road Width (m)	9.5	7.5	
Share of Roads less than 4m Wide	9%	18%	
Share of Roads more than 16m Wide	9%	4%	
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	2.2	1.4	
Average Beeline Distance to Arterial Roads (m)	163	439	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	98%	78%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	75%	37%	
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	12%	4%	
Average Block Size (ha)	8.4	8.2	
3-way Intersection Density (number per km <sup>2</sup> )	51	61	
4-way Intersection Density (number per km <sup>2</sup> )	10	10	
Walkability Ratio	1.7	1.7	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	550	612	
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	73%	72%	
Share of Residential Area Not Laid Out Before Occupation	2%	13%	
Share of Residential Area Laid Out Before Occupation	95%	86%	
Share of Residential Area in Informal Land Subdivisions	0%	0%	
Share of Residential Area in Formal Land Subdivisions	45%	86%	
Share of Residential Area in Housing Projects	52%	0%	



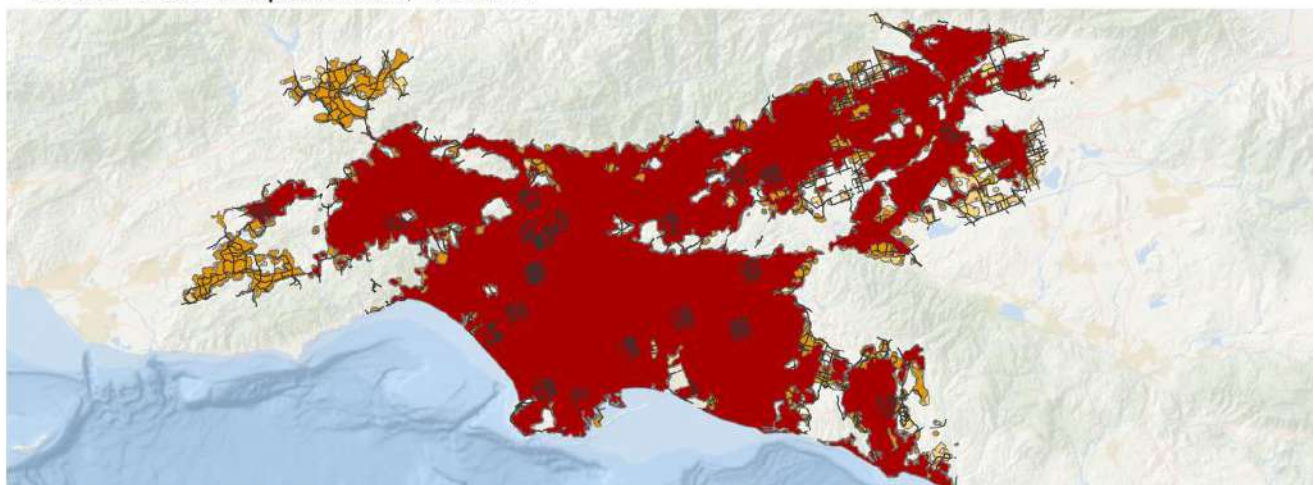
# Los Angeles, United States (Land-Rich Developed Countries)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



## Los Angeles, United States 1990-2014



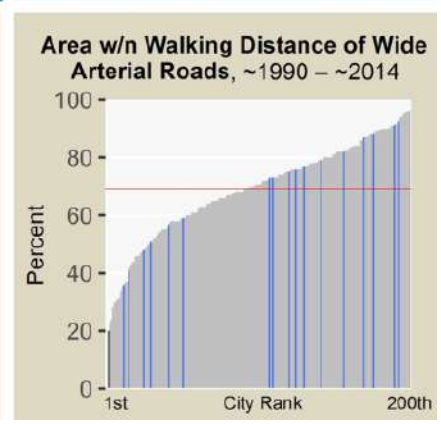
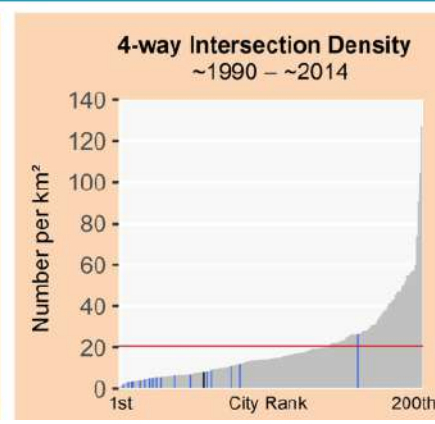
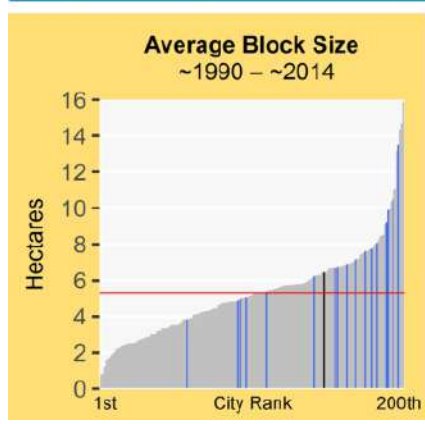
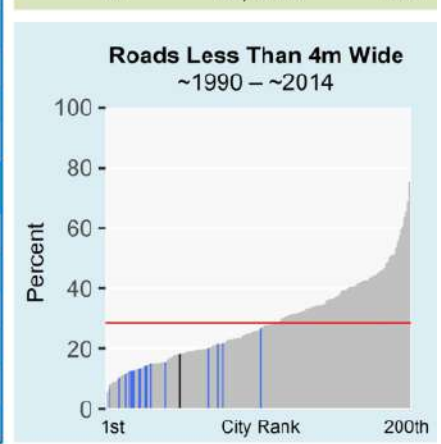
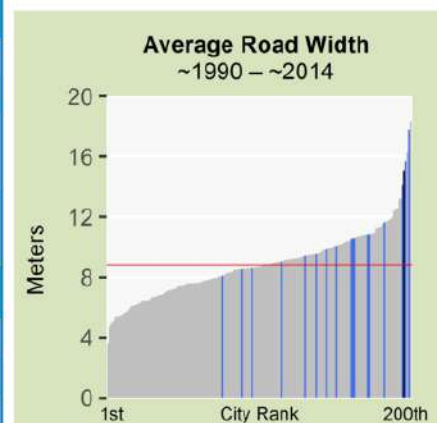
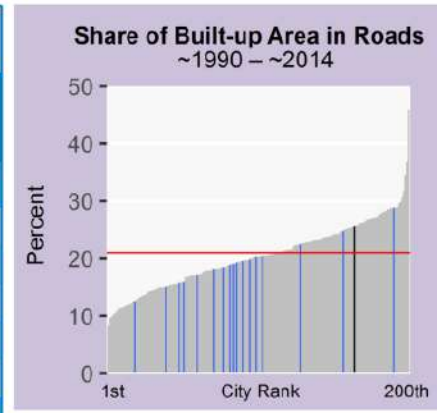
- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2014

Arterial Roads

# Los Angeles, United States (Land-Rich Developed Countries)



Legend for Charts			
	Los Angeles	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1990	1990-2014	
Roads			
Share of Built-Up Area Occupied by Roads	24%	25%	
Share of Built-Up Area that is Gridded or Partially Gridded	28%	0%	
Average Road Width (m)	15.1	15.8	
Share of Roads less than 4m Wide	6%	18%	
Share of Roads more than 16m Wide	46%	20%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	2.1	0.3	
Average Beeline Distance to Arterial Roads (m)	187	2340	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	95%	20%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	95%	20%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	26%	5%	
Average Block Size (ha)	6.5	6.5	
3-way Intersection Density (number per km <sup>2</sup> )	47	74	
4-way Intersection Density (number per km <sup>2</sup> )	19	8	
Walkability Ratio	1.6	2.0	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	752	789	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	85%	86%	
Share of Residential Area Not Laid Out Before Occupation	2%	19%	
Share of Residential Area Laid Out Before Occupation	91%	80%	
Share of Residential Area in Informal Land Subdivisions	0%	3%	
Share of Residential Area in Formal Land Subdivisions	90%	62%	
Share of Residential Area in Housing Projects	7%	15%	



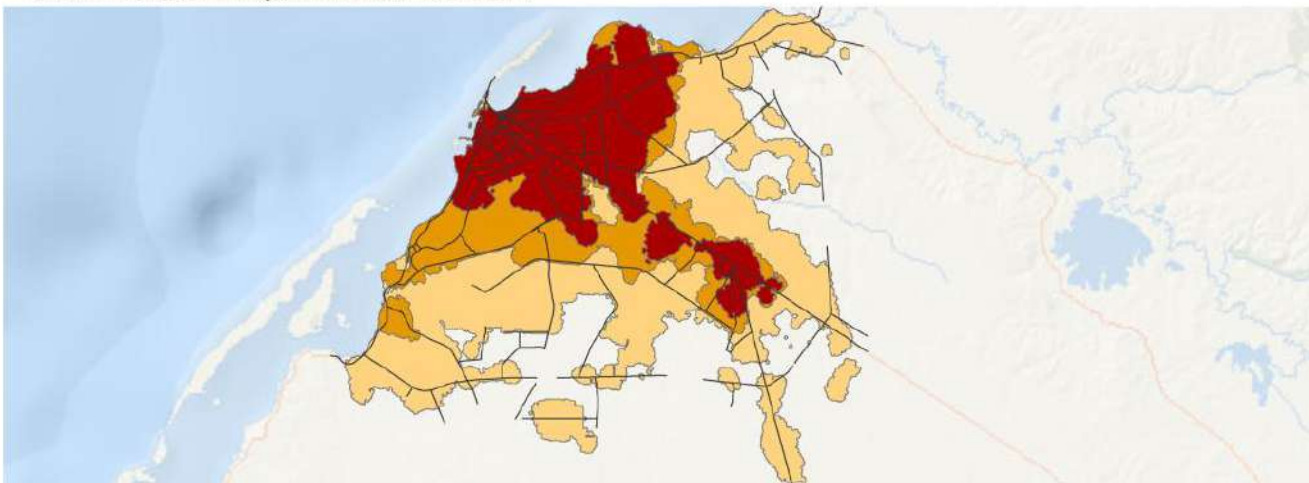
# Luanda, Angola (Sub-Saharan Africa)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2014



**Luanda, Angola**  
1991-2014

0 5 10 15 20 km

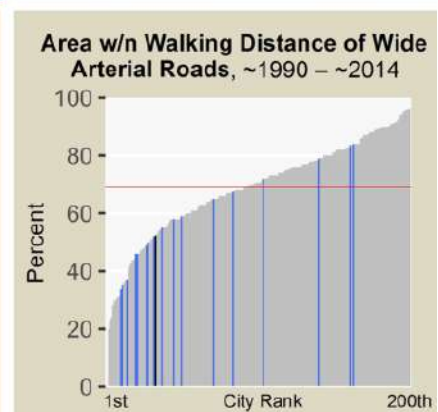
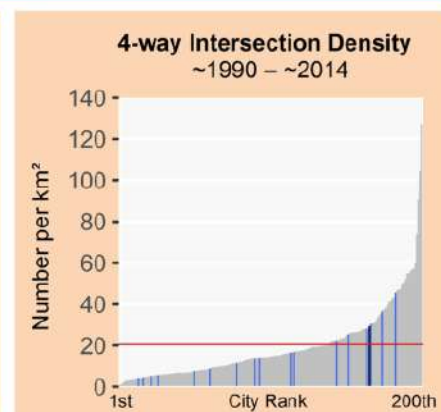
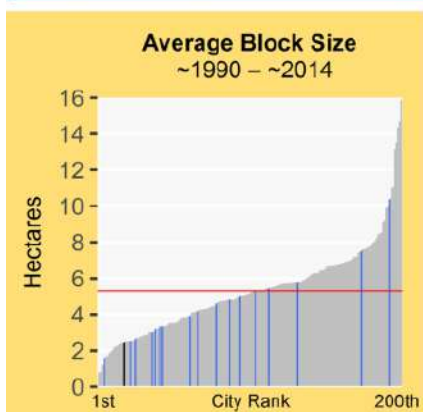
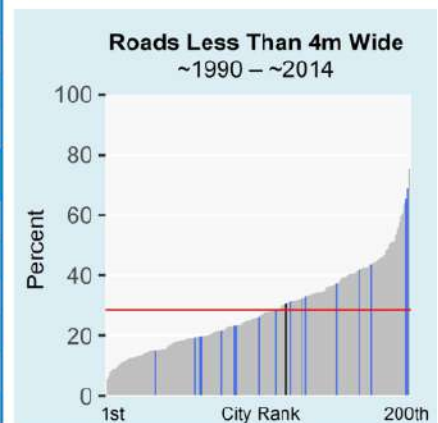
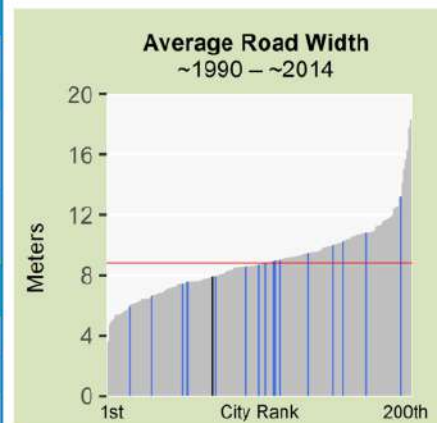
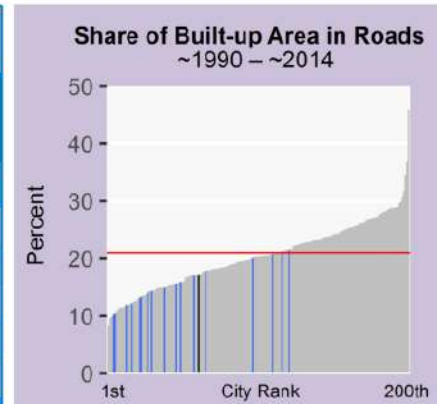
N

- Urban Extent in 1991
- Expansion, 1991 - 2000
- Expansion, 2000 - 2014
- Arterial Roads

# Luanda, Angola (Sub-Saharan Africa)



Legend for Charts		
	Luanda	Other cities in region   All other cities   Global average
Metrics		
	Pre-1991	1991-2014
Roads		
Share of Built-Up Area Occupied by Roads	15%	17%
Share of Built-Up Area that is Gridded or Partially Gridded	10%	0%
Average Road Width (m)	7.9	6.4
Share of Roads less than 4m Wide	16%	30%
Share of Roads more than 16m Wide	6%	5%
Arterial Roads		
Density of Arterial Roads (km/km <sup>2</sup> )	1.1	0.6
Average Beeline Distance to Arterial Roads (m)	412	698
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	78%	58%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	66%	52%
Block Size, Plot Size, Intersection Density, and Walkability		
Share of Intersections that are 4-way	15%	14%
Average Block Size (ha)	3.2	2.4
3-way Intersection Density (number per km <sup>2</sup> )	96	139
4-way Intersection Density (number per km <sup>2</sup> )	17	29
Walkability Ratio	1.7	1.7
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	255	387
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	291	
Stages in the Evolution of Residential Layouts		
Share of Built-Up Area in Residential Use	69%	75%
Share of Residential Area Not Laid Out Before Occupation	58%	52%
Share of Residential Area Laid Out Before Occupation	41%	47%
Share of Residential Area in Informal Land Subdivisions	32%	37%
Share of Residential Area in Formal Land Subdivisions	9%	2%
Share of Residential Area in Housing Projects	0%	7%



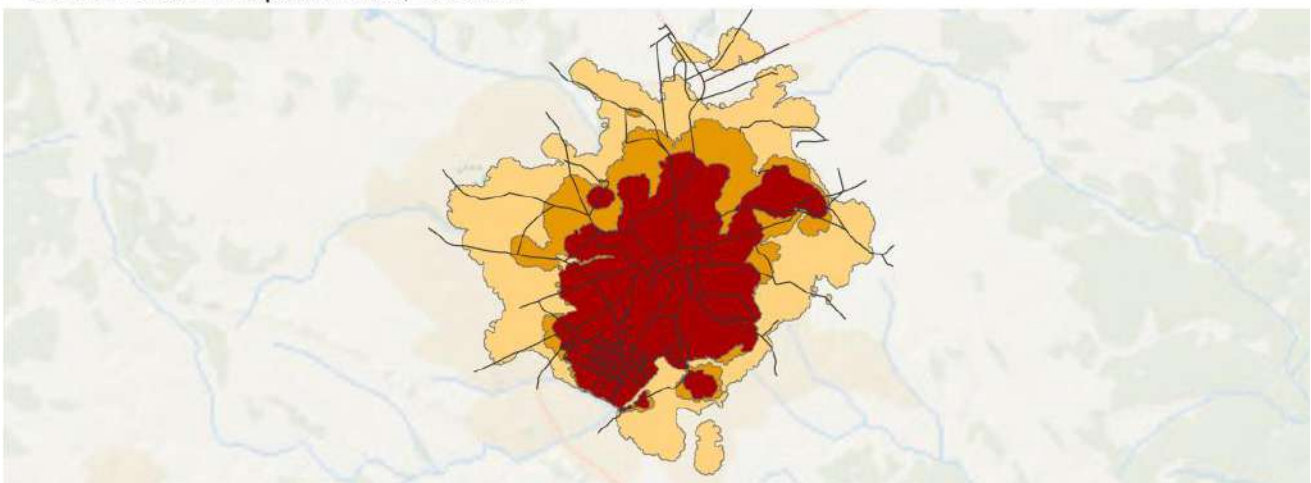
# Lubumbashi, Congo Dem. Rep. (Sub-Saharan Africa)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013



## Lubumbashi, Congo Dem. Rep. 1990-2013



- Urban Extent in 1990
- Expansion, 1990 - 1998
- Expansion, 1998 - 2013

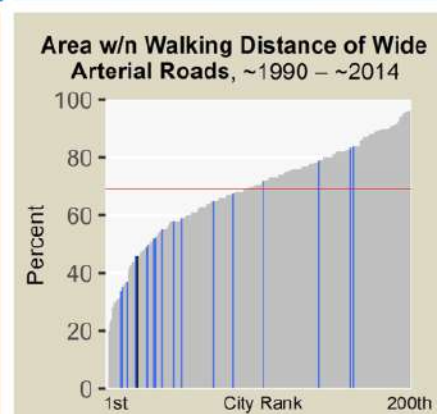
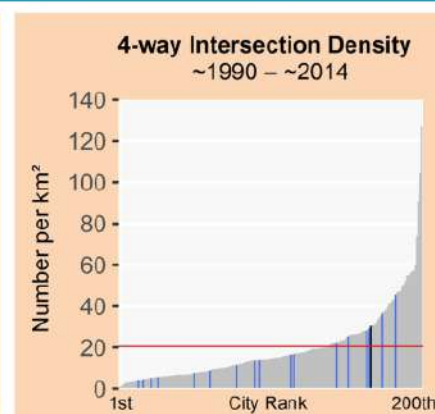
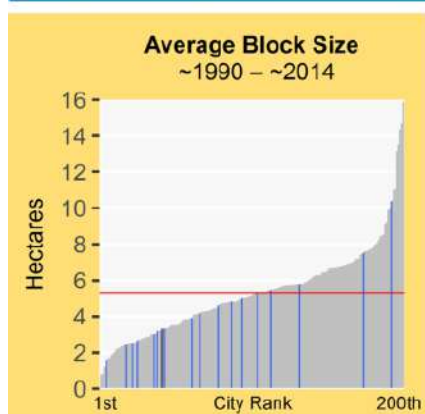
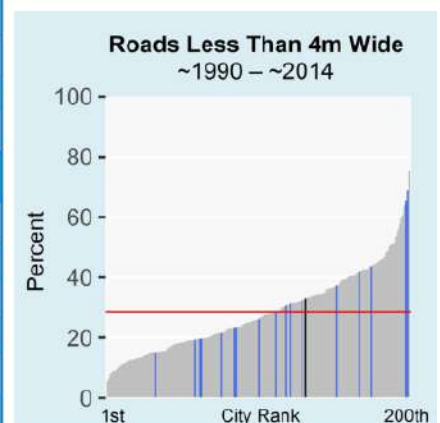
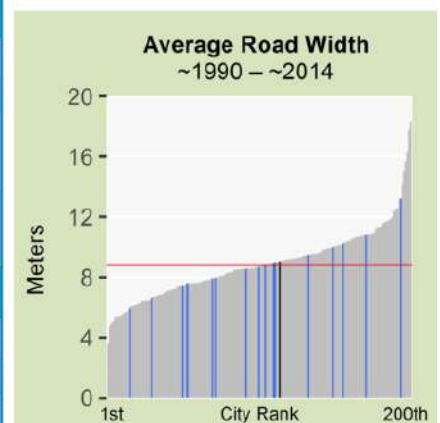
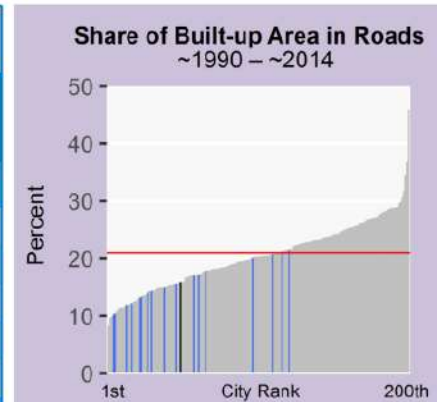
Arterial Roads



# Lubumbashi, Congo Dem. Rep. (Sub-Saharan Africa)



Legend for Charts			
	Lubumbashi	Other cities in region	All other cities
			Global average —
Metrics			
	Pre-1990	1990-2013	
Roads			
Share of Built-Up Area Occupied by Roads	16%	15%	
Share of Built-Up Area that is Gridded or Partially Gridded	22%	0%	
Average Road Width (m)	9.1	5.6	
Share of Roads less than 4m Wide	9%	32%	
Share of Roads more than 16m Wide	10%	1%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	1.6	1.0	
Average Beeline Distance to Arterial Roads (m)	259	428	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	90%	74%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	65%	46%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	30%	18%	
Average Block Size (ha)	5.7	3.3	
3-way Intersection Density (number per km <sup>2</sup> )	61	170	
4-way Intersection Density (number per km <sup>2</sup> )	26	30	
Walkability Ratio	1.6	1.6	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	611	839	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	1452		
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	83%	84%	
Share of Residential Area Not Laid Out Before Occupation	7%	29%	
Share of Residential Area Laid Out Before Occupation	92%	70%	
Share of Residential Area in Informal Land Subdivisions	87%	67%	
Share of Residential Area in Formal Land Subdivisions	4%	1%	
Share of Residential Area in Housing Projects	0%	1%	



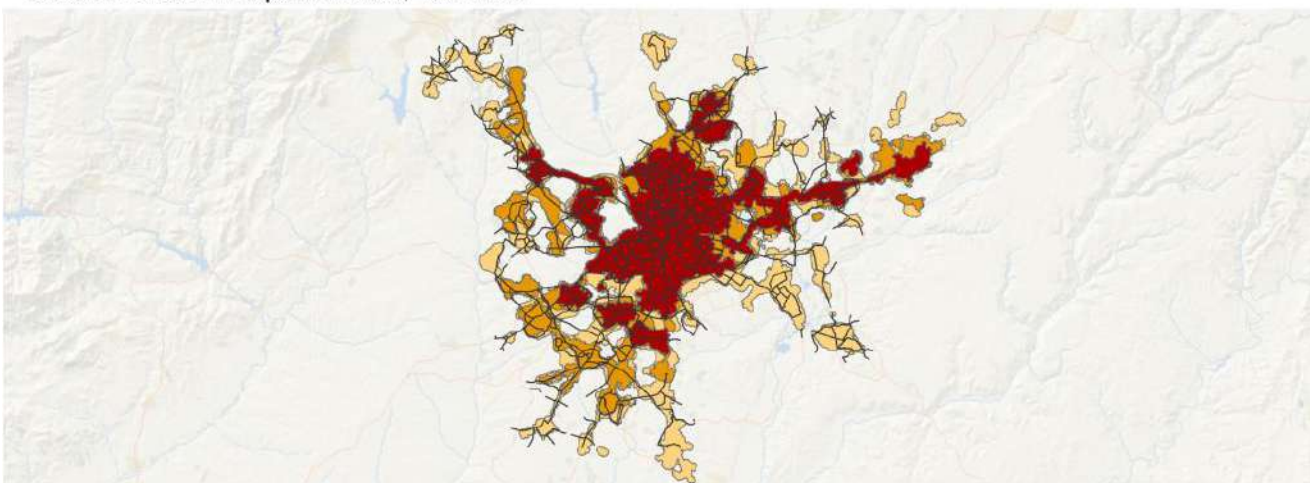
# Madrid, Spain (Europe and Japan)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2010



Madrid, Spain  
1991-2010

0 5 10 15 20 25 30 km

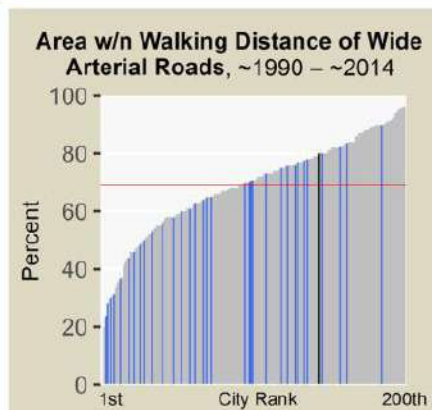
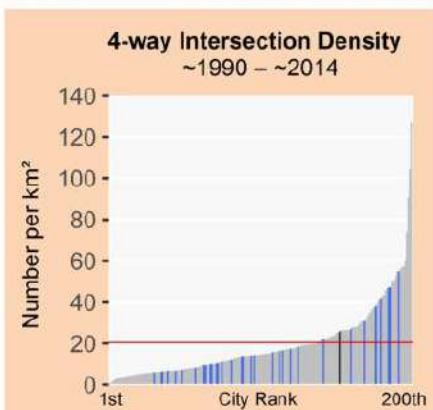
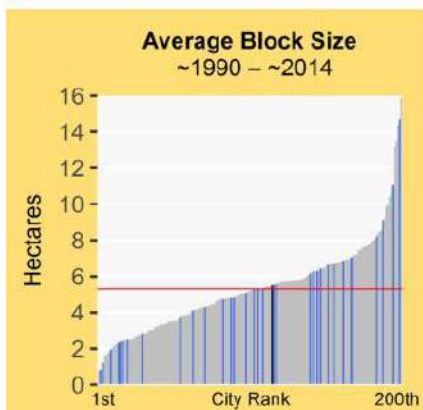
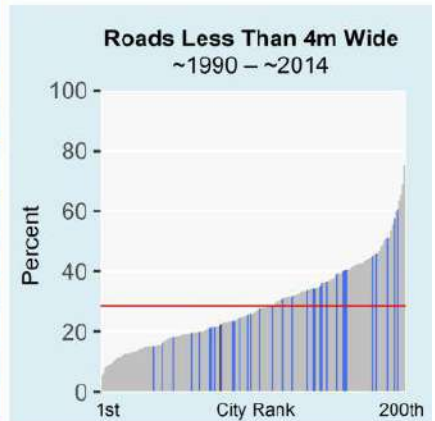
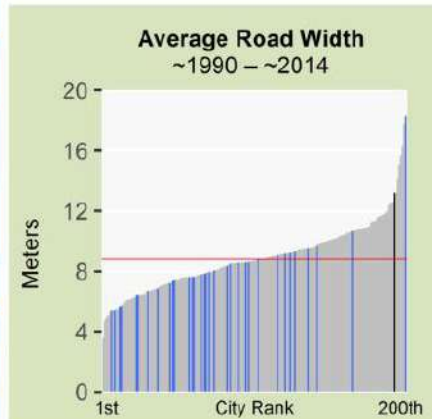
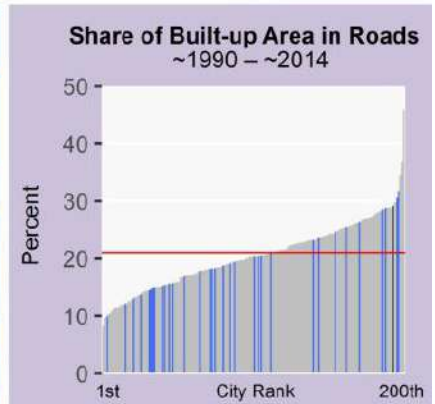
N

- Urban Extent in 1991
- Expansion, 1991 - 2002
- Expansion, 2002 - 2010
- Arterial Roads

# Madrid, Spain (Europe and Japan)



Legend for Charts			
	Madrid	Other cities in region	Global average
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	28%		29%
Share of Built-Up Area that is Gridded or Partially Gridded	7%		5%
Average Road Width (m)	13.2		11.3
Share of Roads less than 4m Wide	11%		22%
Share of Roads more than 16m Wide	25%		27%
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	1.8		1.4
Average Beeline Distance to Arterial Roads (m)	204		266
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	96%		90%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	94%		80%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	18%		21%
Average Block Size (ha)	3.8		5.5
3-way Intersection Density (number per km <sup>2</sup> )	108		80
4-way Intersection Density (number per km <sup>2</sup> )	34		26
Walkability Ratio	1.6		1.8
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	565		546
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	67%		70%
Share of Residential Area Not Laid Out Before Occupation	4%		13%
Share of Residential Area Laid Out Before Occupation	95%		86%
Share of Residential Area in Informal Land Subdivisions	0%		0%
Share of Residential Area in Formal Land Subdivisions	79%		67%
Share of Residential Area in Housing Projects	16%		19%



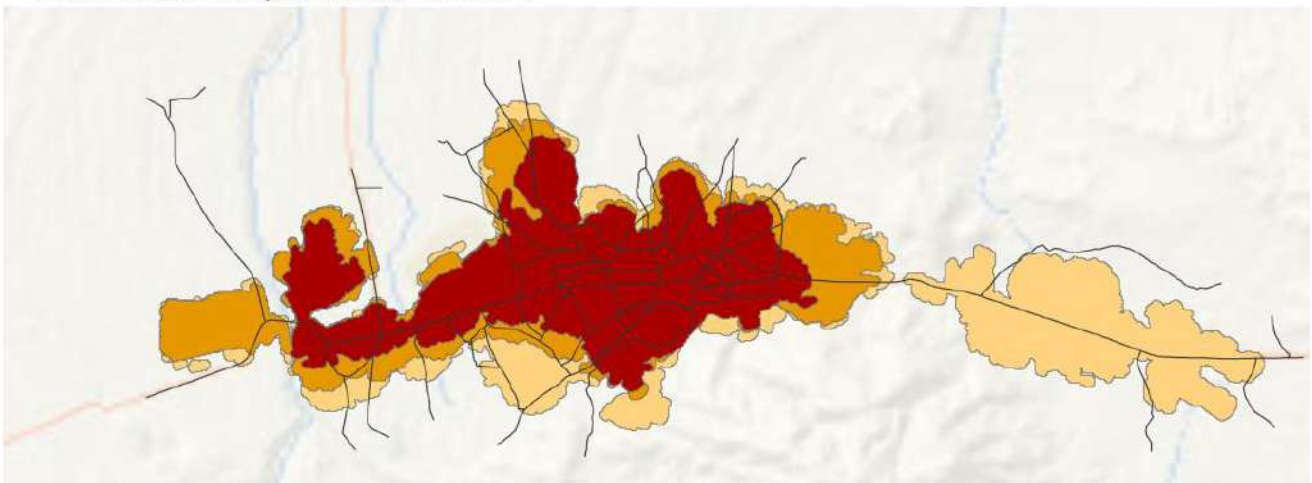
# Malatya, Turkey (Western Asia and North Africa)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



## Malatya, Turkey 1990-2014



- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2014

Arterial Roads

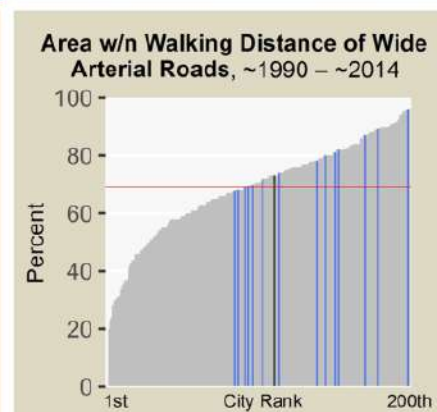
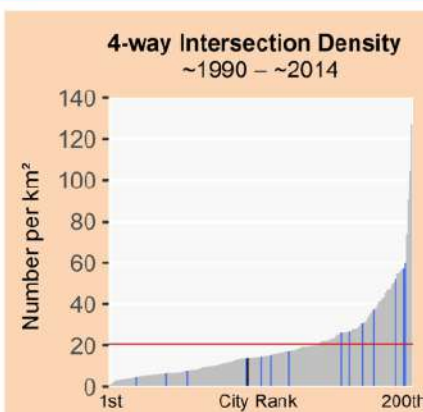
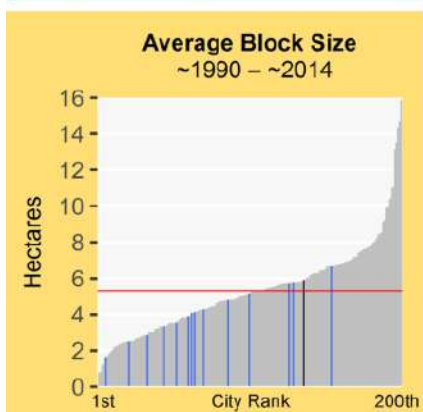
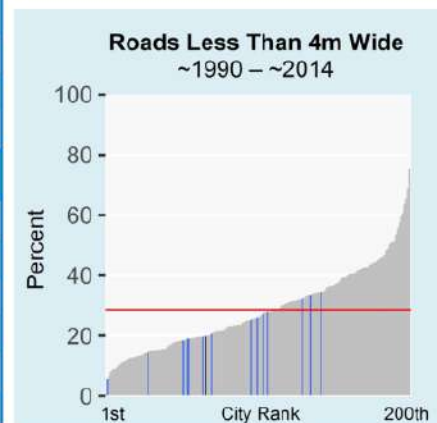
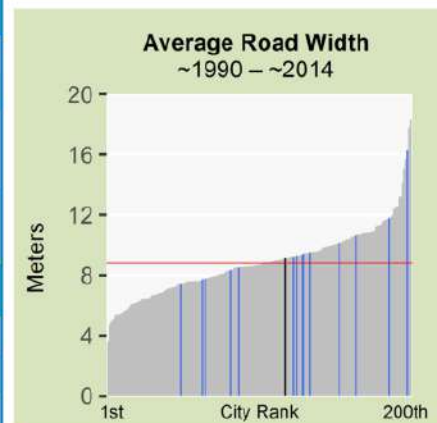
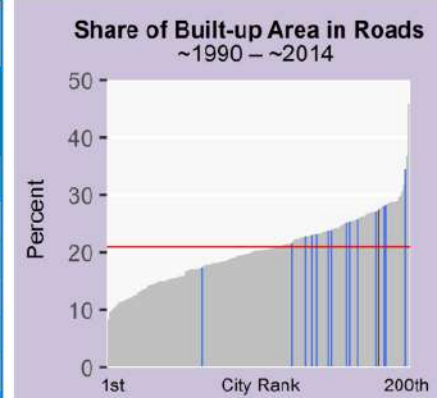
# Malatya, Turkey (Western Asia and North Africa)



### Legend for Charts

Malatya | Other cities in region | All other cities | Global average

Metrics	Pre-1990	1990-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	27%	27%
Share of Built-Up Area that is Gridded or Partially Gridded	2%	0%
Average Road Width (m)	9.2	9.3
Share of Roads less than 4m Wide	10%	19%
Share of Roads more than 16m Wide	11%	14%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.9	1.3
Average Beeline Distance to Arterial Roads (m)	228	354
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	90%	79%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	86%	73%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	14%	8%
Average Block Size (ha)	1.4	5.9
3-way Intersection Density (number per km <sup>2</sup> )	204	121
4-way Intersection Density (number per km <sup>2</sup> )	35	14
Walkability Ratio	1.5	1.8
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	72%	79%
Share of Residential Area Not Laid Out Before Occupation	3%	27%
Share of Residential Area Laid Out Before Occupation	96%	72%
Share of Residential Area in Informal Land Subdivisions	10%	12%
Share of Residential Area in Formal Land Subdivisions	76%	31%
Share of Residential Area in Housing Projects	9%	28%



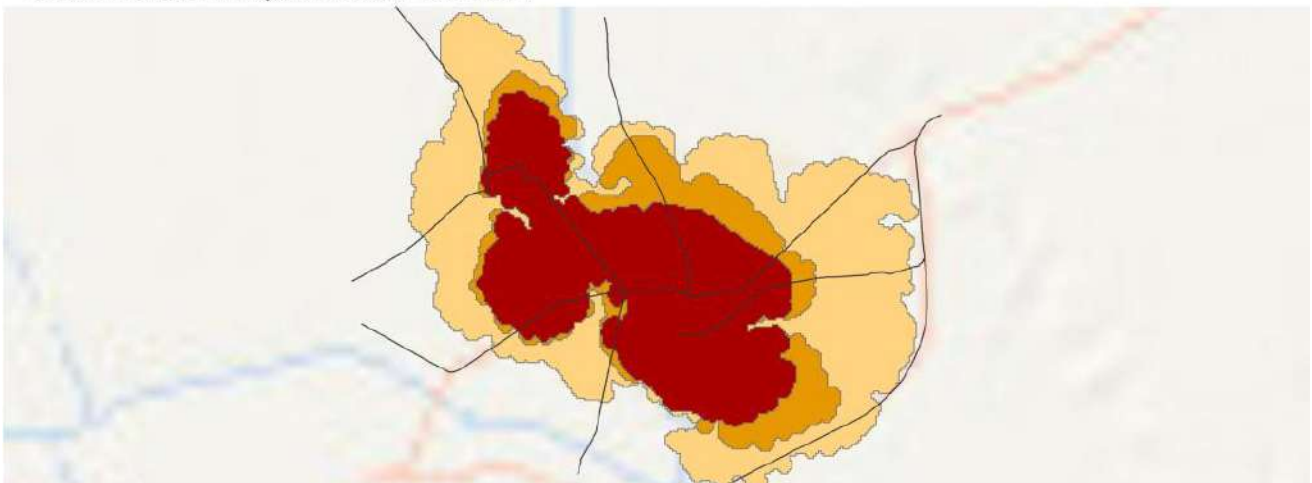
# Malegaon, India (South and Central Asia)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2014



## Malegaon, India 1991-2014



- Urban Extent in 1991
- Expansion, 1991 - 2000
- Expansion, 2000 - 2014

Arterial Roads

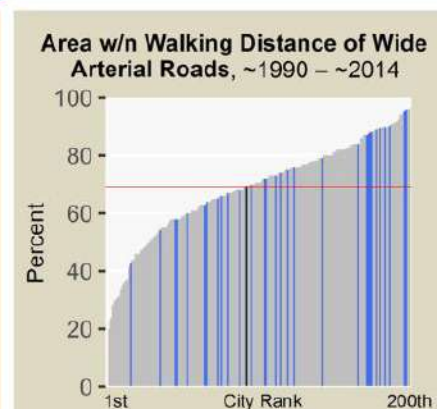
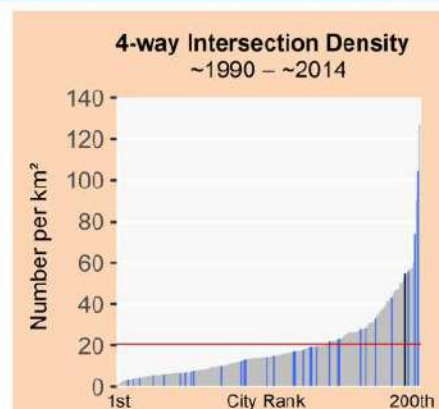
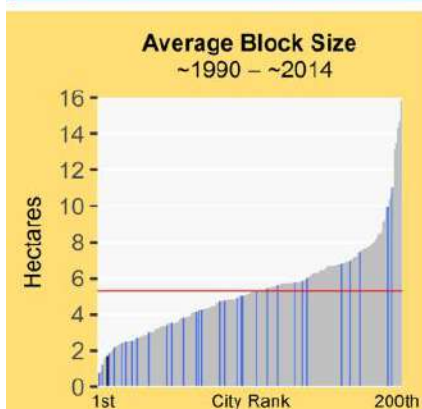
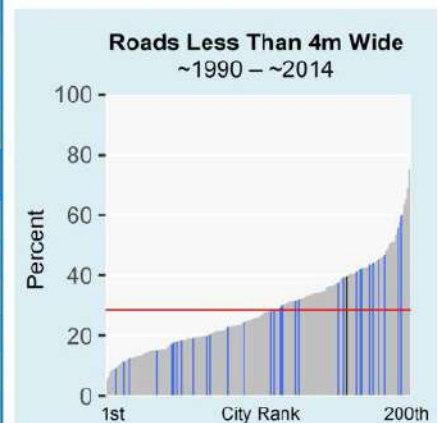
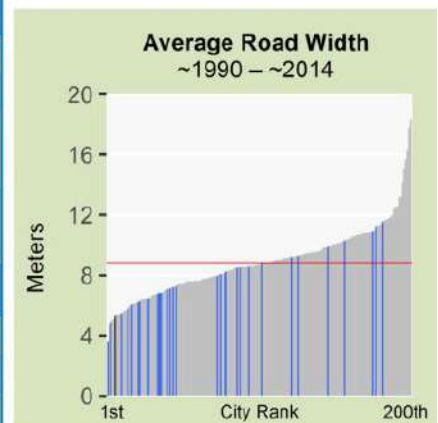
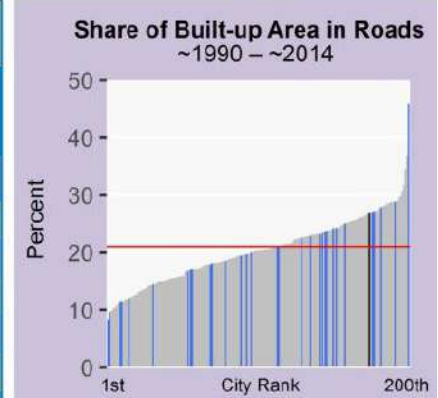
# Malegaon, India (South and Central Asia)



### Legend for Charts

Malegaon | Other cities in region | All other cities | Global average

Metrics	Pre-1991	1991-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	19%	26%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	5.3	4.6
Share of Roads less than 4m Wide	36%	39%
Share of Roads more than 16m Wide	2%	1%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.1	0.8
Average Beeline Distance to Arterial Roads (m)	343	391
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	81%	78%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	72%	69%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	12%	10%
Average Block Size (ha)	1.2	1.7
3-way Intersection Density (number per km <sup>2</sup> )	292	422
4-way Intersection Density (number per km <sup>2</sup> )	52	55
Walkability Ratio	1.5	1.5
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	170	130
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	65%	68%
Share of Residential Area Not Laid Out Before Occupation	35%	48%
Share of Residential Area Laid Out Before Occupation	64%	51%
Share of Residential Area in Informal Land Subdivisions	38%	48%
Share of Residential Area in Formal Land Subdivisions	25%	0%
Share of Residential Area in Housing Projects	0%	2%



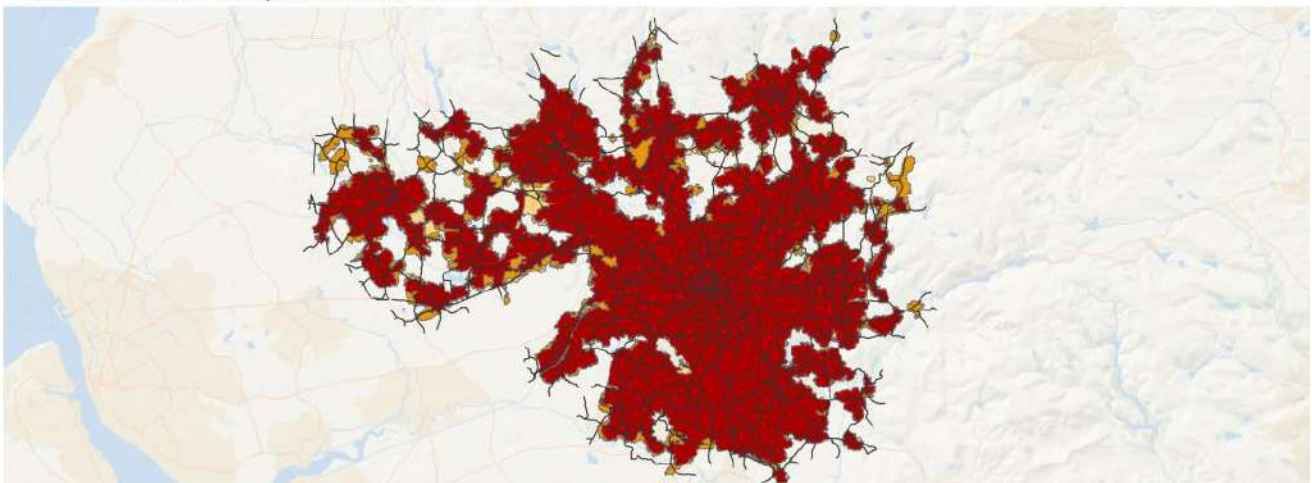
# Manchester, United Kingdom (Europe and Japan)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2010



## Manchester, United Kingdom 1989-2010



- Urban Extent in 1989
- Expansion, 1989 - 2002
- Expansion, 2002 - 2010

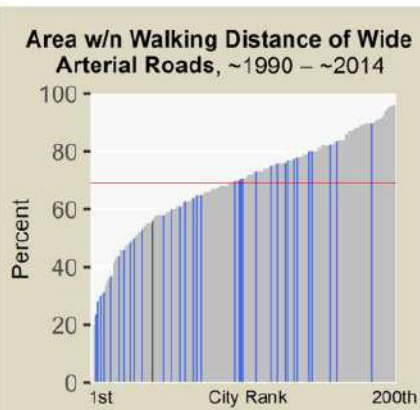
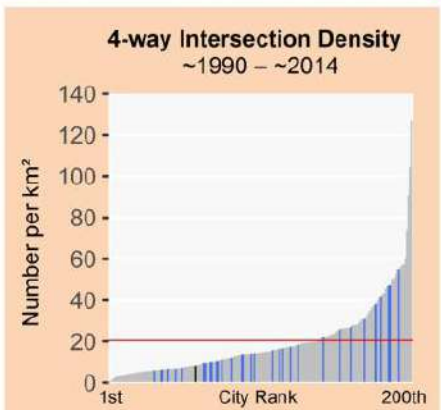
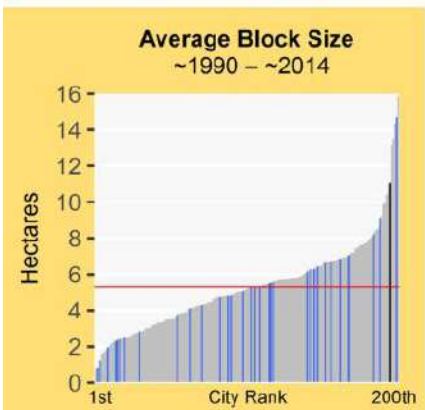
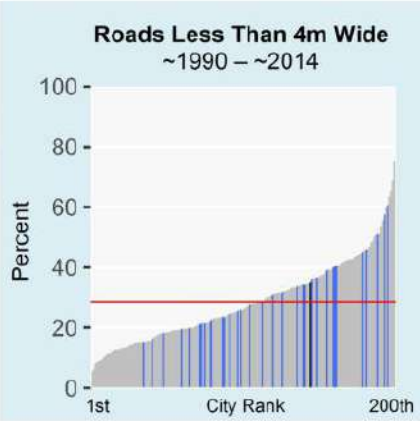
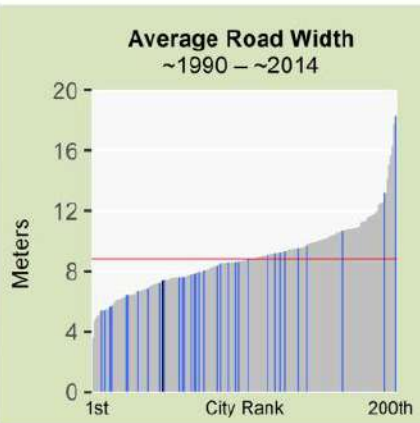
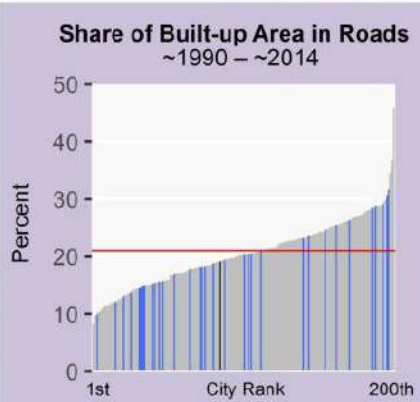
Arterial Roads



# Manchester, United Kingdom (Europe and Japan)



Legend for Charts			
	Manchester	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1989	1989-2010	
Roads			
Share of Built-Up Area Occupied by Roads	19%	19%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%	
Average Road Width (m)	7.4	6.3	
Share of Roads less than 4m Wide	25%	35%	
Share of Roads more than 16m Wide	4%	3%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	1.8	1.7	
Average Beeline Distance to Arterial Roads (m)	187	194	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	97%	96%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	58%	56%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	10%	6%	
Average Block Size (ha)	5.3	11.1	
3-way Intersection Density (number per km <sup>2</sup> )	150	76	
4-way Intersection Density (number per km <sup>2</sup> )	22	8	
Walkability Ratio	2.0	1.8	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	489	321	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	63%	58%	
Share of Residential Area Not Laid Out Before Occupation	1%	21%	
Share of Residential Area Laid Out Before Occupation	98%	78%	
Share of Residential Area in Informal Land Subdivisions	0%	0%	
Share of Residential Area in Formal Land Subdivisions	97%	78%	
Share of Residential Area in Housing Projects	0%	0%	



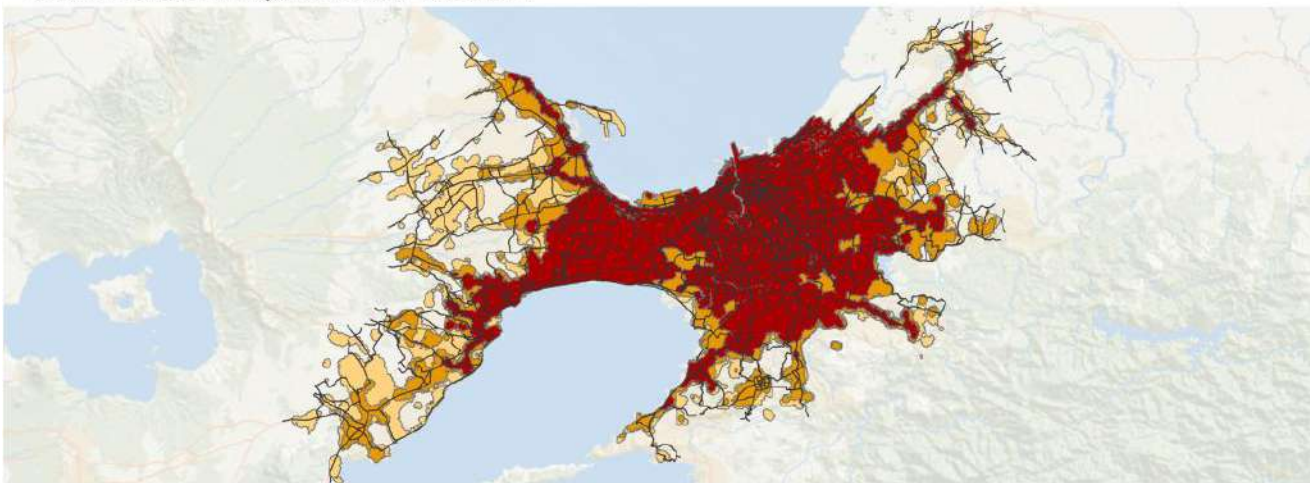
# Manila, Philippines (Southeast Asia)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



## Manila, Philippines 1990-2014



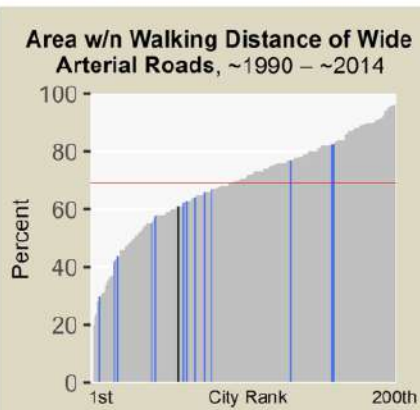
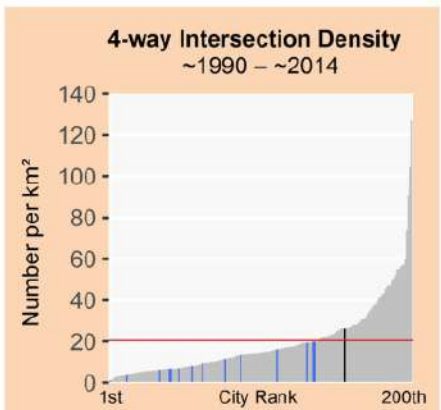
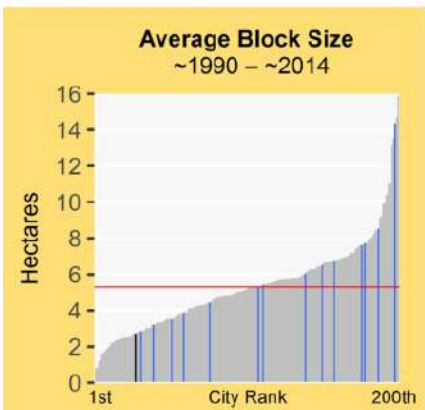
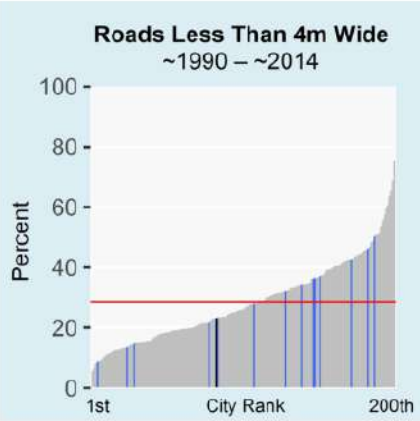
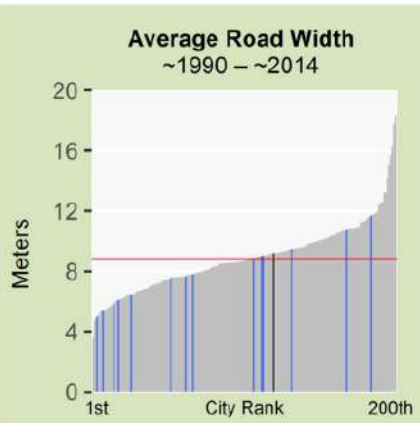
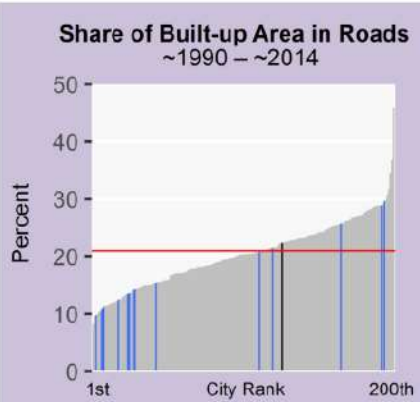
- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2014

Arterial Roads

# Manila, Philippines (Southeast Asia)



Legend for Charts		
	Manila	Other cities in region   All other cities   Global average
Metrics	Pre-1990	1990-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	19%	22%
Share of Built-Up Area that is Gridded or Partially Gridded	12%	0%
Average Road Width (m)	9.2	5.8
Share of Roads less than 4m Wide	11%	23%
Share of Roads more than 16m Wide	10%	0%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.9	1.5
Average Beeline Distance to Arterial Roads (m)	202	265
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	95%	90%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	72%	61%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	19%	10%
Average Block Size (ha)	3.1	2.7
3-way Intersection Density (number per km <sup>2</sup> )	82	189
4-way Intersection Density (number per km <sup>2</sup> )	28	26
Walkability Ratio	1.6	1.8
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		94
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	329	312
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	69%	76%
Share of Residential Area Not Laid Out Before Occupation	44%	32%
Share of Residential Area Laid Out Before Occupation	50%	67%
Share of Residential Area in Informal Land Subdivisions	1%	27%
Share of Residential Area in Formal Land Subdivisions	52%	33%
Share of Residential Area in Housing Projects	0%	6%



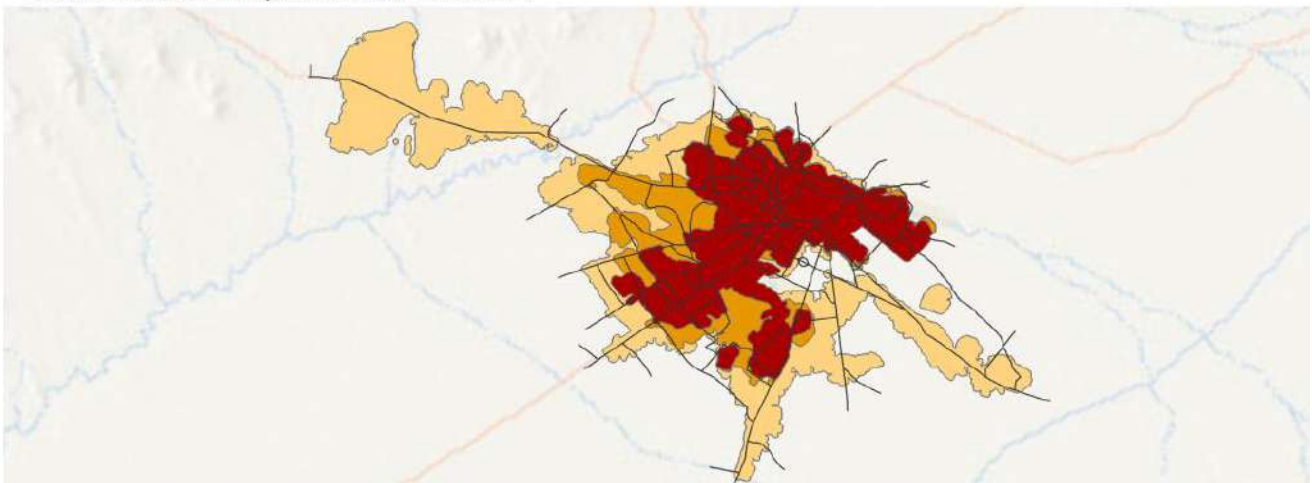
# Marrakesh, Morocco (Western Asia and North Africa)



Selected Locales in Area Developed Before 1988



Selected Locales in Expansion Area, 1988-2014



## Marrakesh, Morocco 1988-2014



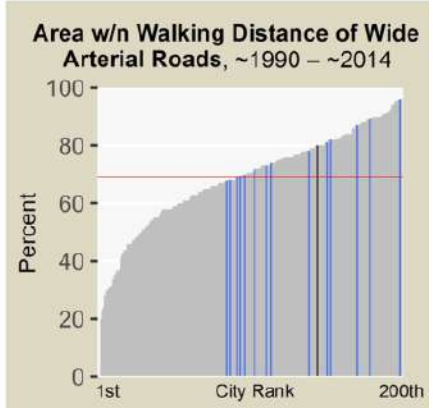
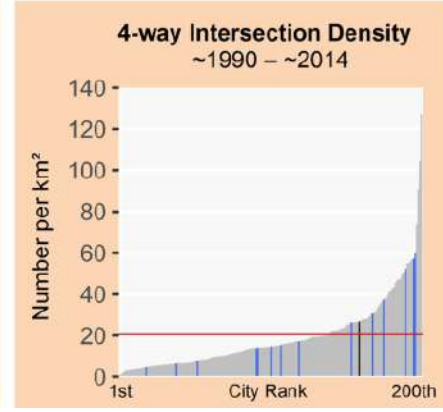
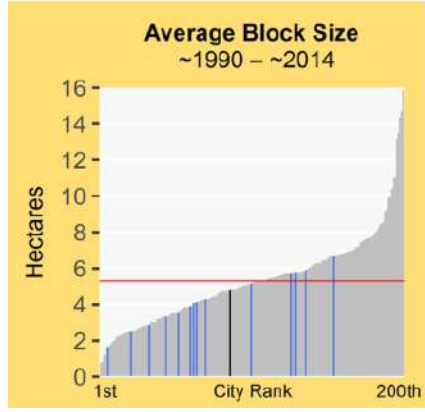
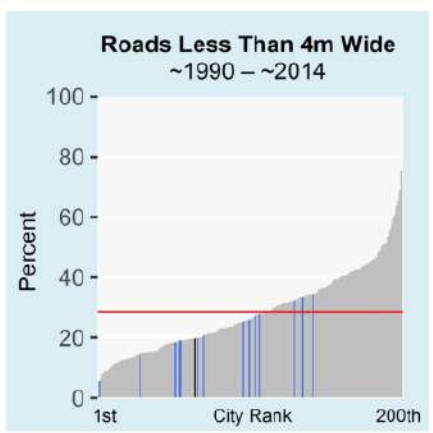
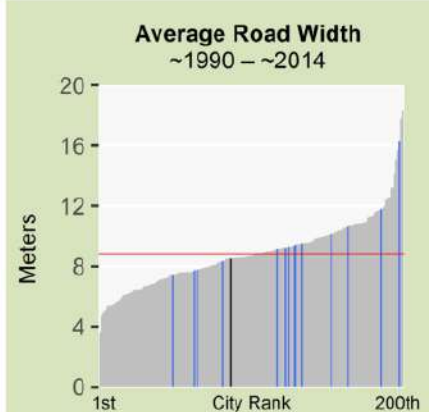
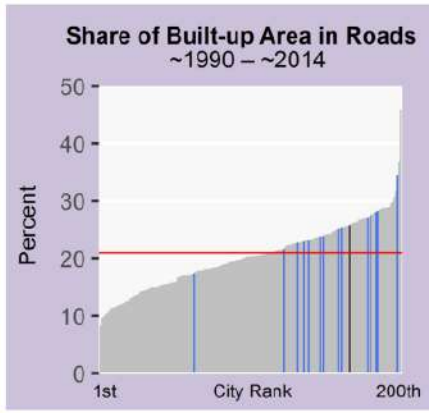
- Urban Extent in 1988
- Expansion, 1988 - 2002
- Expansion, 2002 - 2014

Arterial Roads

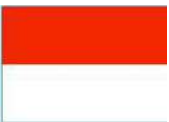
# Marrakesh, Morocco (Western Asia and North Africa)



Legend for Charts			
	Marrakesh	Other cities in region	All other cities
			Global average
Metrics			
Roads			
Share of Built-Up Area Occupied by Roads	21%	1988-2014	25%
Share of Built-Up Area that is Gridded or Partially Gridded	2%	1988-2014	0%
Average Road Width (m)	8.5	1988-2014	8.7
Share of Roads less than 4m Wide	27%	1988-2014	19%
Share of Roads more than 16m Wide	13%	1988-2014	12%
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	2.3	1988-2014	1.4
Average Beeline Distance to Arterial Roads (m)	176	1988-2014	360
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	97%	1988-2014	85%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	92%	1988-2014	80%
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	12%	1988-2014	13%
Average Block Size (ha)	2.7	1988-2014	4.8
3-way Intersection Density (number per km <sup>2</sup> )	159	1988-2014	172
4-way Intersection Density (number per km <sup>2</sup> )	21	1988-2014	27
Walkability Ratio	1.7	1988-2014	1.5
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	136	1988-2014	1226
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	194	1988-2014	478
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	62%	1988-2014	75%
Share of Residential Area Not Laid Out Before Occupation	20%	1988-2014	22%
Share of Residential Area Laid Out Before Occupation	79%	1988-2014	77%
Share of Residential Area in Informal Land Subdivisions	3%	1988-2014	12%
Share of Residential Area in Formal Land Subdivisions	61%	1988-2014	33%
Share of Residential Area in Housing Projects	14%	1988-2014	31%



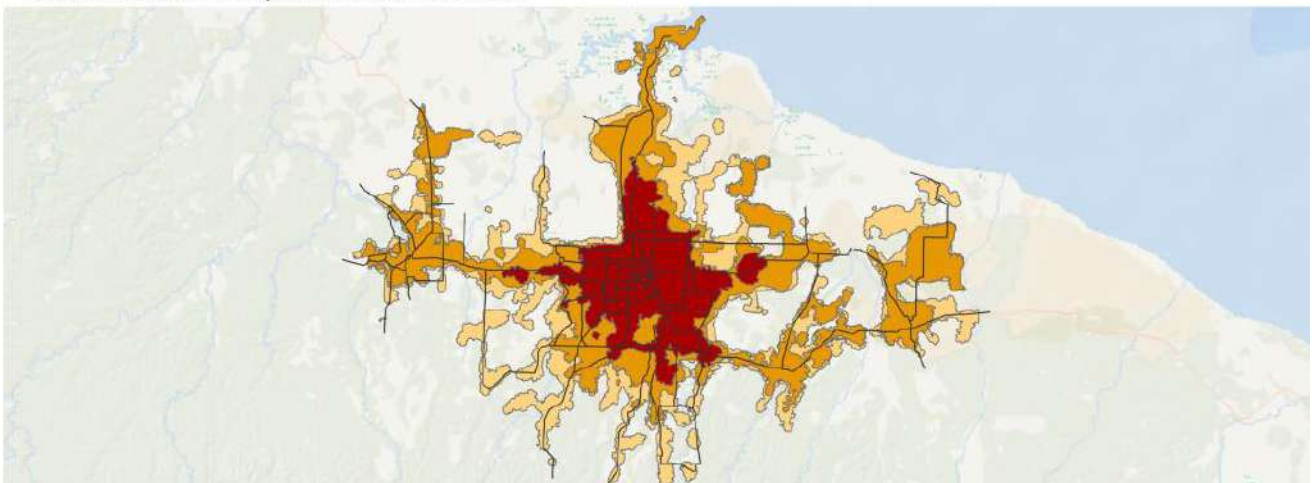
# Medan, Indonesia (Southeast Asia)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2013



## Medan, Indonesia 1989-2013



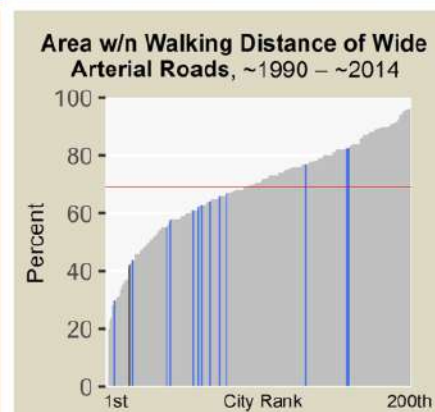
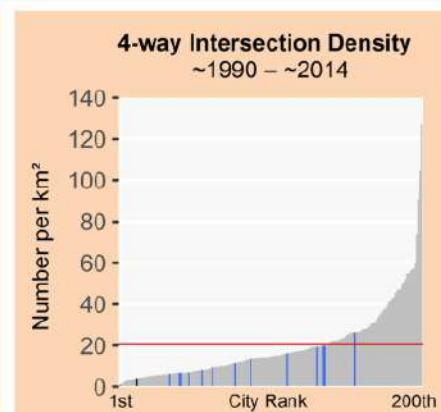
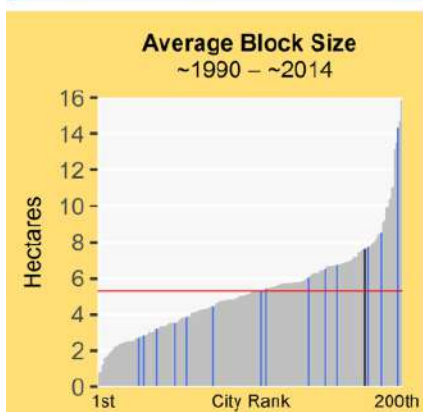
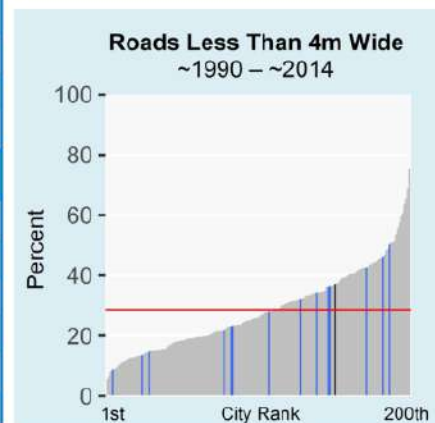
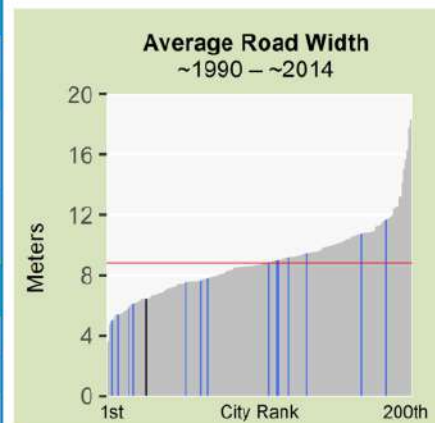
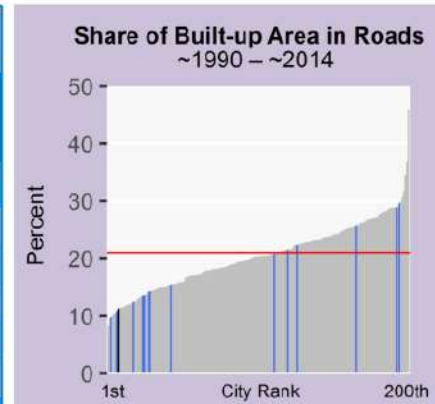
- Urban Extent in 1989
- Expansion, 1989 - 2001
- Expansion, 2001 - 2013

Arterial Roads

# Medan, Indonesia (Southeast Asia)



Legend for Charts			
	Medan	Other cities in region	All other cities
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	12%		11%
Share of Built-Up Area that is Gridded or Partially Gridded	0%		0%
Average Road Width (m)	6.5		5.1
Share of Roads less than 4m Wide	24%		37%
Share of Roads more than 16m Wide	4%		0%
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	1.3		0.7
Average Beeline Distance to Arterial Roads (m)	284		645
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	88%		68%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	70%		42%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	9%		5%
Average Block Size (ha)	5.2		7.6
3-way Intersection Density (number per km <sup>2</sup> )	76		55
4-way Intersection Density (number per km <sup>2</sup> )	10		4
Walkability Ratio	1.7		1.5
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	483		
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	69%		75%
Share of Residential Area Not Laid Out Before Occupation	10%		69%
Share of Residential Area Laid Out Before Occupation	89%		30%
Share of Residential Area in Informal Land Subdivisions	38%		25%
Share of Residential Area in Formal Land Subdivisions	50%		4%
Share of Residential Area in Housing Projects	0%		0%



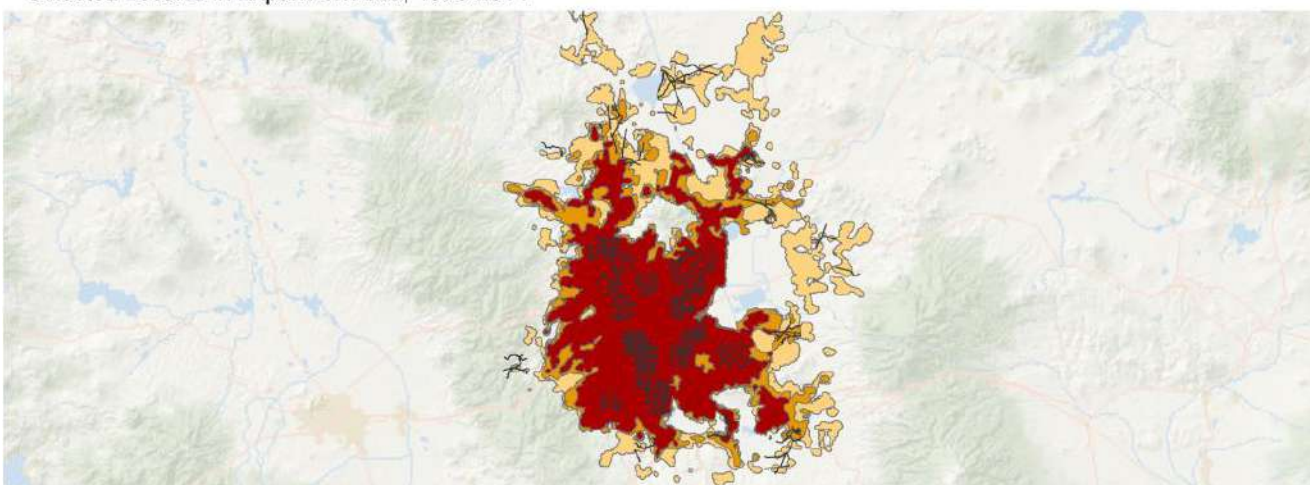
# Mexico City, Mexico (Latin America and the Caribbean)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



**Mexico City, Mexico**  
1990-2014

0 10 20 30 40 50 60 km

N

- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2014
- Arterial Roads



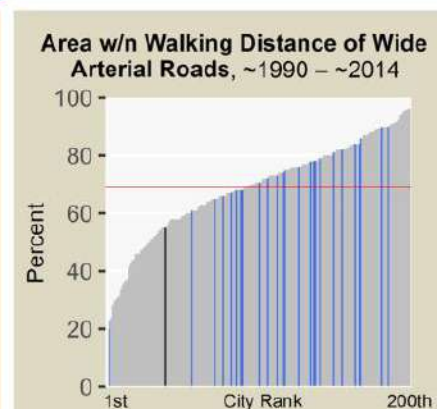
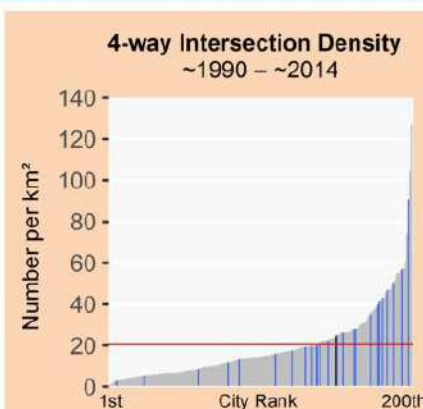
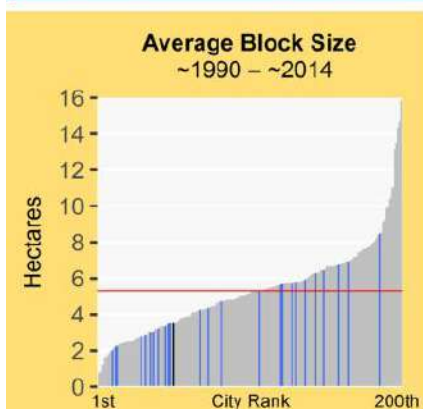
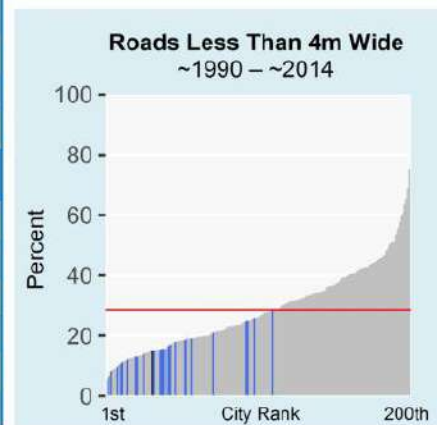
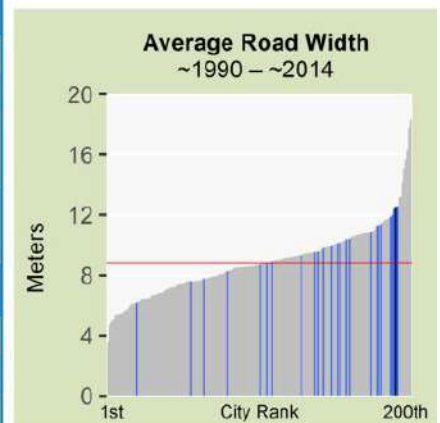
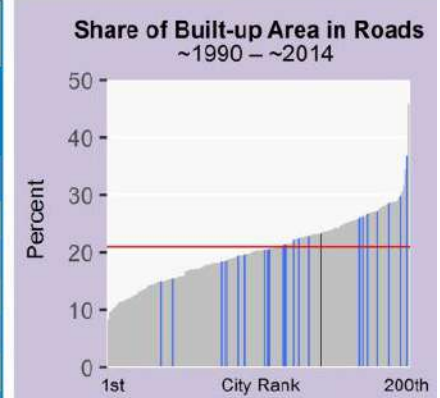
# Mexico City, Mexico (Latin America and the Caribbean)



### Legend for Charts

Mexico City | Other cities in region | All other cities | Global average

Metrics	Pre-1990	1990-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	25%	23%
Share of Built-Up Area that is Gridded or Partially Gridded	53%	7%
Average Road Width (m)	12.5	8.0
Share of Roads less than 4m Wide	5%	14%
Share of Roads more than 16m Wide	19%	4%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.4	0.8
Average Beeline Distance to Arterial Roads (m)	162	418
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	98%	77%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	97%	55%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	38%	14%
Average Block Size (ha)	2.7	3.5
3-way Intersection Density (number per km <sup>2</sup> )	68	149
4-way Intersection Density (number per km <sup>2</sup> )	37	25
Walkability Ratio	1.6	1.7
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		132
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	211	181
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	65%	64%
Share of Residential Area Not Laid Out Before Occupation	4%	25%
Share of Residential Area Laid Out Before Occupation	90%	74%
Share of Residential Area in Informal Land Subdivisions	3%	27%
Share of Residential Area in Formal Land Subdivisions	89%	42%
Share of Residential Area in Housing Projects	1%	4%



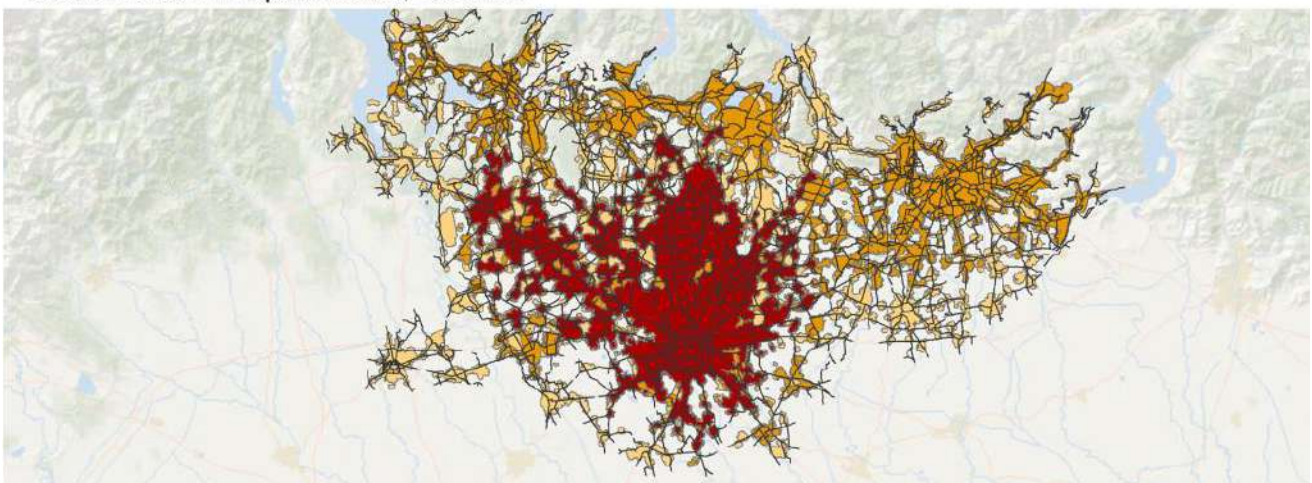
# Milan, Italy (Europe and Japan)



Selected Locales in Area Developed Before 1988



Selected Locales in Expansion Area, 1988-2013



Milan, Italy  
1988-2013

0 10 20 30 40 km

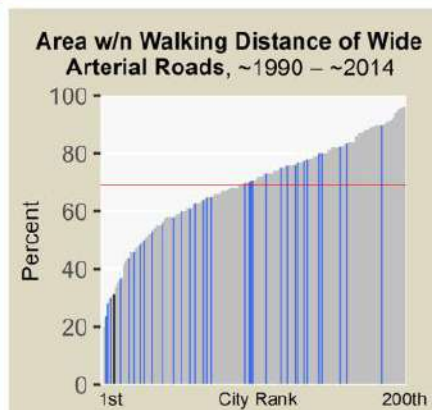
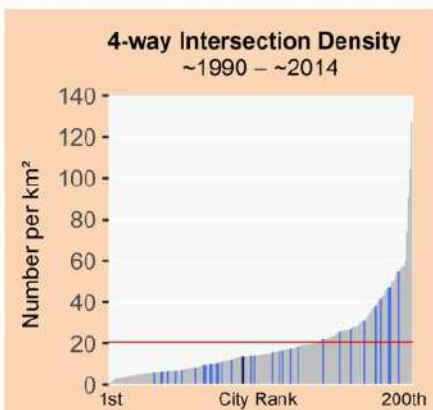
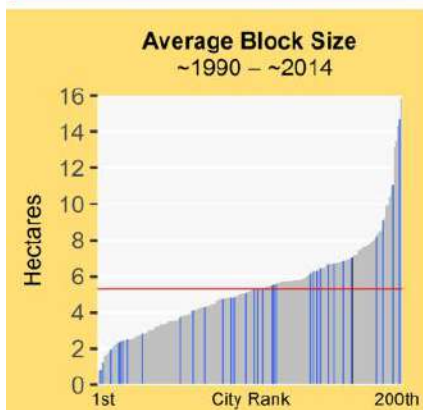
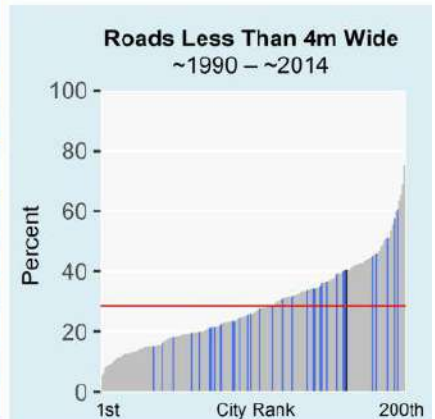
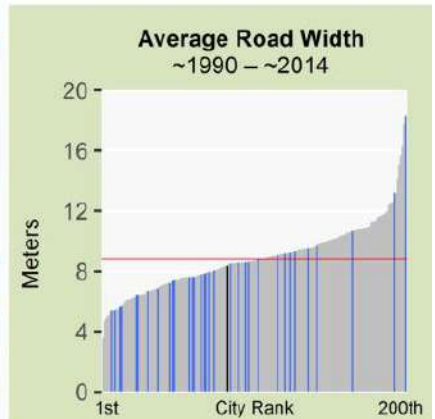
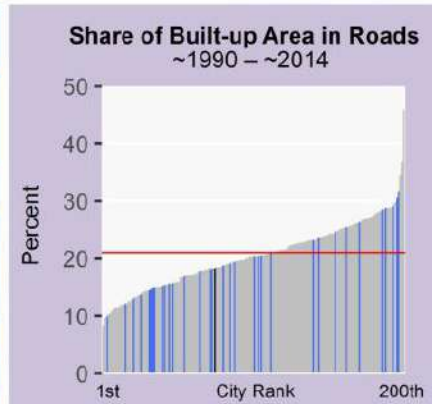
N

- Urban Extent in 1988
- Expansion, 1988 - 2003
- Expansion, 2003 - 2013
- Arterial Roads

# Milan, Italy (Europe and Japan)



Legend for Charts			
	Milan	Other cities in region	Global average
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	21%		18%
Share of Built-Up Area that is Gridded or Partially Gridded	2%		0%
Average Road Width (m)	8.4		5.0
Share of Roads less than 4m Wide	17%		40%
Share of Roads more than 16m Wide	10%		0%
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	1.5		1.5
Average Beeline Distance to Arterial Roads (m)	234		244
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	93%		92%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	52%		31%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	10%		9%
Average Block Size (ha)	3.9		7.1
3-way Intersection Density (number per km <sup>2</sup> )	93		101
4-way Intersection Density (number per km <sup>2</sup> )	13		14
Walkability Ratio	2.1		2.0
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )			
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	58%		66%
Share of Residential Area Not Laid Out Before Occupation	4%		39%
Share of Residential Area Laid Out Before Occupation	95%		60%
Share of Residential Area in Informal Land Subdivisions	0%		0%
Share of Residential Area in Formal Land Subdivisions	84%		44%
Share of Residential Area in Housing Projects	11%		16%



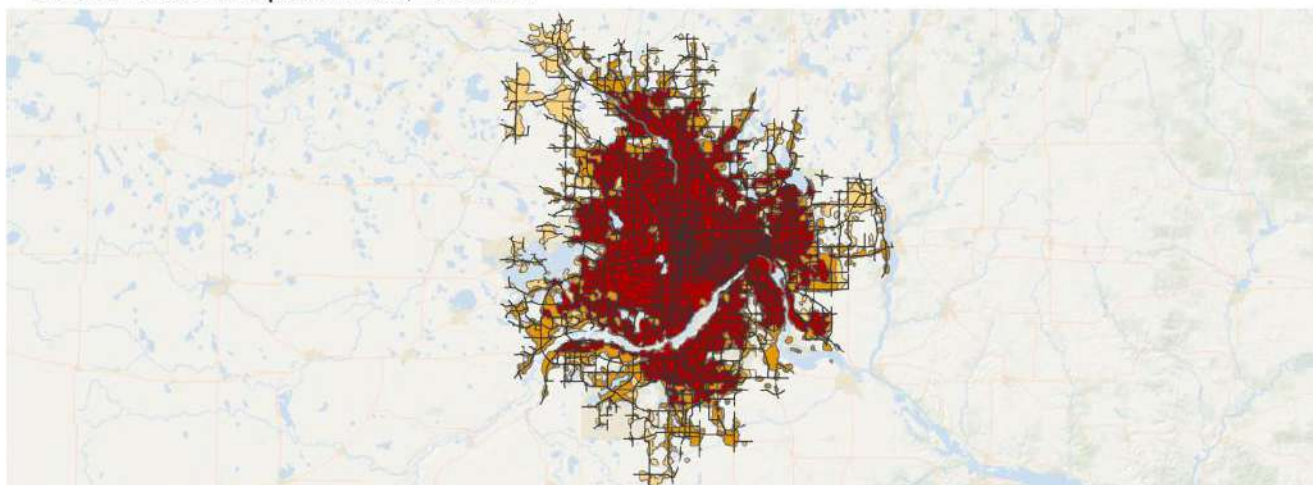
# Minneapolis, United States (Land-Rich Developed Countries)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



**Minneapolis, United States**  
1990-2014

0 10 20 30 40 50 km

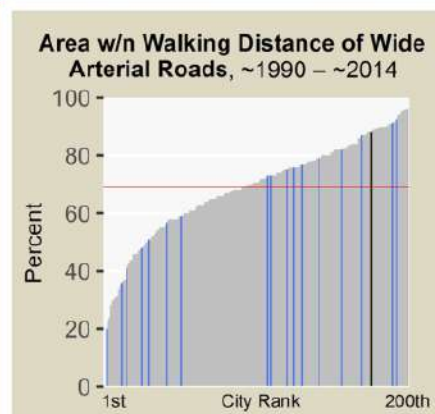
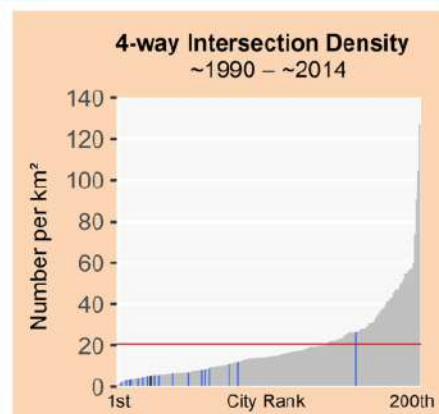
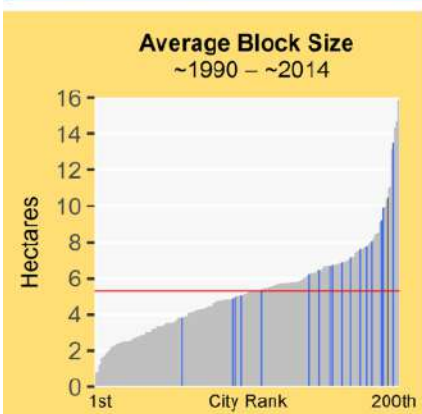
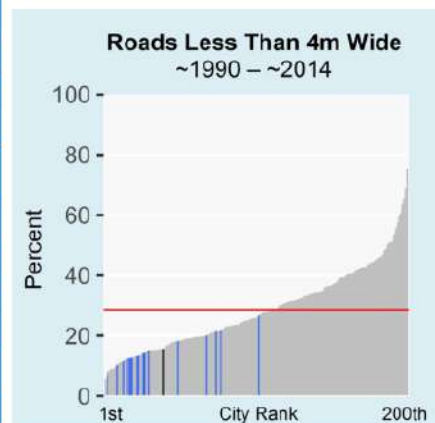
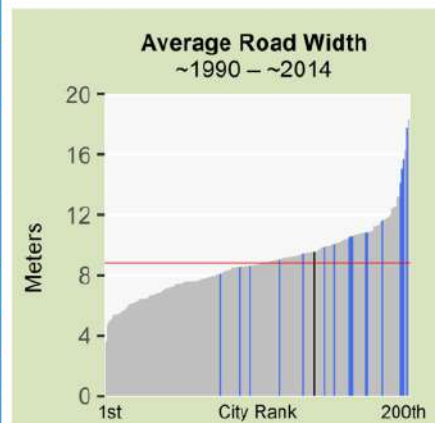
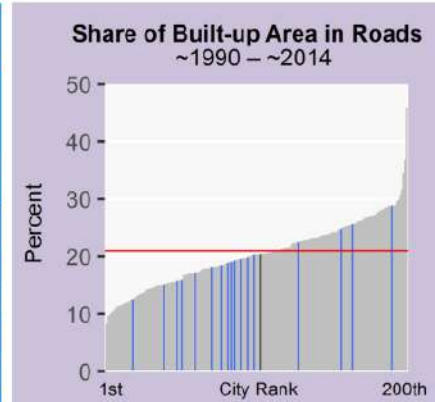
N

- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2014
- Arterial Roads

# Minneapolis, United States (Land-Rich Developed Countries)



Legend for Charts			
	Minneapolis	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1990	1990-2014	
Roads			
Share of Built-Up Area Occupied by Roads	22%	20%	
Share of Built-Up Area that is Gridded or Partially Gridded	15%	0%	
Average Road Width (m)	9.5	8.8	
Share of Roads less than 4m Wide	15%	15%	
Share of Roads more than 16m Wide	14%	6%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	1.8	1.5	
Average Beeline Distance to Arterial Roads (m)	213	250	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	95%	92%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	92%	88%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	17%	5%	
Average Block Size (ha)	3.8	10.5	
3-way Intersection Density (number per km <sup>2</sup> )	102	52	
4-way Intersection Density (number per km <sup>2</sup> )	17	5	
Walkability Ratio	1.8	1.6	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	925	1091	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	72%	84%	
Share of Residential Area Not Laid Out Before Occupation	6%	28%	
Share of Residential Area Laid Out Before Occupation	93%	71%	
Share of Residential Area in Informal Land Subdivisions	0%	0%	
Share of Residential Area in Formal Land Subdivisions	80%	61%	
Share of Residential Area in Housing Projects	13%	9%	



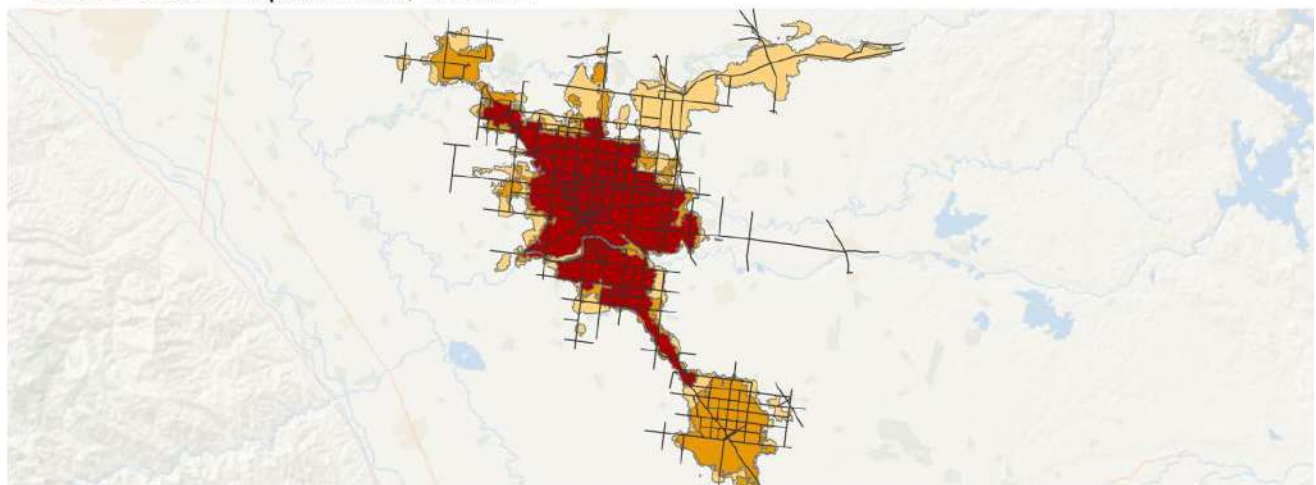
# Modesto, United States (Land-Rich Developed Countries)



Selected Locales in Area Developed Before 1992



Selected Locales in Expansion Area, 1992-2014




Modesto, United States  
1992-2014

0 5 10 15 20 km

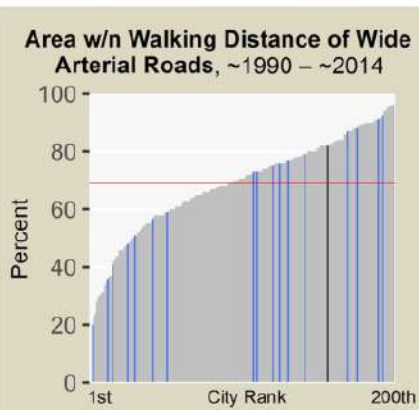
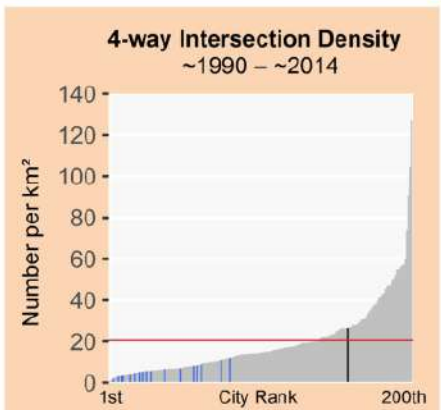
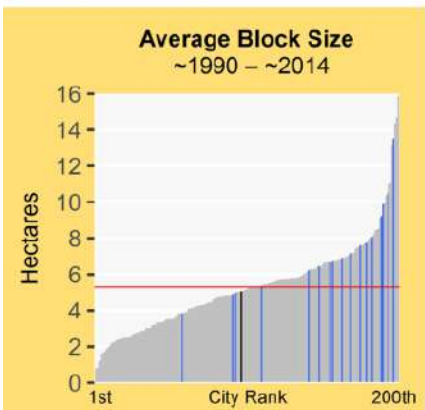
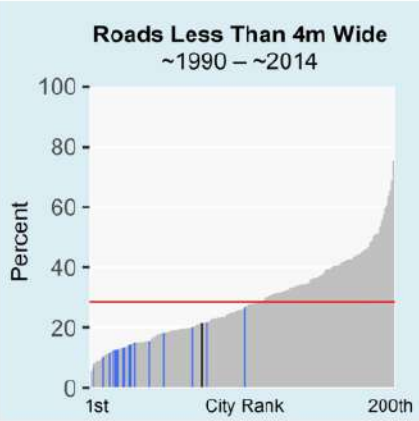
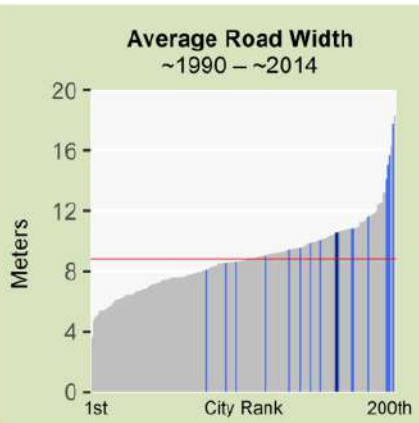
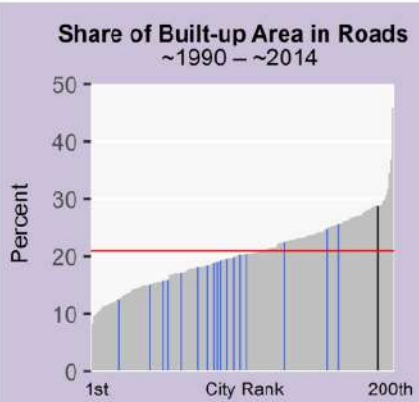
N

- Urban Extent in 1992
- Expansion, 1992 - 2000
- Expansion, 2000 - 2014
- Arterial Roads

# Modesto, United States (Land-Rich Developed Countries)



Legend for Charts			
	Modesto	Other cities in region	All other cities
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	24%		28%
Share of Built-Up Area that is Gridded or Partially Gridded	2%		0%
Average Road Width (m)	10.6		10.2
Share of Roads less than 4m Wide	17%		21%
Share of Roads more than 16m Wide	17%		18%
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	1.9		1.5
Average Beeline Distance to Arterial Roads (m)	196		242
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	96%		92%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	90%		82%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	13%		13%
Average Block Size (ha)	2.5		5.1
3-way Intersection Density (number per km <sup>2</sup> )	128		139
4-way Intersection Density (number per km <sup>2</sup> )	16		27
Walkability Ratio	1.9		2.1
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	620		581
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	70%		66%
Share of Residential Area Not Laid Out Before Occupation	5%		3%
Share of Residential Area Laid Out Before Occupation	94%		96%
Share of Residential Area in Informal Land Subdivisions	1%		0%
Share of Residential Area in Formal Land Subdivisions	87%		89%
Share of Residential Area in Housing Projects	5%		6%



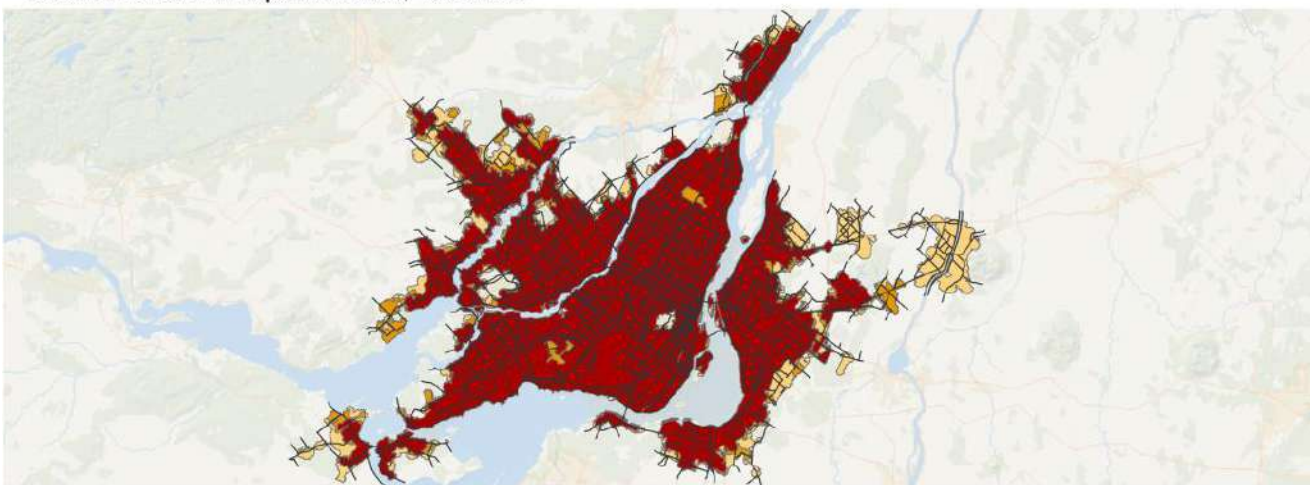
# Montreal, Canada (Land-Rich Developed Countries)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013



## Montreal, Canada 1990-2013



- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2013

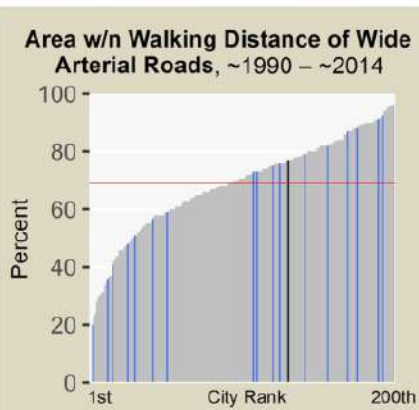
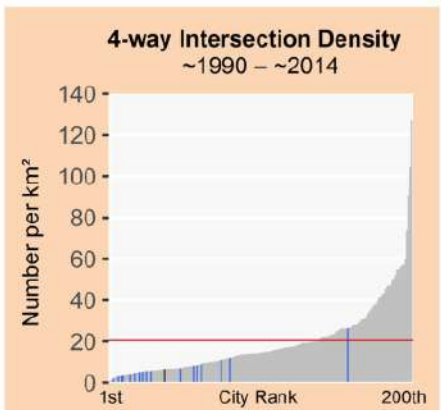
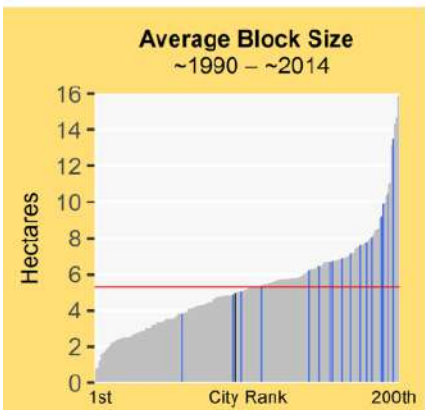
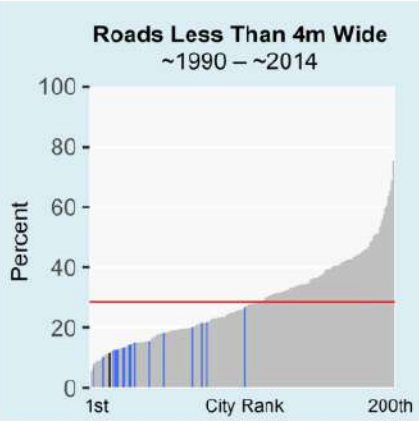
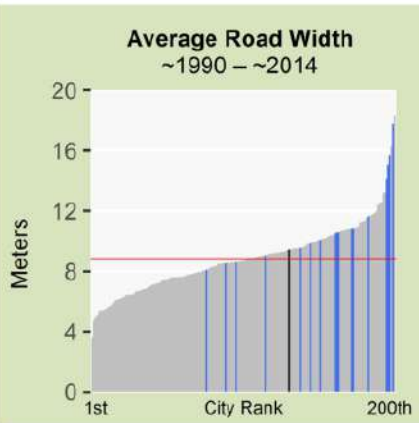
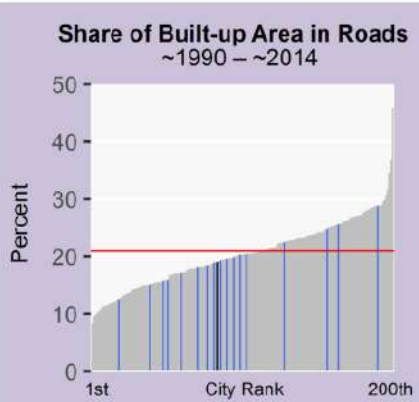
Arterial Roads



# Montreal, Canada (Land-Rich Developed Countries)



Legend for Charts		
Montreal	Other cities in region	All other cities
		Global average
Metrics	Pre-1990	1990-2013
Roads		
Share of Built-Up Area Occupied by Roads	20%	19%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	9.4	16.1
Share of Roads less than 4m Wide	10%	11%
Share of Roads more than 16m Wide	8%	11%
Arterial Roads		
Density of Arterial Roads (km/km <sup>2</sup> )	2.3	2.1
Average Beeline Distance to Arterial Roads (m)	165	187
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	97%	96%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	82%	77%
Block Size, Plot Size, Intersection Density, and Walkability		
Share of Intersections that are 4-way	10%	5%
Average Block Size (ha)	4.1	5.0
3-way Intersection Density (number per km <sup>2</sup> )	84	67
4-way Intersection Density (number per km <sup>2</sup> )	9	7
Walkability Ratio	2.5	2.2
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	556	593
Stages in the Evolution of Residential Layouts		
Share of Built-Up Area in Residential Use	74%	79%
Share of Residential Area Not Laid Out Before Occupation	0%	7%
Share of Residential Area Laid Out Before Occupation	99%	92%
Share of Residential Area in Informal Land Subdivisions	0%	0%
Share of Residential Area in Formal Land Subdivisions	92%	73%
Share of Residential Area in Housing Projects	6%	18%



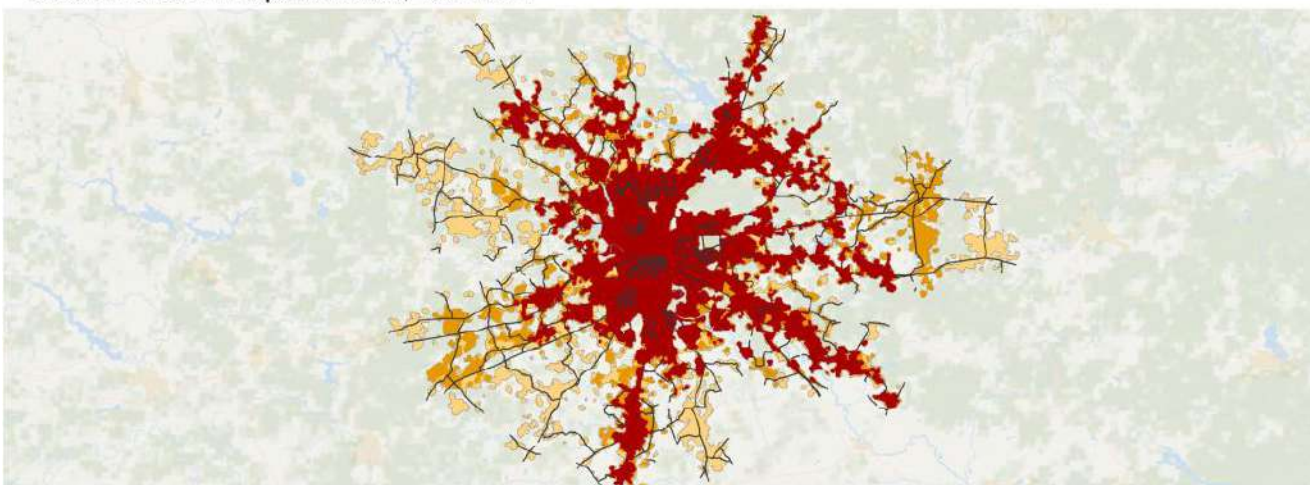
# Moscow, Russia (Europe and Japan)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2014



## Moscow, Russia 1991-2014



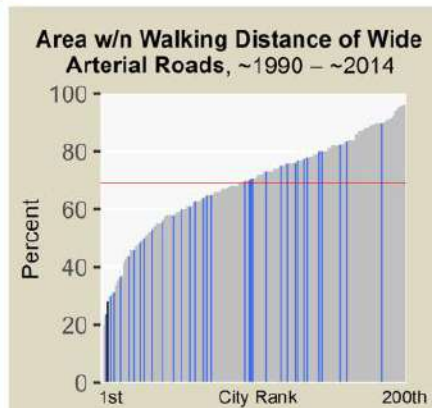
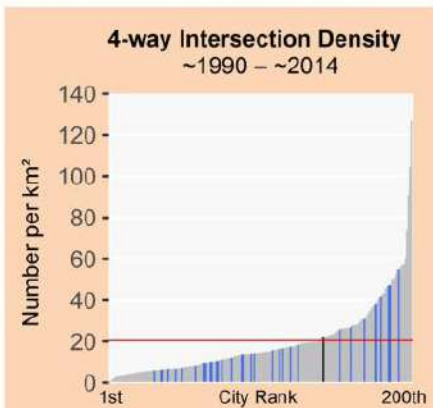
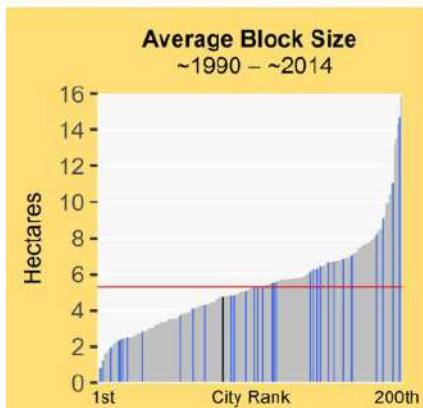
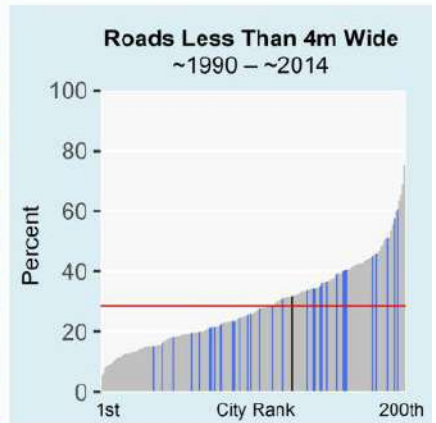
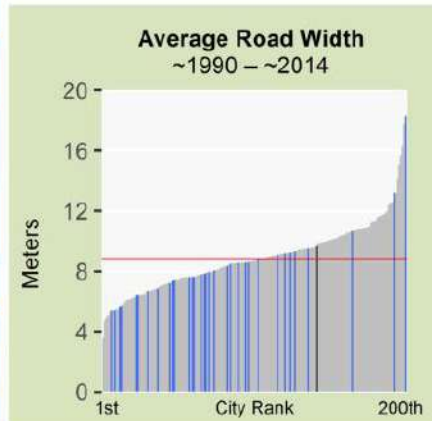
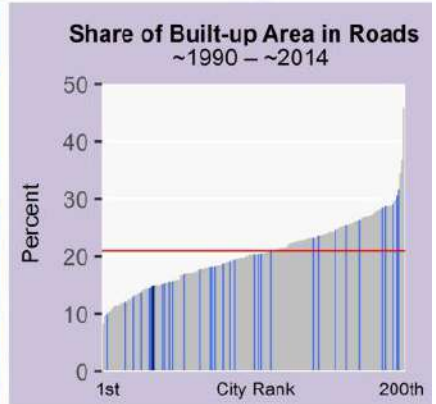
- Urban Extent in 1991
- Expansion, 1991 - 2001
- Expansion, 2001 - 2014

Arterial Roads

# Moscow, Russia (Europe and Japan)



Legend for Charts			
	Moscow	Other cities in region	All other cities
			Global average —
Metrics			
	Pre-1991	1991-2014	
Roads			
Share of Built-Up Area Occupied by Roads	19%	14%	
Share of Built-Up Area that is Gridded or Partially Gridded	3%	2%	
Average Road Width (m)	9.7	5.6	
Share of Roads less than 4m Wide	10%	31%	
Share of Roads more than 16m Wide	25%	2%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	1.1	0.3	
Average Beeline Distance to Arterial Roads (m)	385	1191	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	79%	35%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	75%	28%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	14%	10%	
Average Block Size (ha)	6.1	4.8	
3-way Intersection Density (number per km <sup>2</sup> )	43	102	
4-way Intersection Density (number per km <sup>2</sup> )	8	22	
Walkability Ratio	1.6	2.1	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		1099	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		962	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	74%	84%	
Share of Residential Area Not Laid Out Before Occupation	5%	0%	
Share of Residential Area Laid Out Before Occupation	78%	99%	
Share of Residential Area in Informal Land Subdivisions	8%	74%	
Share of Residential Area in Formal Land Subdivisions	54%	10%	
Share of Residential Area in Housing Projects	31%	14%	



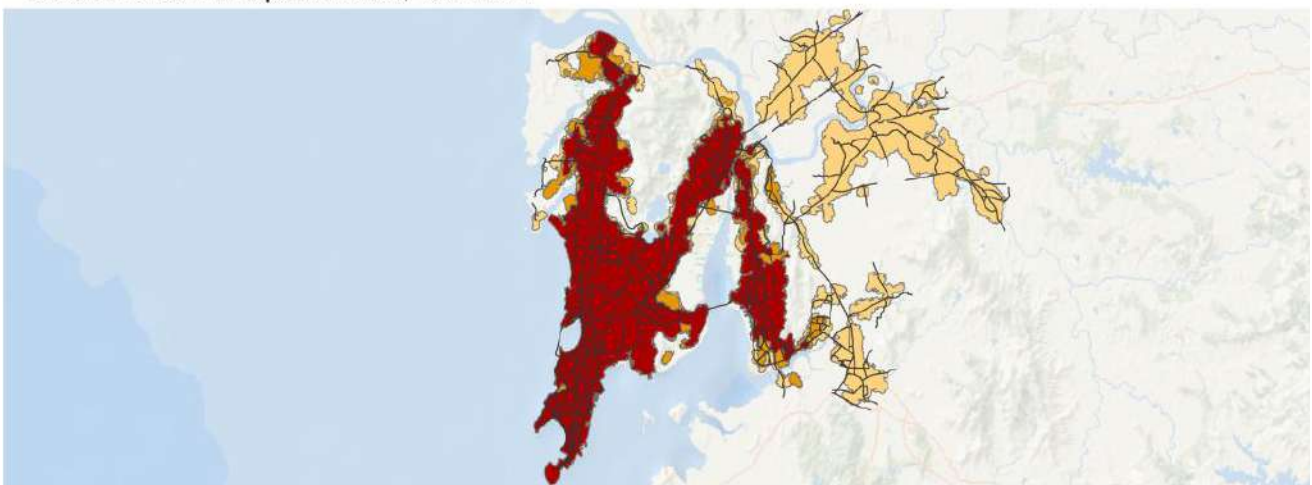
# Mumbai, India (South and Central Asia)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2014



## Mumbai, India 1991-2014



- Urban Extent in 1991
- Expansion, 1991 - 2001
- Expansion, 2001 - 2014

Arterial Roads

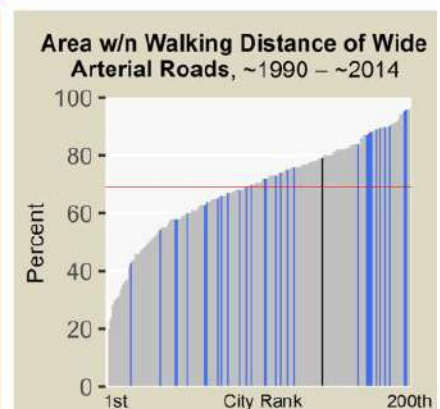
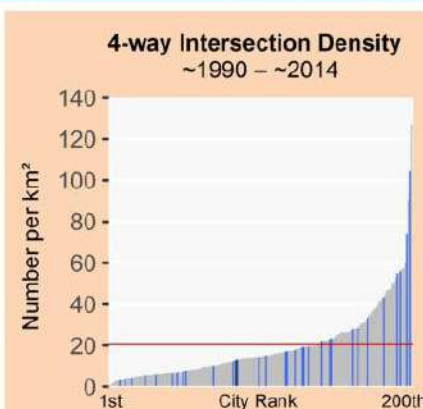
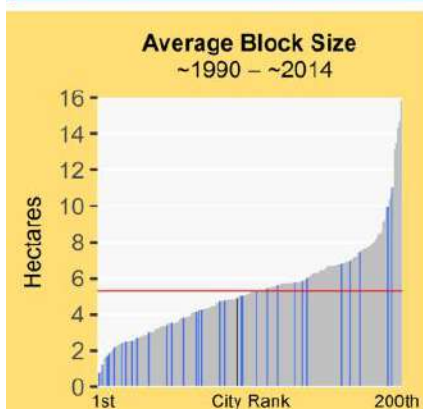
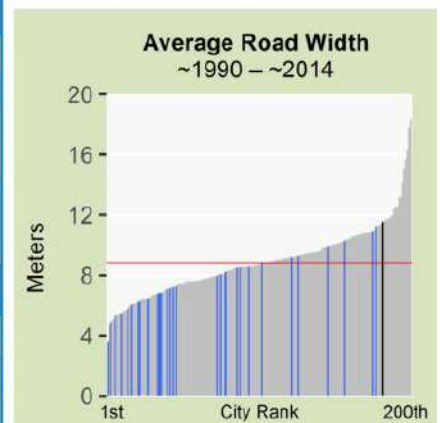
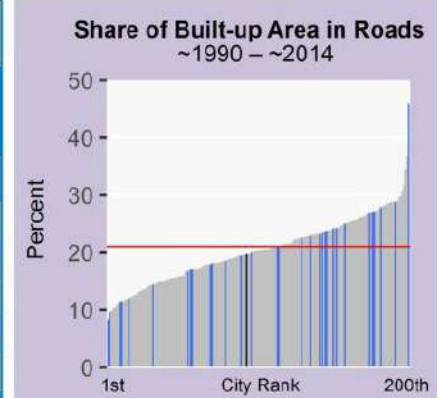
# Mumbai, India (South and Central Asia)



### Legend for Charts

Mumbai | Other cities in region | All other cities | Global average

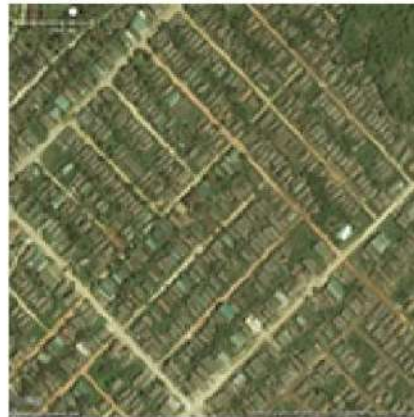
Metrics	Pre-1991	1991-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	17%	19%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	2%
Average Road Width (m)	11.6	8.6
Share of Roads less than 4m Wide	10%	24%
Share of Roads more than 16m Wide	18%	11%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.6	1.3
Average Beeline Distance to Arterial Roads (m)	272	347
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	90%	84%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	87%	79%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	11%	9%
Average Block Size (ha)	5.8	4.9
3-way Intersection Density (number per km <sup>2</sup> )	62	89
4-way Intersection Density (number per km <sup>2</sup> )	12	13
Walkability Ratio	1.6	1.7
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	655	
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	66%	70%
Share of Residential Area Not Laid Out Before Occupation	60%	62%
Share of Residential Area Laid Out Before Occupation	35%	37%
Share of Residential Area in Informal Land Subdivisions	1%	0%
Share of Residential Area in Formal Land Subdivisions	24%	15%
Share of Residential Area in Housing Projects	13%	21%



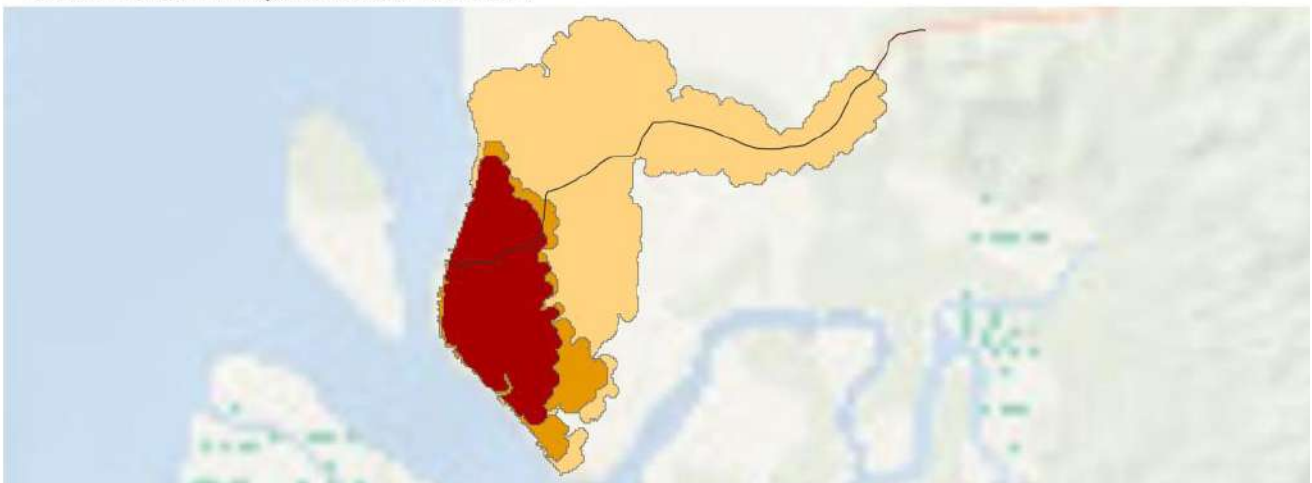
# Myeik, Myanmar (Southeast Asia)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2014



## Myeik, Myanmar 1991-2014



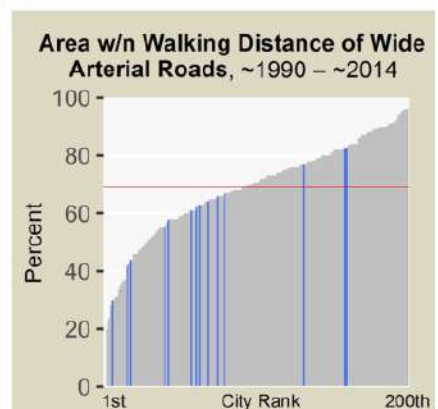
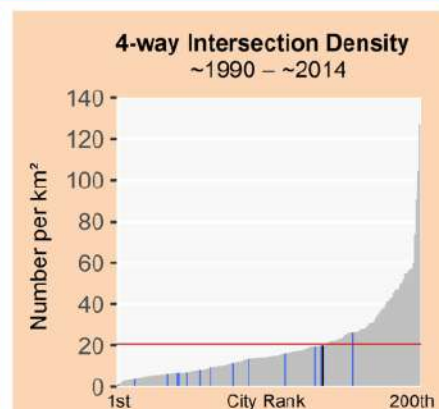
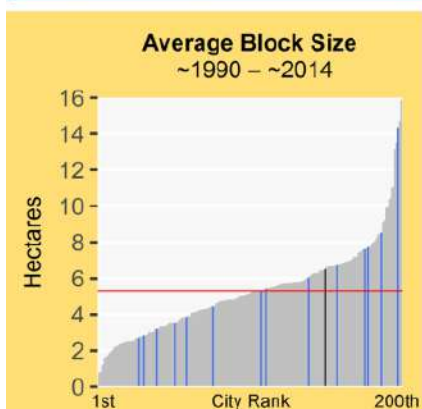
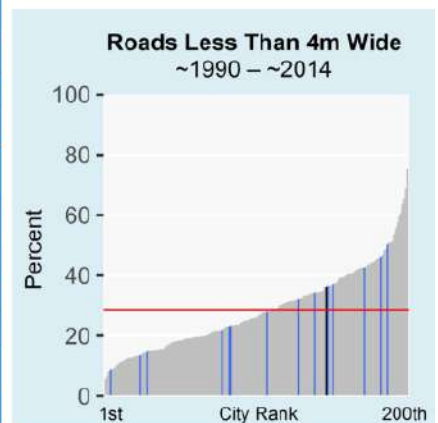
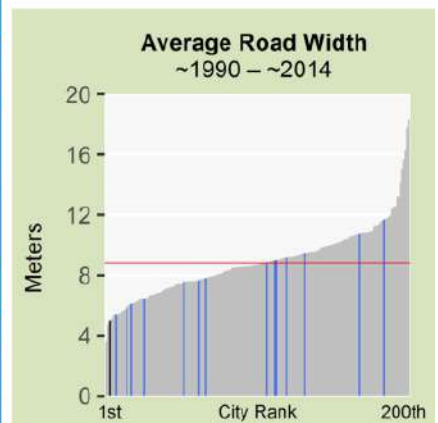
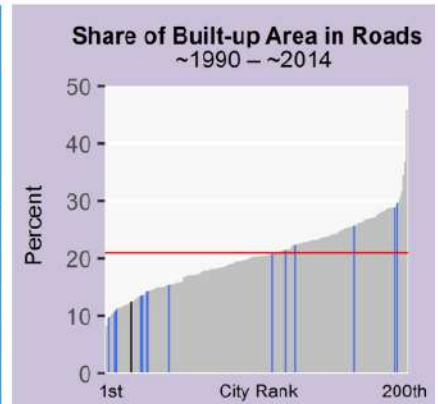
- Urban Extent in 1991
- Expansion, 1991 - 2003
- Expansion, 2003 - 2014

Arterial Roads

# Myeik, Myanmar (Southeast Asia)



Legend for Charts		
	Myeik	Other cities in region   All other cities   Global average
<b>Metrics</b>	Pre-1991	1991-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	14%	12%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	5.1	5.3
Share of Roads less than 4m Wide	32%	36%
Share of Roads more than 16m Wide	0%	2%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	0.3	0.4
Average Beeline Distance to Arterial Roads (m)	422	599
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	69%	63%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	0%	0%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	25%	11%
Average Block Size (ha)	1.7	6.5
3-way Intersection Density (number per km <sup>2</sup> )	161	90
4-way Intersection Density (number per km <sup>2</sup> )	57	20
Walkability Ratio	1.5	1.7
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	165	182
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	298	
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	78%	61%
Share of Residential Area Not Laid Out Before Occupation	23%	66%
Share of Residential Area Laid Out Before Occupation	76%	33%
Share of Residential Area in Informal Land Subdivisions	69%	33%
Share of Residential Area in Formal Land Subdivisions	7%	0%
Share of Residential Area in Housing Projects	0%	0%



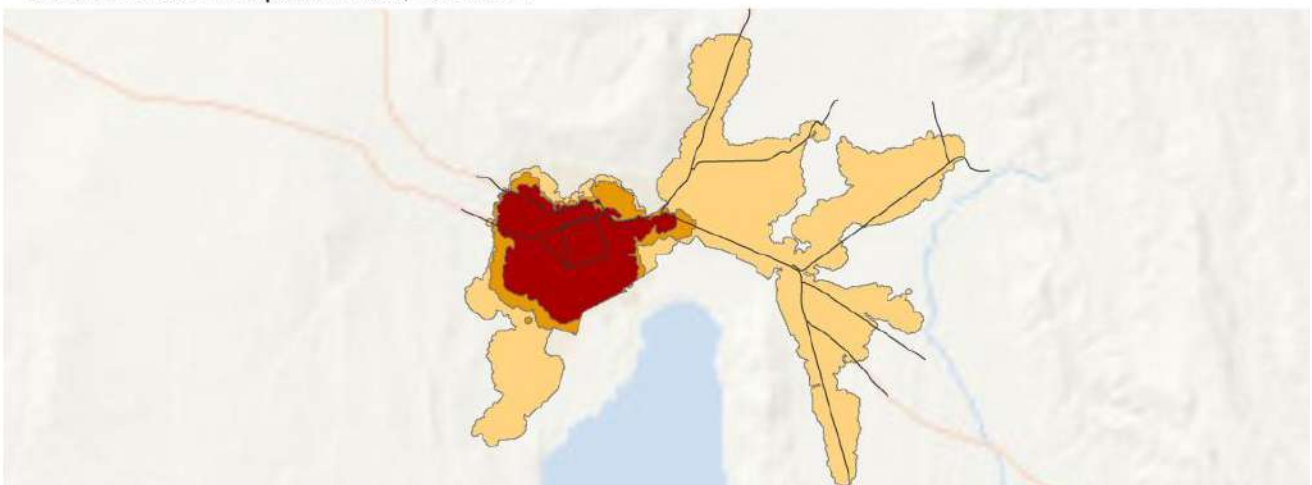
# Nakuru, Kenya (Sub-Saharan Africa)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2014



**Nakuru, Kenya**  
1989-2014

0 5 10 km

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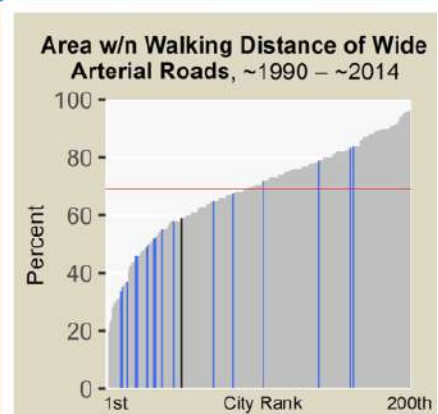
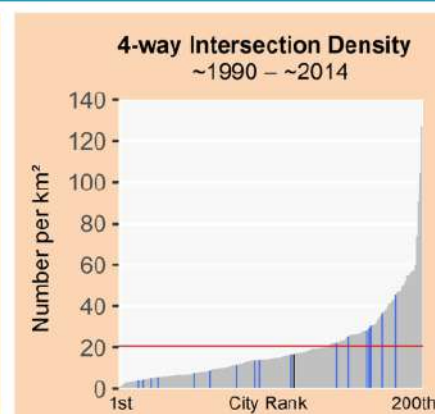
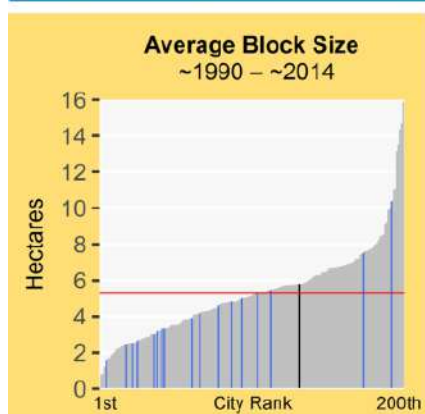
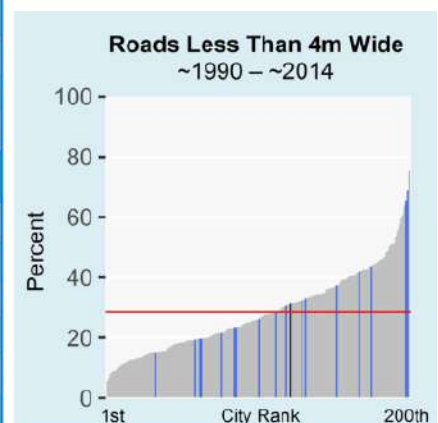
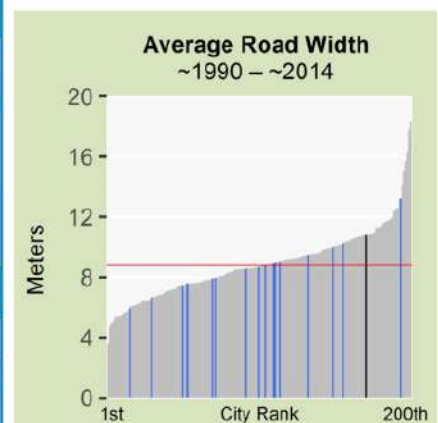
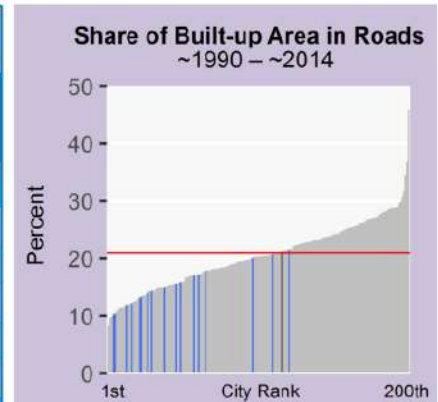
- Urban Extent in 1989
- Expansion, 1989 - 2000
- Expansion, 2000 - 2014
- Arterial Roads



# Nakuru, Kenya (Sub-Saharan Africa)



Legend for Charts		
	Nakuru	Other cities in region   All other cities   Global average
Metrics		
	Pre-1989	1989-2014
Roads		
Share of Built-Up Area Occupied by Roads	23%	21%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	10.8	5.5
Share of Roads less than 4m Wide	13%	31%
Share of Roads more than 16m Wide	19%	1%
Arterial Roads		
Density of Arterial Roads (km/km <sup>2</sup> )	1.0	0.6
Average Beeline Distance to Arterial Roads (m)	546	916
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	65%	60%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	64%	59%
Block Size, Plot Size, Intersection Density, and Walkability		
Share of Intersections that are 4-way	16%	9%
Average Block Size (ha)	4.4	5.8
3-way Intersection Density (number per km <sup>2</sup> )	103	165
4-way Intersection Density (number per km <sup>2</sup> )	18	17
Walkability Ratio	1.6	1.7
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	302	626
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	2240	
Stages in the Evolution of Residential Layouts		
Share of Built-Up Area in Residential Use	54%	75%
Share of Residential Area Not Laid Out Before Occupation	0%	16%
Share of Residential Area Laid Out Before Occupation	99%	83%
Share of Residential Area in Informal Land Subdivisions	81%	79%
Share of Residential Area in Formal Land Subdivisions	2%	2%
Share of Residential Area in Housing Projects	15%	1%



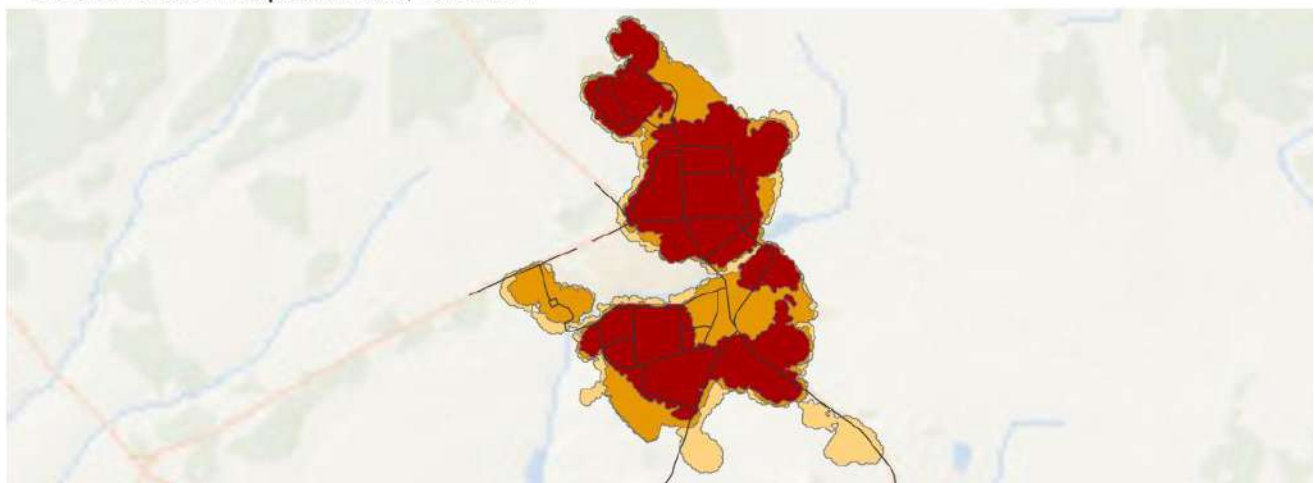
# Ndola, Zambia (Sub-Saharan Africa)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2014



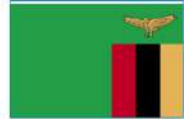
## Ndola, Zambia 1989-2014



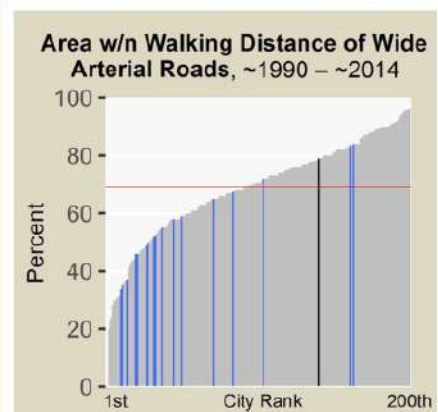
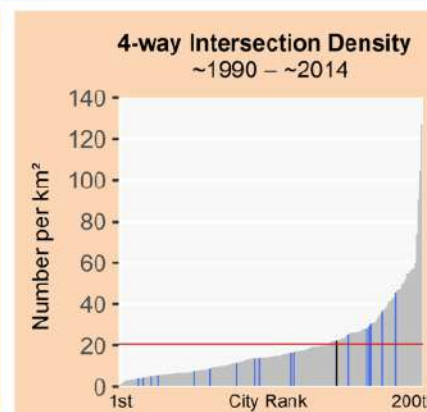
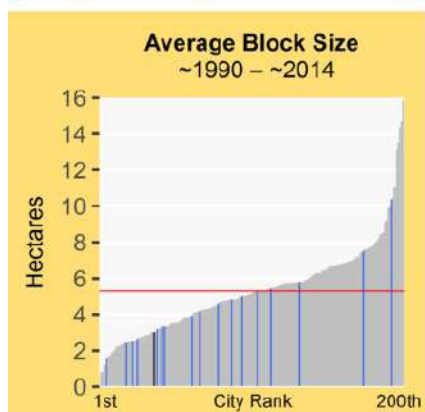
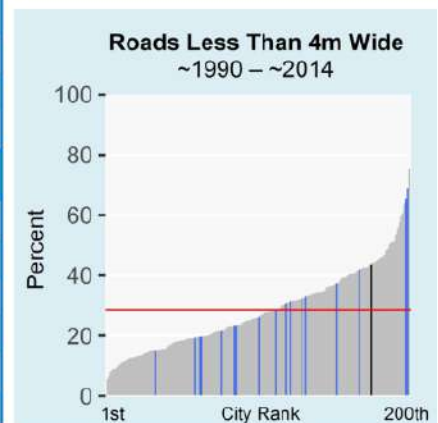
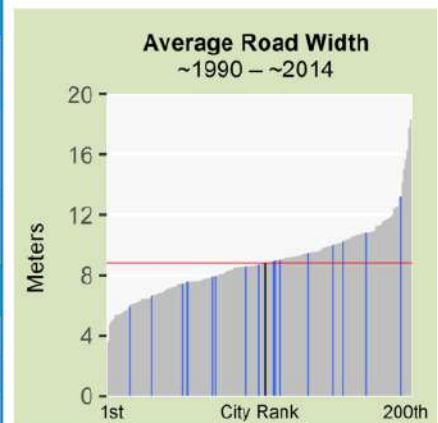
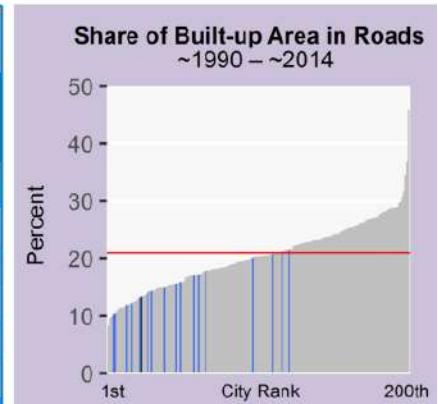
- Urban Extent in 1989
- Expansion, 1989 - 2002
- Expansion, 2002 - 2014

Arterial Roads

# Ndola, Zambia (Sub-Saharan Africa)



Legend for Charts		
	Ndola	Other cities in region
		All other cities
		Global average
		—
Metrics	Pre-1989	1989-2014
Roads		
Share of Built-Up Area Occupied by Roads	16%	13%
Share of Built-Up Area that is Gridded or Partially Gridded		0%
Average Road Width (m)	8.9	4.9
Share of Roads less than 4m Wide	16%	43%
Share of Roads more than 16m Wide	13%	2%
Arterial Roads		
Density of Arterial Roads (km/km <sup>2</sup> )	1.2	1.0
Average Beeline Distance to Arterial Roads (m)	332	392
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	85%	79%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	85%	79%
Block Size, Plot Size, Intersection Density, and Walkability		
Share of Intersections that are 4-way	10%	11%
Average Block Size (ha)	5.1	3.0
3-way Intersection Density (number per km <sup>2</sup> )	102	148
4-way Intersection Density (number per km <sup>2</sup> )	13	22
Walkability Ratio	1.9	1.7
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	742	373
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	1810	424
Stages in the Evolution of Residential Layouts		
Share of Built-Up Area in Residential Use	83%	72%
Share of Residential Area Not Laid Out Before Occupation	5%	18%
Share of Residential Area Laid Out Before Occupation	94%	81%
Share of Residential Area in Informal Land Subdivisions	70%	80%
Share of Residential Area in Formal Land Subdivisions	22%	0%
Share of Residential Area in Housing Projects	1%	0%



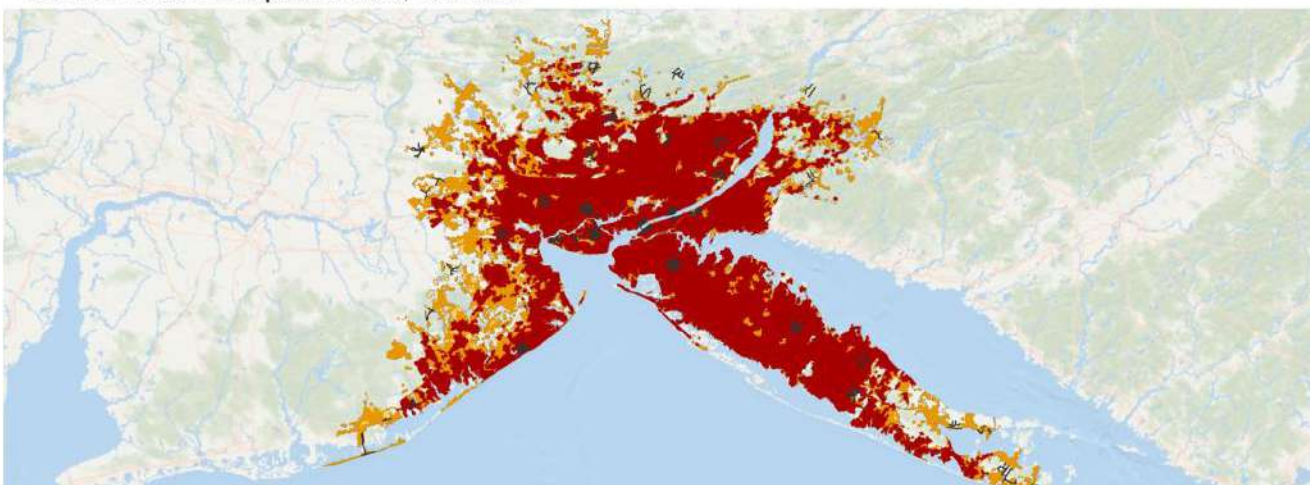
# New York, United States (Land-Rich Developed Countries)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2011



**New York, United States**  
1991-2011

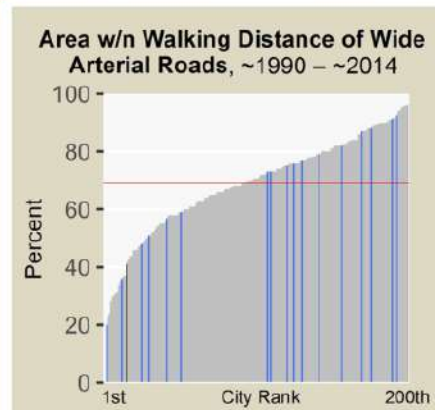
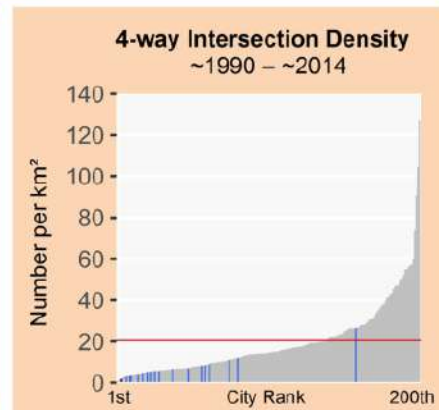
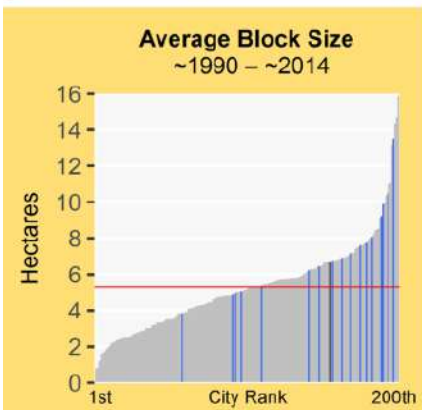
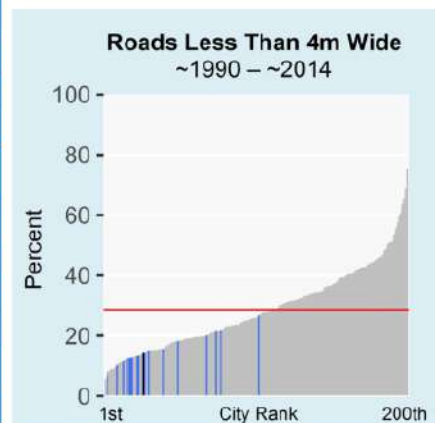
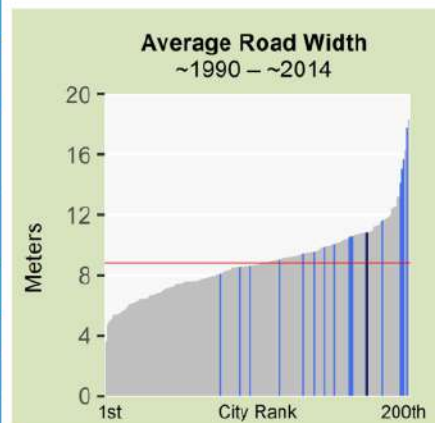
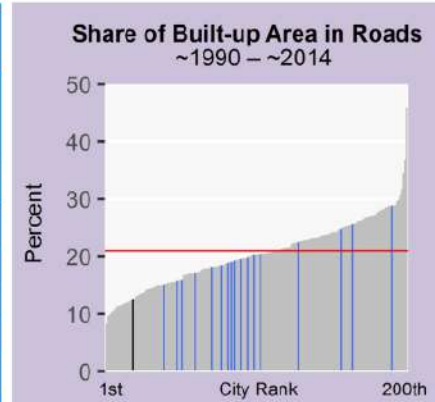
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Urban Extent in 1991  
Expansion, 1991 - 2000  
Expansion, 2000 - 2011  
Arterial Roads

# New York, United States (Land-Rich Developed Countries)



Legend for Charts		
	New York	Other cities in region
	All other cities	Global average
Metrics	Pre-1991	1991-2011
Roads		
Share of Built-Up Area Occupied by Roads	20%	12%
Share of Built-Up Area that is Gridded or Partially Gridded		0%
Average Road Width (m)	10.8	8.9
Share of Roads less than 4m Wide	7%	14%
Share of Roads more than 16m Wide	12%	7%
Arterial Roads		
Density of Arterial Roads (km/km <sup>2</sup> )	1.8	0.7
Average Beeline Distance to Arterial Roads (m)	226	393
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	93%	78%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	62%	41%
Block Size, Plot Size, Intersection Density, and Walkability		
Share of Intersections that are 4-way	21%	0%
Average Block Size (ha)	5.1	6.7
3-way Intersection Density (number per km <sup>2</sup> )	45	47
4-way Intersection Density (number per km <sup>2</sup> )	14	2
Walkability Ratio	1.6	1.8
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	712	400
Stages in the Evolution of Residential Layouts		
Share of Built-Up Area in Residential Use	82%	82%
Share of Residential Area Not Laid Out Before Occupation	3%	11%
Share of Residential Area Laid Out Before Occupation	96%	88%
Share of Residential Area in Informal Land Subdivisions	0%	0%
Share of Residential Area in Formal Land Subdivisions	93%	86%
Share of Residential Area in Housing Projects	3%	1%



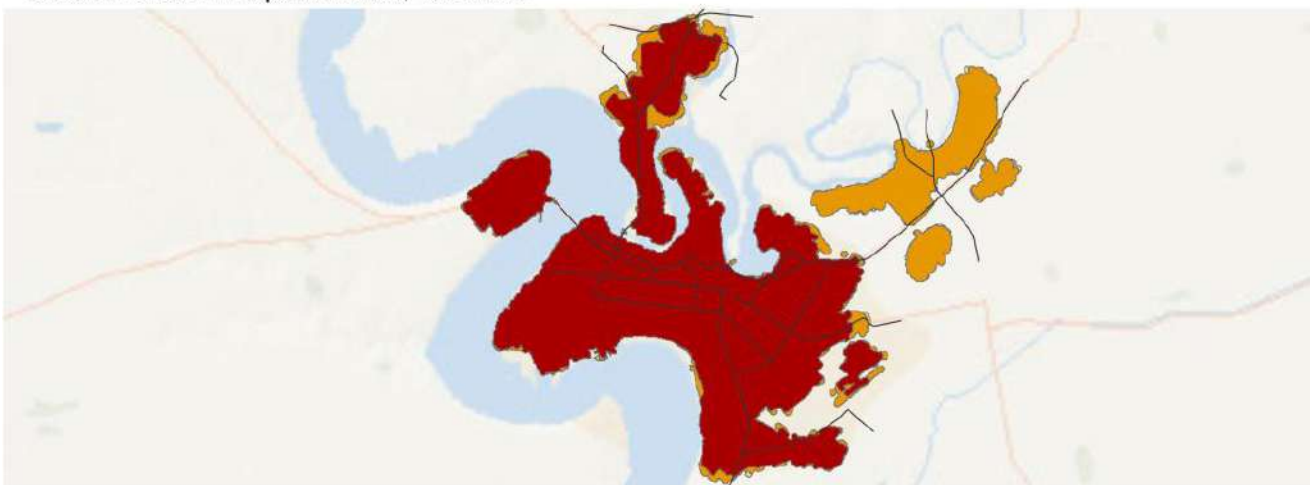
# Nikolaev, Ukraine (Europe and Japan)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2013



**Nikolaev, Ukraine**  
1989-2013

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- Urban Extent in 1989
- Expansion, 1989 - 2000
- Expansion, 2000 - 2013
- Arterial Roads

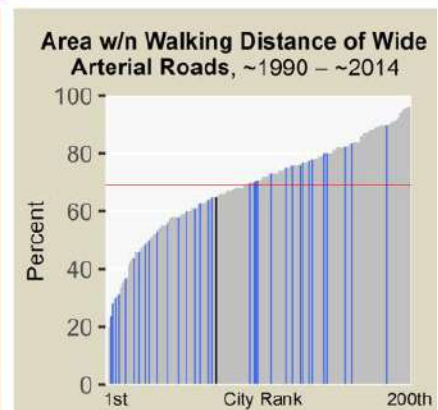
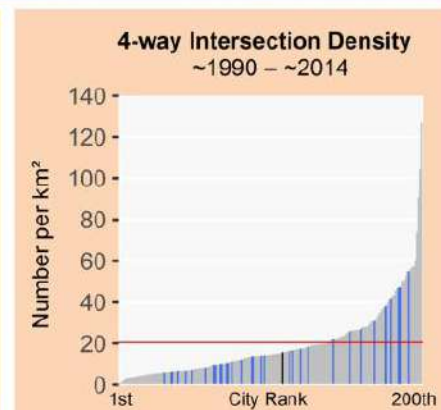
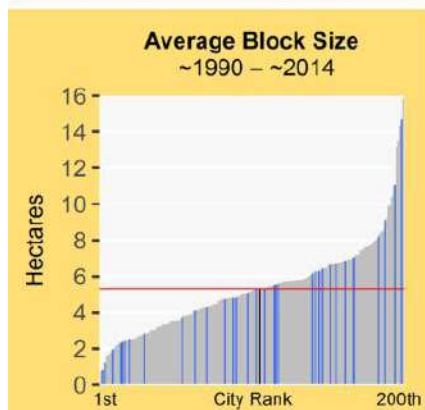
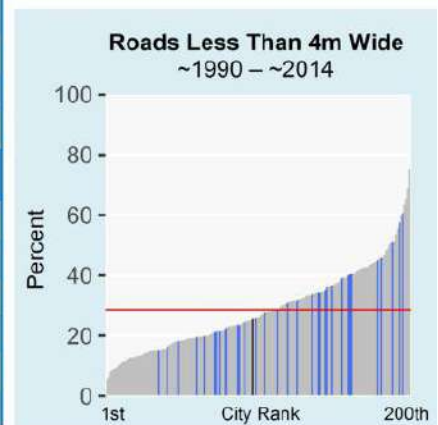
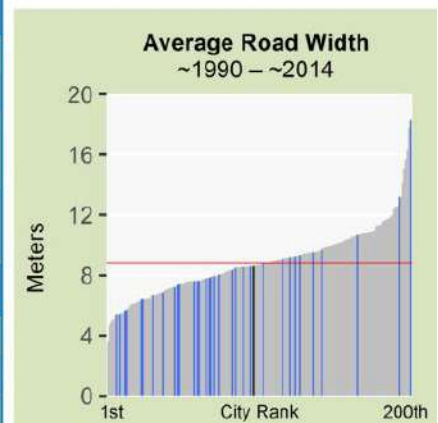
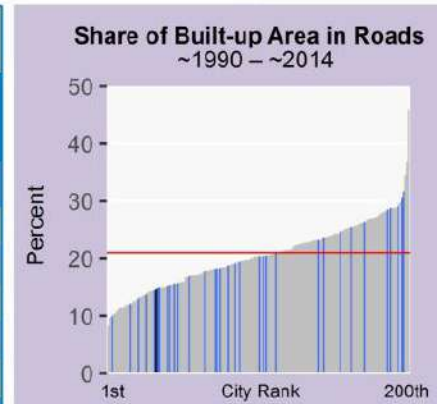
# Nikolaev, Ukraine (Europe and Japan)



**Legend for Charts**

Nikolaev | Other cities in region | All other cities | Global average —

Metrics	Pre-1989	1989-2013
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	18%	14%
Share of Built-Up Area that is Gridded or Partially Gridded	5%	0%
Average Road Width (m)	8.6	5.6
Share of Roads less than 4m Wide	10%	25%
Share of Roads more than 16m Wide	7%	0%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	0.9	0.8
Average Beeline Distance to Arterial Roads (m)	481	531
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	72%	67%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	71%	65%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	12%	13%
Average Block Size (ha)	3.7	5.3
3-way Intersection Density (number per km <sup>2</sup> )	101	129
4-way Intersection Density (number per km <sup>2</sup> )	13	16
Walkability Ratio	1.9	1.5
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	501	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	484	
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	73%	85%
Share of Residential Area Not Laid Out Before Occupation	12%	8%
Share of Residential Area Laid Out Before Occupation	87%	91%
Share of Residential Area in Informal Land Subdivisions	50%	62%
Share of Residential Area in Formal Land Subdivisions	25%	25%
Share of Residential Area in Housing Projects	11%	3%



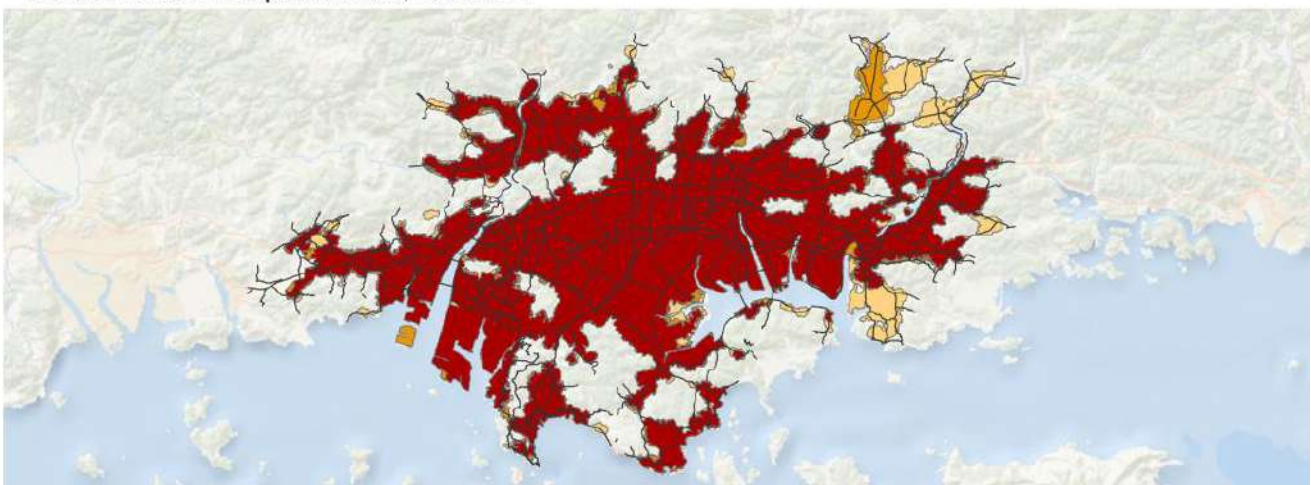
# Okayama, Japan (Europe and Japan)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



## Okayama, Japan 1990-2014



- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2014

Arterial Roads



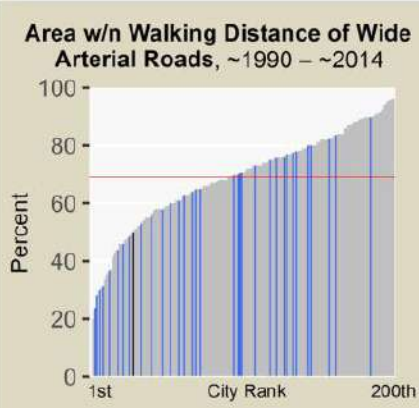
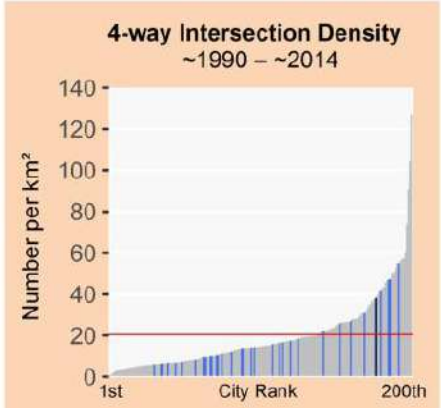
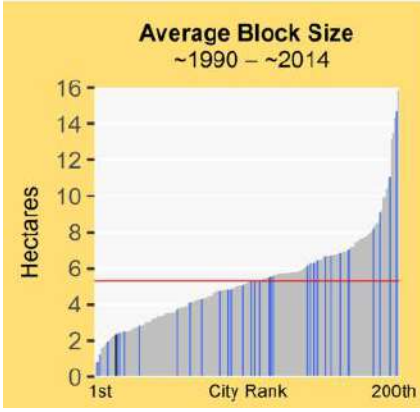
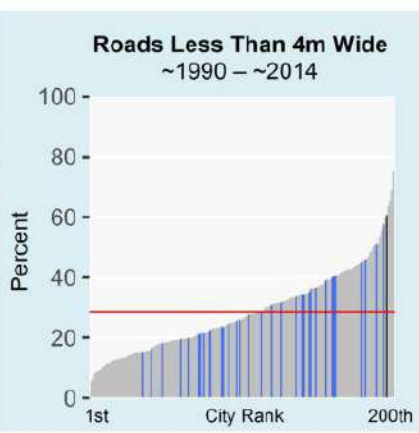
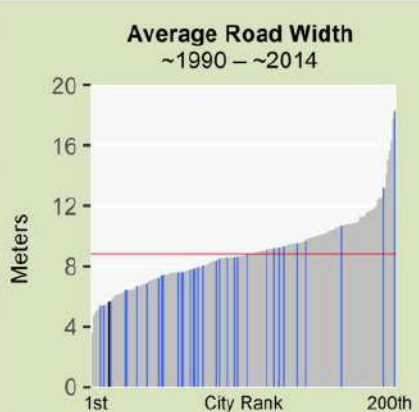
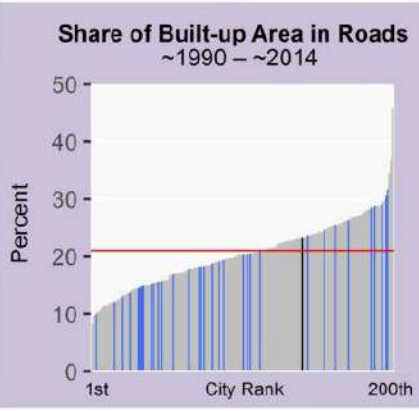
# Okayama, Japan (Europe and Japan)



**Legend for Charts**

Okayama | Other cities in region | All other cities | Global average

Metrics	Pre-1990	1990-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	25%	23%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	5.7	4.4
Share of Roads less than 4m Wide	50%	60%
Share of Roads more than 16m Wide	5%	2%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.6	1.6
Average Beeline Distance to Arterial Roads (m)	314	320
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	89%	89%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	53%	50%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	16%	10%
Average Block Size (ha)	1.6	2.3
3-way Intersection Density (number per km <sup>2</sup> )	278	270
4-way Intersection Density (number per km <sup>2</sup> )	59	38
Walkability Ratio	1.5	1.7
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	189	283
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	57%	54%
Share of Residential Area Not Laid Out Before Occupation	25%	32%
Share of Residential Area Laid Out Before Occupation	74%	67%
Share of Residential Area in Informal Land Subdivisions	2%	10%
Share of Residential Area in Formal Land Subdivisions	71%	56%
Share of Residential Area in Housing Projects	0%	0%



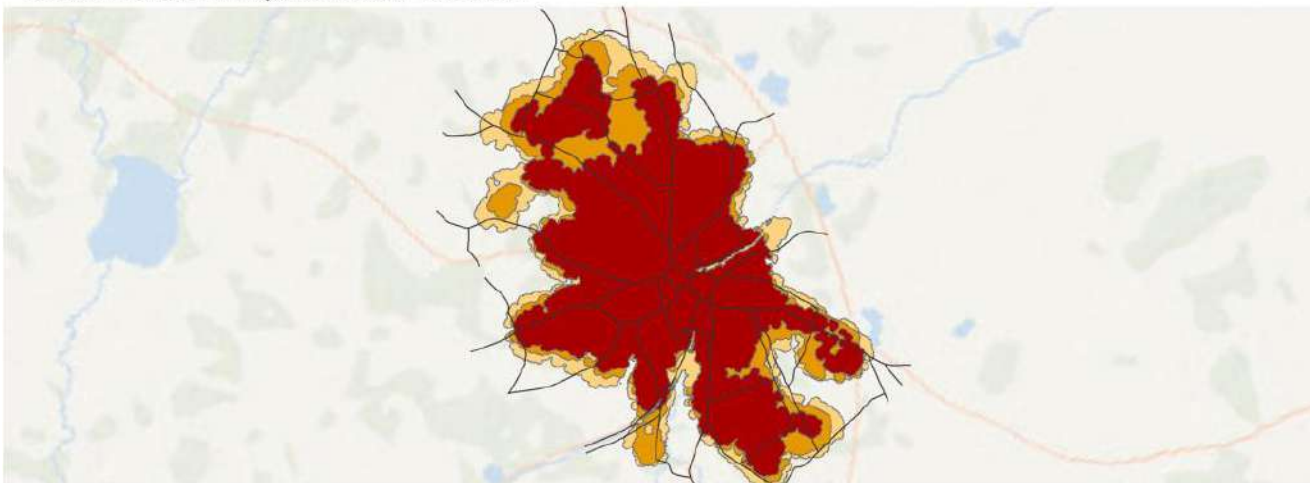
# Oldenburg, Germany (Europe and Japan)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013



## Oldenburg, Germany 1990-2013



- Urban Extent in 1990
- Expansion, 1990 - 1999
- Expansion, 1999 - 2013

Arterial Roads

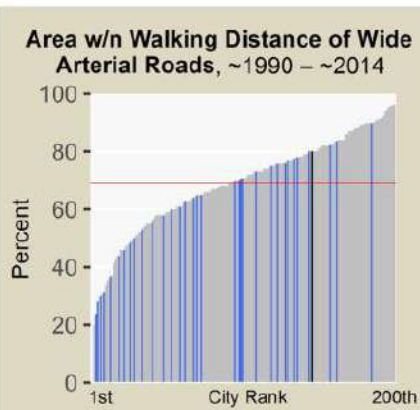
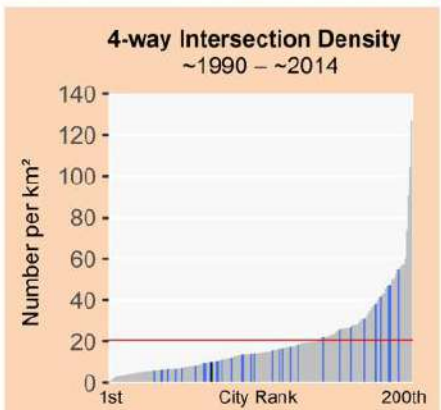
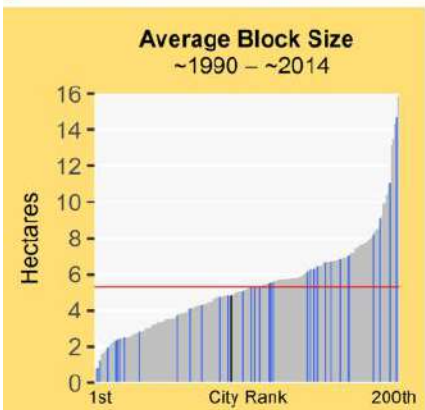
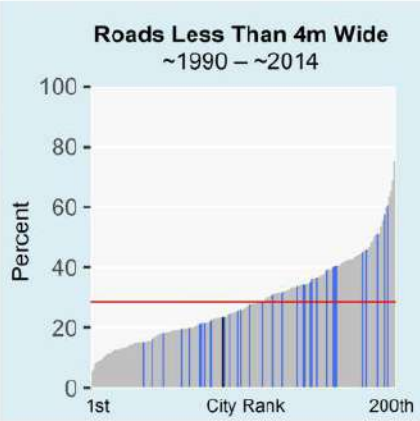
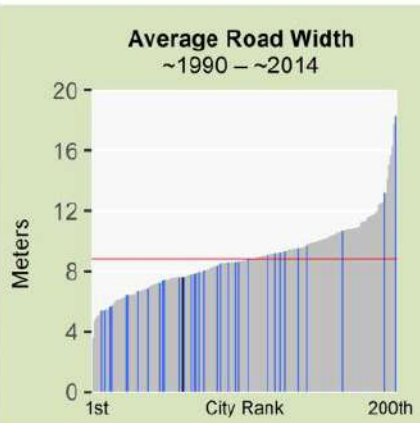
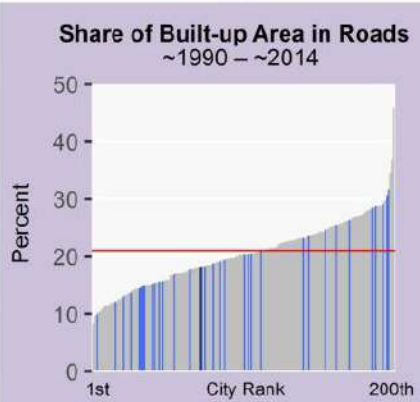
# Oldenburg, Germany (Europe and Japan)



**Legend for Charts**

Oldenburg | Other cities in region | All other cities | Global average —

Metrics	Pre-1990	1990-2013
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	18%	18%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	7.6	6.6
Share of Roads less than 4m Wide	17%	23%
Share of Roads more than 16m Wide	4%	3%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.4	1.4
Average Beeline Distance to Arterial Roads (m)	239	252
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	92%	92%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	87%	80%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	7%	8%
Average Block Size (ha)	3.4	4.9
3-way Intersection Density (number per km <sup>2</sup> )	99	110
4-way Intersection Density (number per km <sup>2</sup> )	9	10
Walkability Ratio	1.8	1.7
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		536
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	71%	82%
Share of Residential Area Not Laid Out Before Occupation	0%	6%
Share of Residential Area Laid Out Before Occupation	100%	93%
Share of Residential Area in Informal Land Subdivisions	3%	0%
Share of Residential Area in Formal Land Subdivisions	86%	87%
Share of Residential Area in Housing Projects	10%	6%



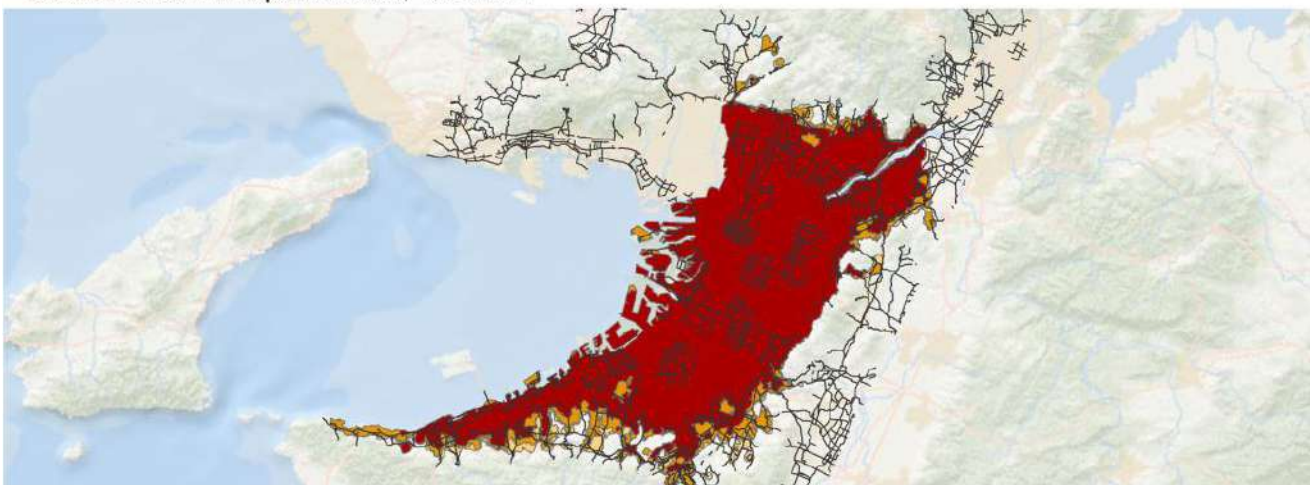
# Osaka, Japan (Europe and Japan)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2014



**Osaka, Japan**  
1989-2014

0 10 20 30 40 km

N

- Urban Extent in 1989
- Expansion, 1989 - 2001
- Expansion, 2001 - 2014
- Arterial Roads

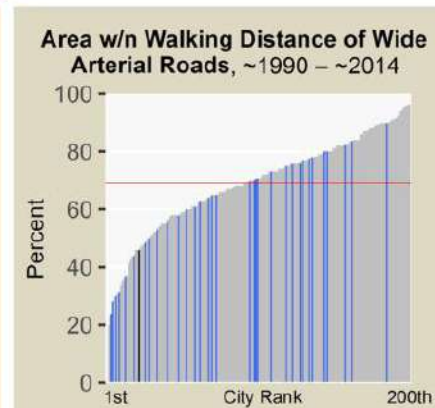
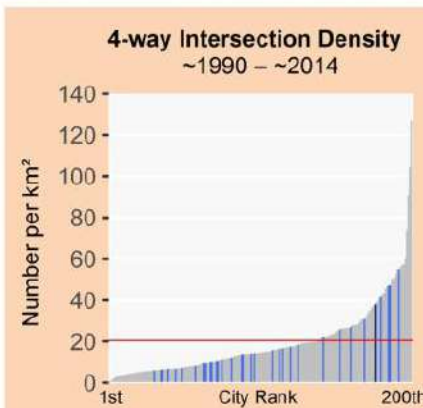
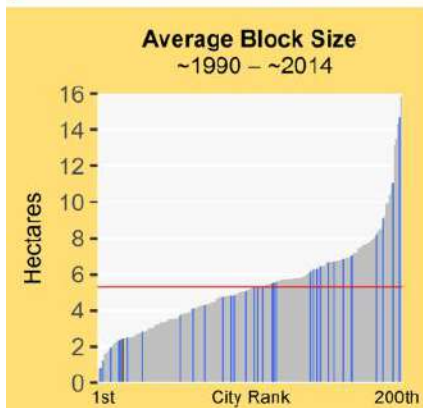
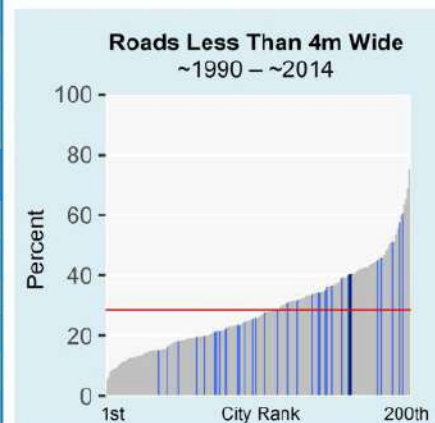
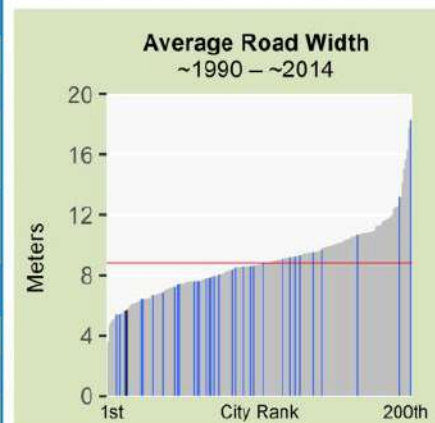
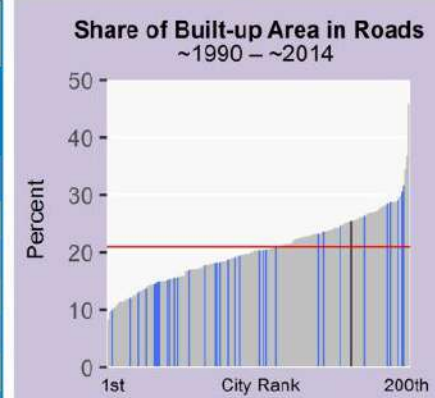
# Osaka, Japan (Europe and Japan)



### Legend for Charts

Osaka | Other cities in region | All other cities | Global average

Metrics	Pre-1989	1989-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	20%	25%
Share of Built-Up Area that is Gridded or Partially Gridded	15%	0%
Average Road Width (m)	5.7	5.5
Share of Roads less than 4m Wide	46%	40%
Share of Roads more than 16m Wide	5%	3%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.8	1.1
Average Beeline Distance to Arterial Roads (m)	220	550
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	95%	69%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	75%	46%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	21%	18%
Average Block Size (ha)	1.7	2.4
3-way Intersection Density (number per km <sup>2</sup> )	201	196
4-way Intersection Density (number per km <sup>2</sup> )	55	38
Walkability Ratio	1.4	1.6
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	143	227
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	51%	60%
Share of Residential Area Not Laid Out Before Occupation	30%	41%
Share of Residential Area Laid Out Before Occupation	69%	58%
Share of Residential Area in Informal Land Subdivisions	0%	4%
Share of Residential Area in Formal Land Subdivisions	67%	52%
Share of Residential Area in Housing Projects	1%	1%



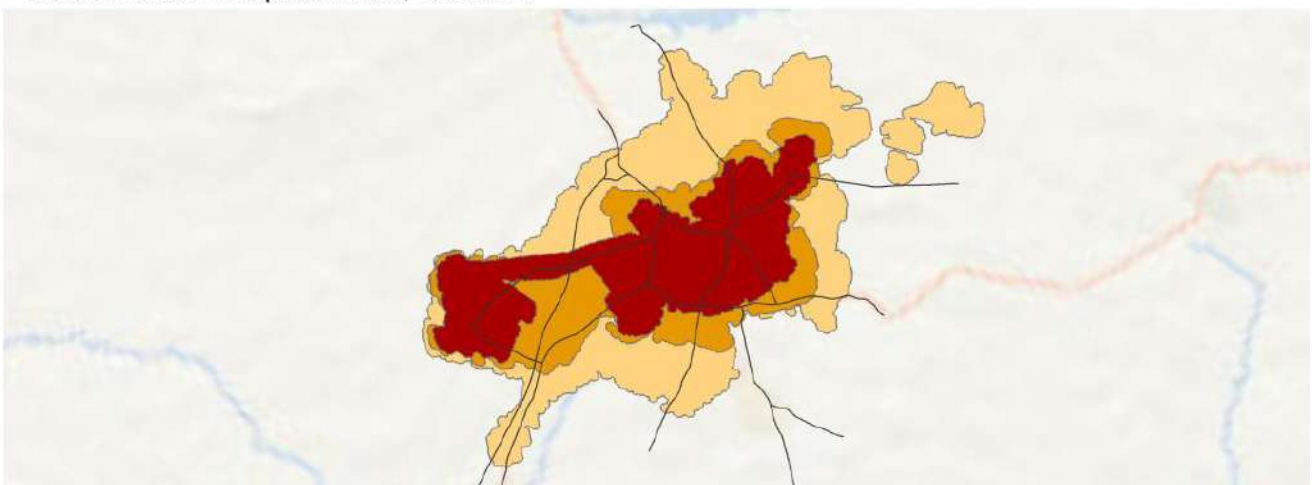
# Oyo, Nigeria (Sub-Saharan Africa)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



**Oyo, Nigeria**  
1990-2014

0 2 4 6 8 km

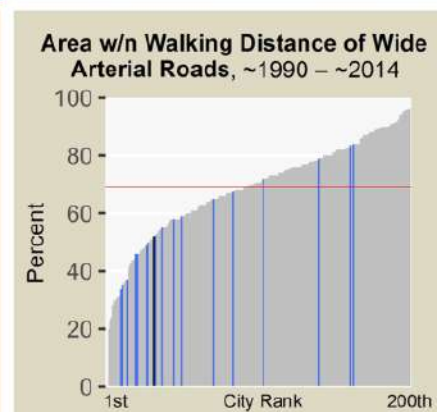
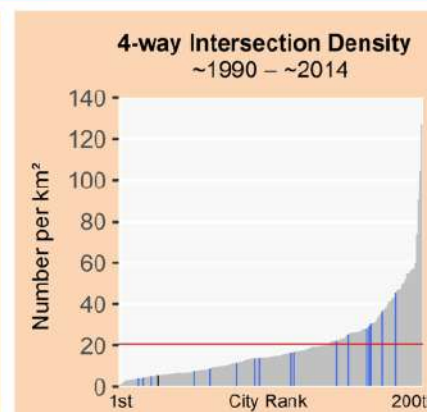
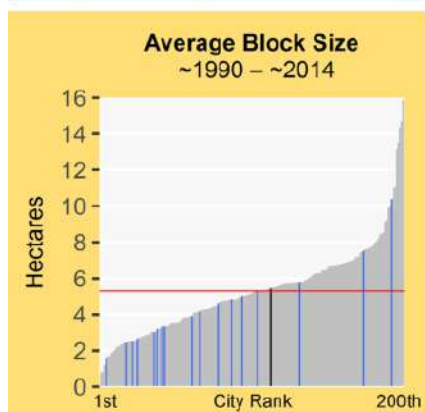
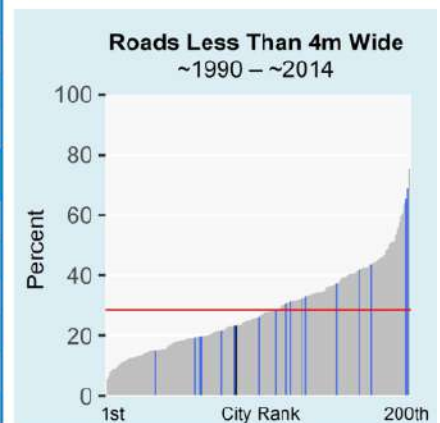
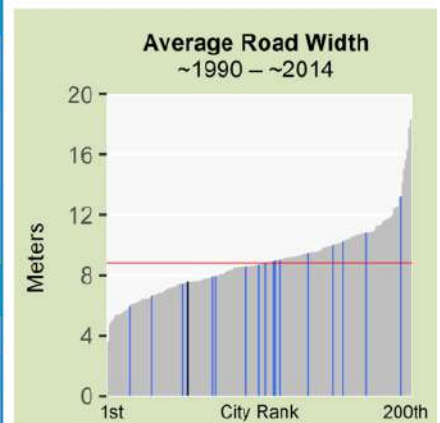
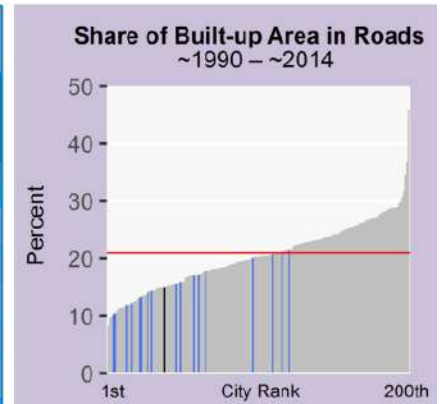
Urban Extent in 1990  
Expansion, 1990 - 2000  
Expansion, 2000 - 2014

Arterial Roads

# Oyo, Nigeria (Sub-Saharan Africa)



Legend for Charts		
	Oyo	Other cities in region
	All other cities	Global average
Metrics	Pre-1990	1990-2014
Roads		
Share of Built-Up Area Occupied by Roads	12%	15%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	7.6	6.7
Share of Roads less than 4m Wide	12%	23%
Share of Roads more than 16m Wide	3%	3%
Arterial Roads		
Density of Arterial Roads (km/km <sup>2</sup> )	1.1	0.8
Average Beeline Distance to Arterial Roads (m)	269	428
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	94%	78%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	49%	52%
Block Size, Plot Size, Intersection Density, and Walkability		
Share of Intersections that are 4-way	10%	9%
Average Block Size (ha)	5.6	5.4
3-way Intersection Density (number per km <sup>2</sup> )	54	77
4-way Intersection Density (number per km <sup>2</sup> )	5	6
Walkability Ratio	1.7	1.6
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	558	393
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		
Stages in the Evolution of Residential Layouts		
Share of Built-Up Area in Residential Use	89%	83%
Share of Residential Area Not Laid Out Before Occupation	72%	31%
Share of Residential Area Laid Out Before Occupation	27%	68%
Share of Residential Area in Informal Land Subdivisions	26%	65%
Share of Residential Area in Formal Land Subdivisions	0%	0%
Share of Residential Area in Housing Projects	0%	3%



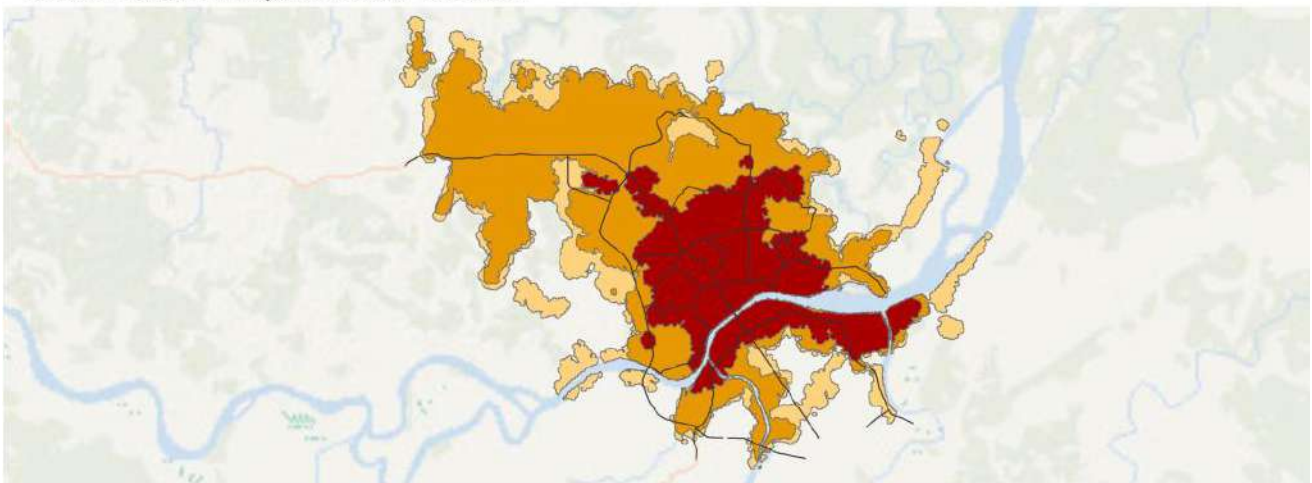
# Palembang, Indonesia (Southeast Asia)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013



**Palembang, Indonesia**  
1990-2013

0 5 10 15 km

N

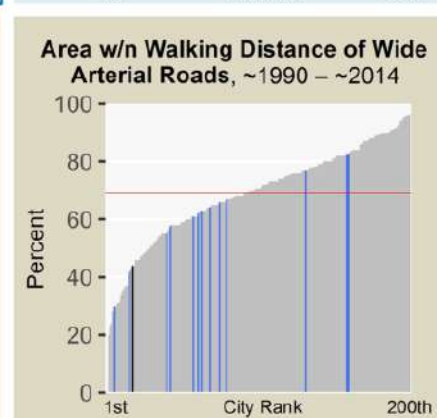
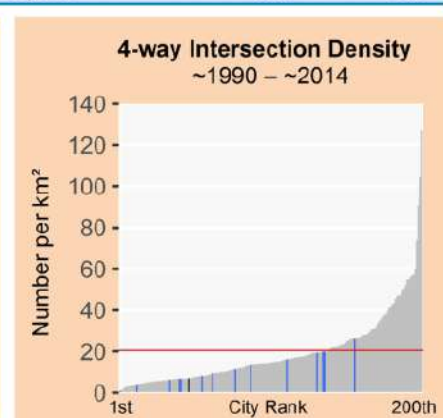
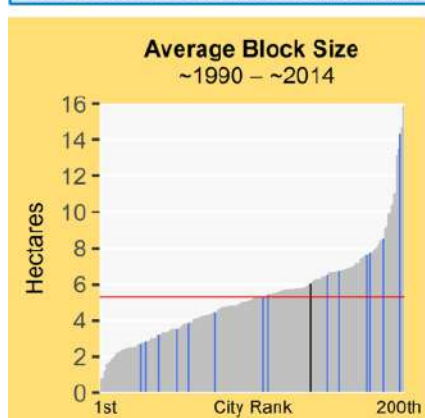
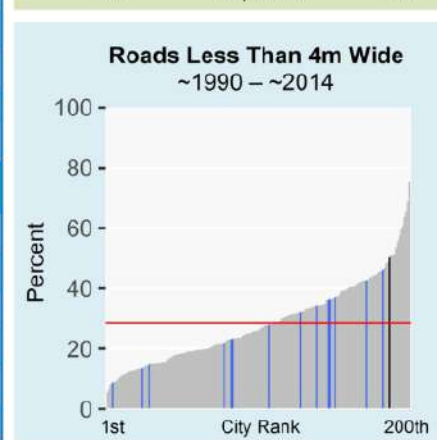
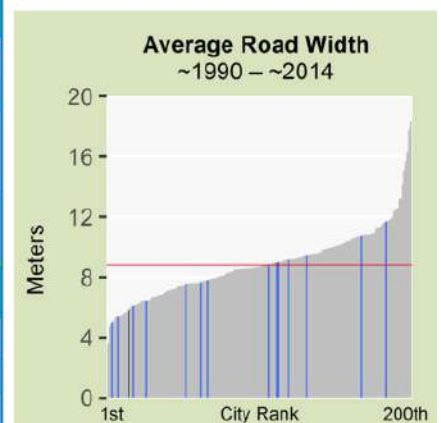
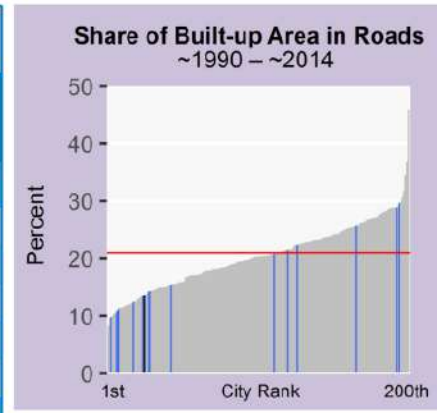
- Urban Extent in 1990
- Expansion, 1990 - 2001
- Expansion, 2001 - 2013
- Arterial Roads



# Palembang, Indonesia (Southeast Asia)



Legend for Charts			
	Palembang	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1990	1990-2013	
Roads			
Share of Built-Up Area Occupied by Roads	12%	13%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%	
Average Road Width (m)	5.8	4.4	
Share of Roads less than 4m Wide	34%	50%	
Share of Roads more than 16m Wide	5%	1%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	0.9	0.5	
Average Beeline Distance to Arterial Roads (m)	400	783	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	80%	57%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	64%	44%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	8%	2%	
Average Block Size (ha)	4.1	6.1	
3-way Intersection Density (number per km <sup>2</sup> )	104	71	
4-way Intersection Density (number per km <sup>2</sup> )	16	7	
Walkability Ratio	1.6	1.5	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	189		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	185	244	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	73%	56%	
Share of Residential Area Not Laid Out Before Occupation	32%	78%	
Share of Residential Area Laid Out Before Occupation	67%	21%	
Share of Residential Area in Informal Land Subdivisions	26%	12%	
Share of Residential Area in Formal Land Subdivisions	37%	3%	
Share of Residential Area in Housing Projects	2%	6%	



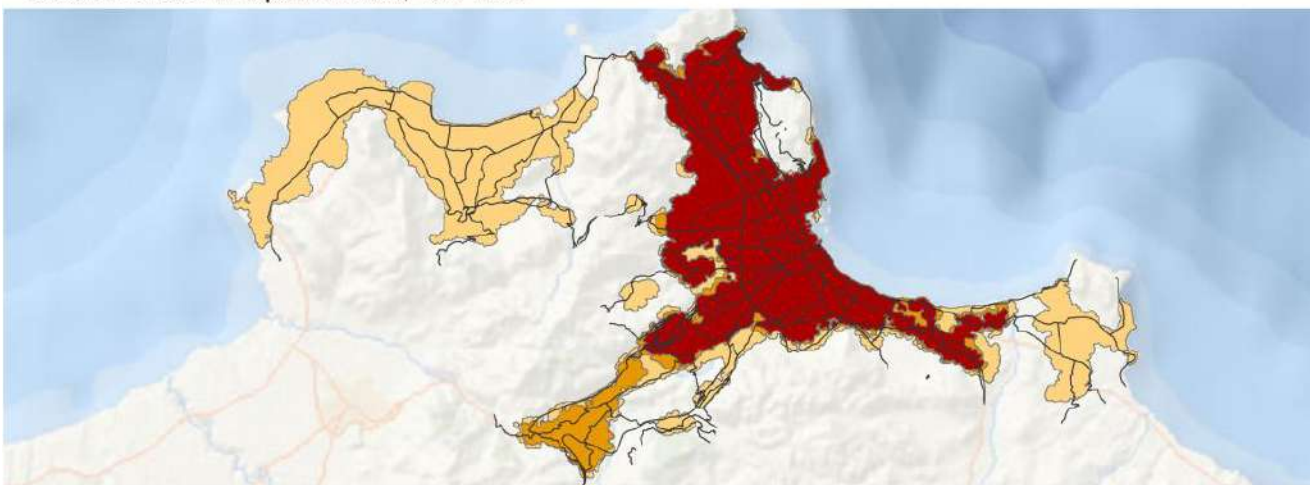
# Palermo, Italy (Europe and Japan)



Selected Locales in Area Developed Before 1987



Selected Locales in Expansion Area, 1987-2013



## Palermo, Italy 1987-2013



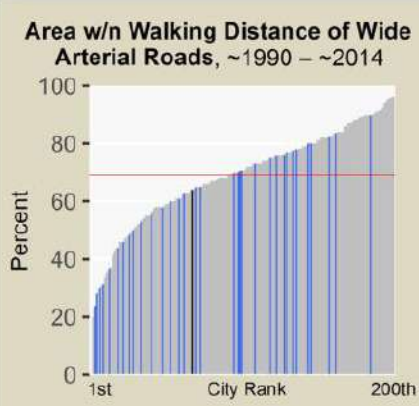
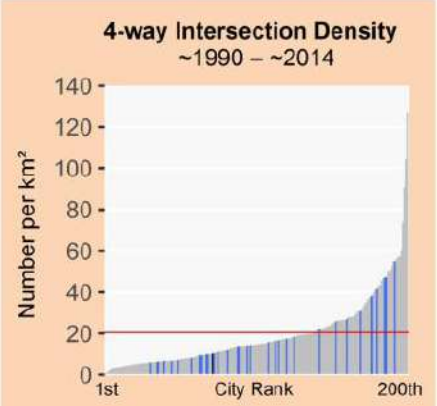
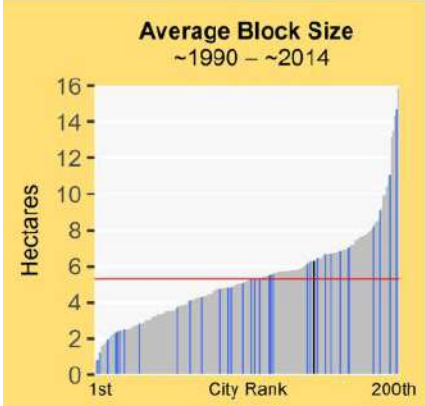
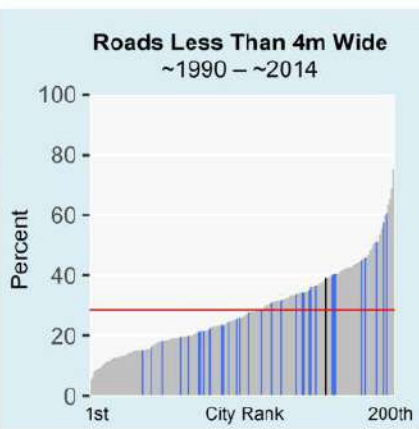
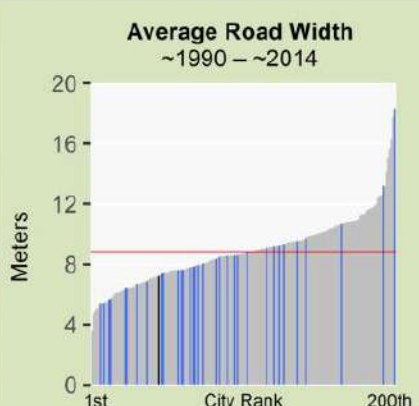
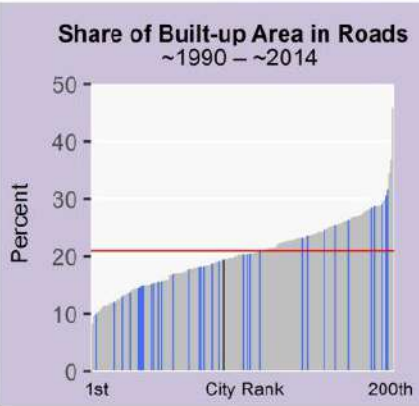
- Urban Extent in 1987
- Expansion, 1987 - 2000
- Expansion, 2000 - 2013

Arterial Roads

# Palermo, Italy (Europe and Japan)



Legend for Charts			
	Palermo	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1987	1987-2013	
Roads			
Share of Built-Up Area Occupied by Roads	20%	19%	
Share of Built-Up Area that is Gridded or Partially Gridded	5%	0%	
Average Road Width (m)	7.2	5.4	
Share of Roads less than 4m Wide	29%	39%	
Share of Roads more than 16m Wide	8%	0%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	2.3	1.9	
Average Beeline Distance to Arterial Roads (m)	165	197	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	97%	95%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	85%	64%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	7%	7%	
Average Block Size (ha)	3.1	6.3	
3-way Intersection Density (number per km <sup>2</sup> )	156	105	
4-way Intersection Density (number per km <sup>2</sup> )	20	10	
Walkability Ratio	1.7	2.0	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		867	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	1119	444	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	56%	58%	
Share of Residential Area Not Laid Out Before Occupation	15%	36%	
Share of Residential Area Laid Out Before Occupation	84%	63%	
Share of Residential Area in Informal Land Subdivisions	1%	21%	
Share of Residential Area in Formal Land Subdivisions	80%	41%	
Share of Residential Area in Housing Projects	2%	0%	



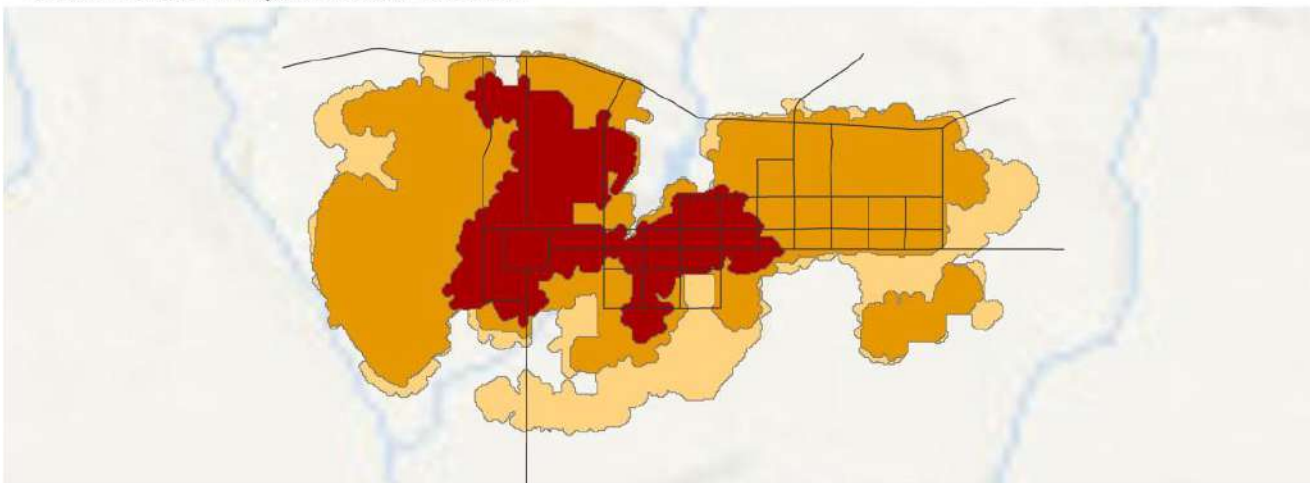
# Palmas, Brazil (Latin America and the Caribbean)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013



## Palmas, Brazil 1990-2013



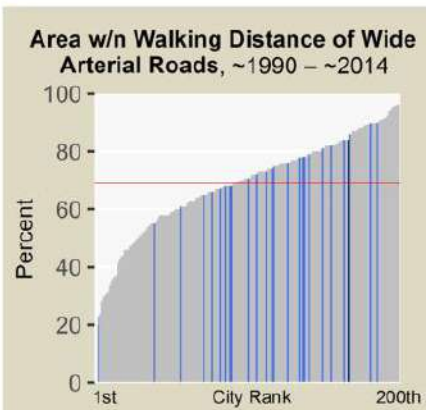
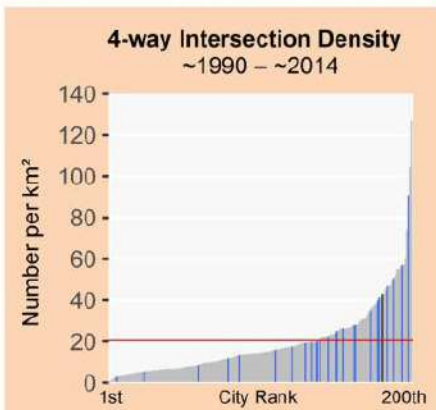
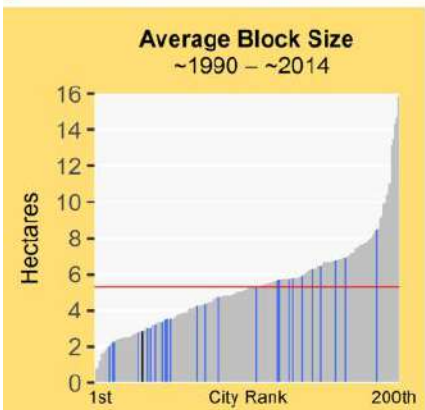
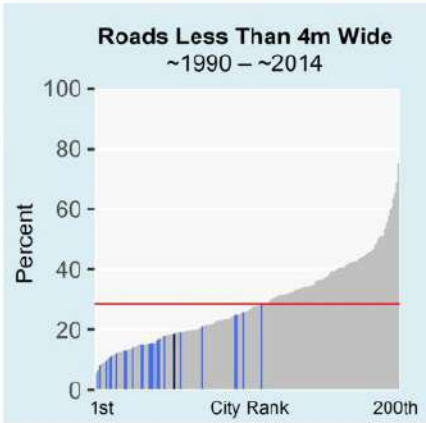
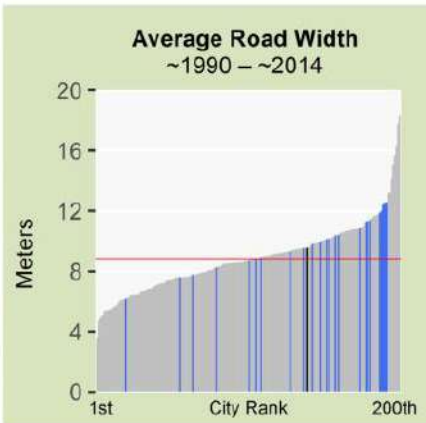
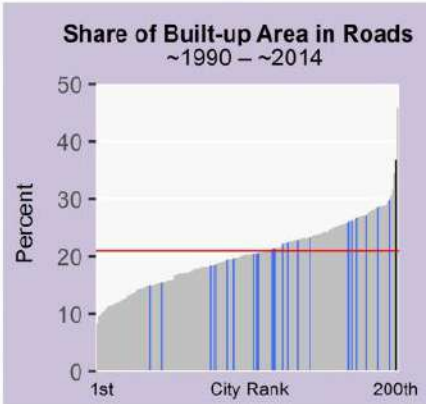
- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2013

Arterial Roads

# Palmas, Brazil (Latin America and the Caribbean)



Legend for Charts			
	Palmas	Other cities in region	All other cities
			Global average —
Metrics	Pre-1990	1990-2013	
Roads			
Share of Built-Up Area Occupied by Roads	30%	36%	
Share of Built-Up Area that is Gridded or Partially Gridded	22%	0%	
Average Road Width (m)	9.6	8.3	
Share of Roads less than 4m Wide	27%	18%	
Share of Roads more than 16m Wide	16%	9%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	2.2	1.1	
Average Beeline Distance to Arterial Roads (m)	189	590	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	96%	68%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	96%	84%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	26%	20%	
Average Block Size (ha)	3.4	2.9	
3-way Intersection Density (number per km <sup>2</sup> )	89	174	
4-way Intersection Density (number per km <sup>2</sup> )	23	43	
Walkability Ratio	1.5	1.6	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	395	350	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	342	306	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	64%	85%	
Share of Residential Area Not Laid Out Before Occupation	0%	3%	
Share of Residential Area Laid Out Before Occupation	100%	96%	
Share of Residential Area in Informal Land Subdivisions	8%	41%	
Share of Residential Area in Formal Land Subdivisions	89%	54%	
Share of Residential Area in Housing Projects	2%	0%	



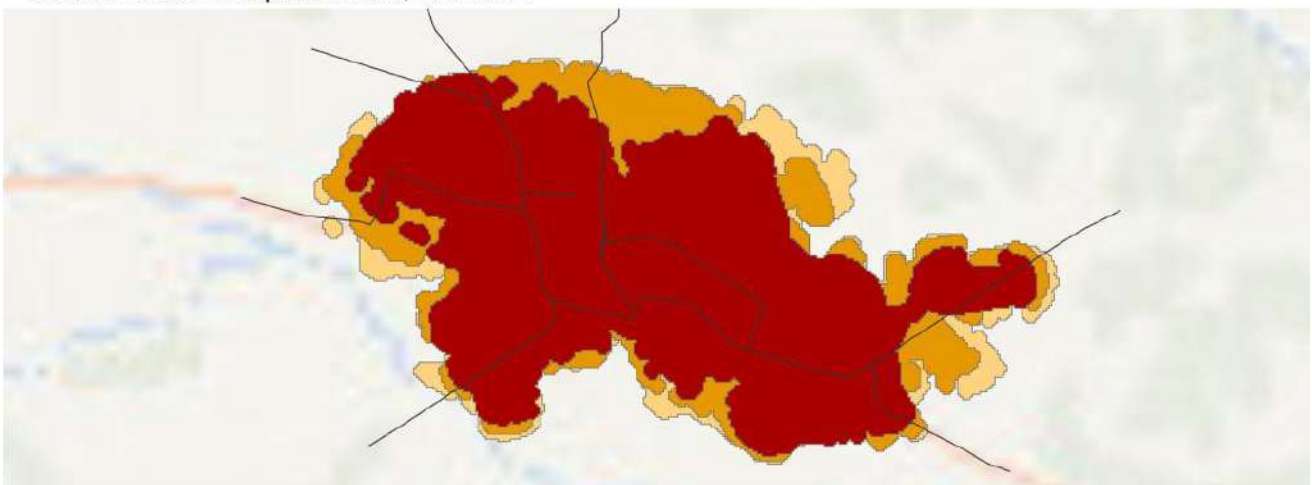
# Parbhani, India (South and Central Asia)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2014



**Parbhani, India**  
1991-2014

0 1 2 3 4 km

N

- Urban Extent in 1991
- Expansion, 1991 - 2002
- Expansion, 2002 - 2014
- Arterial Roads

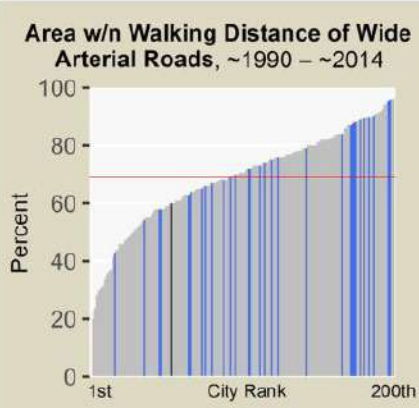
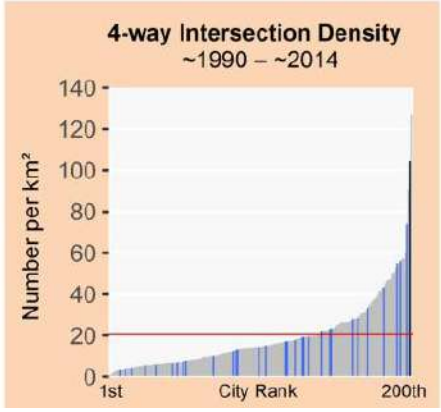
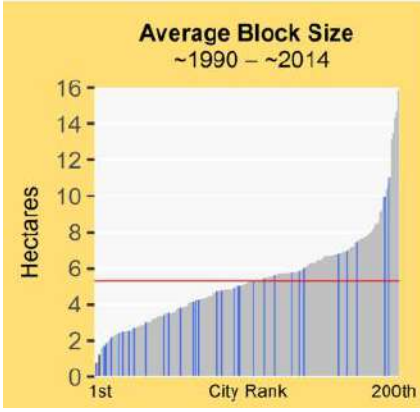
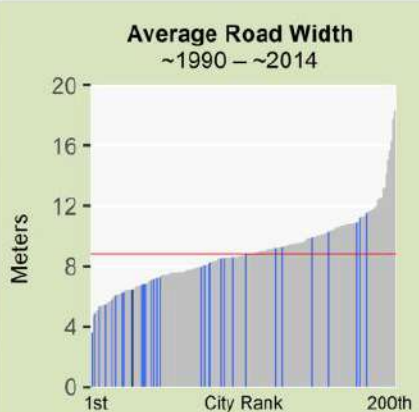
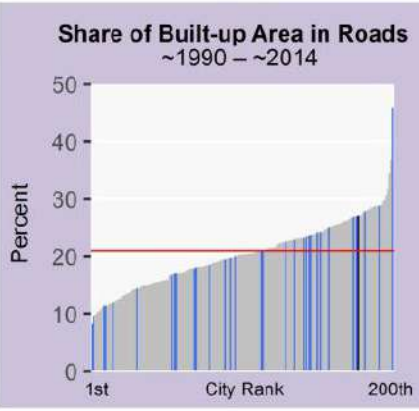
# Parbhani, India (South and Central Asia)



**Legend for Charts**

Parbhani | Other cities in region | All other cities | Global average

Metrics	Pre-1991	1991-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	23%	27%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	6.5	3.8
Share of Roads less than 4m Wide	15%	46%
Share of Roads more than 16m Wide	2%	0%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.1	0.9
Average Beeline Distance to Arterial Roads (m)	332	376
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	85%	80%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	64%	60%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	9%	17%
Average Block Size (ha)	1.5	1.2
3-way Intersection Density (number per km <sup>2</sup> )	242	500
4-way Intersection Density (number per km <sup>2</sup> )	24	104
Walkability Ratio	1.8	1.7
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	216	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	411	
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	79%	84%
Share of Residential Area Not Laid Out Before Occupation	2%	26%
Share of Residential Area Laid Out Before Occupation	97%	73%
Share of Residential Area in Informal Land Subdivisions	80%	73%
Share of Residential Area in Formal Land Subdivisions	16%	0%
Share of Residential Area in Housing Projects	0%	0%



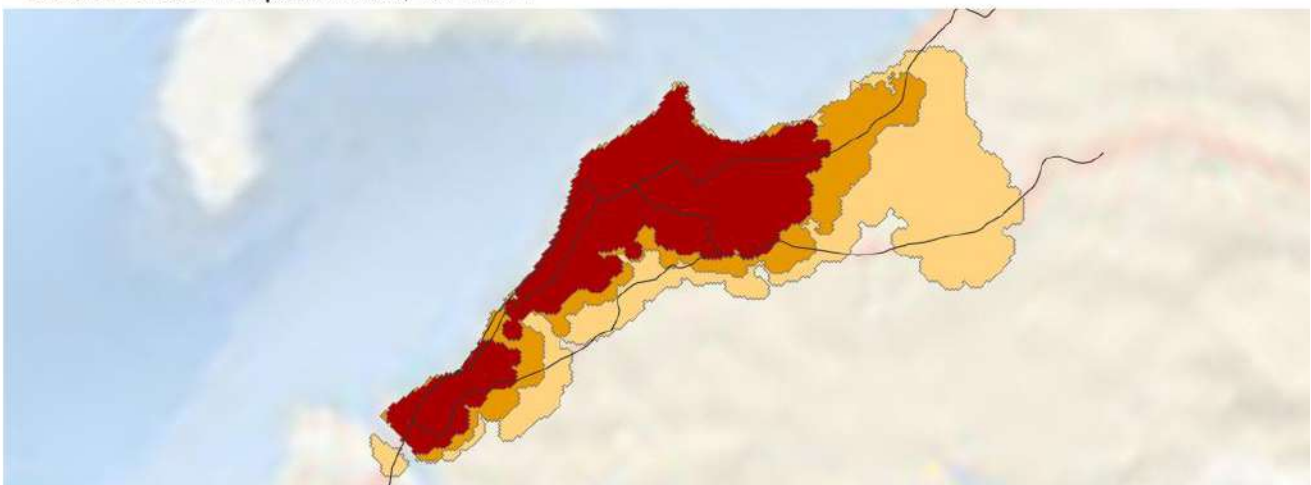
# Parepare, Indonesia (Southeast Asia)



Selected Locales in Area Developed Before 1994



Selected Locales in Expansion Area, 1994-2014



## Parepare, Indonesia 1994-2014



- Urban Extent in 1994
- Expansion, 1994 - 2000
- Expansion, 2000 - 2014

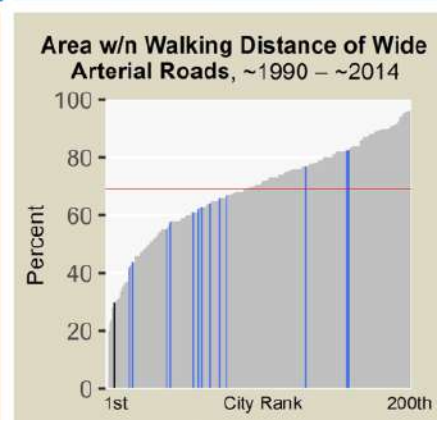
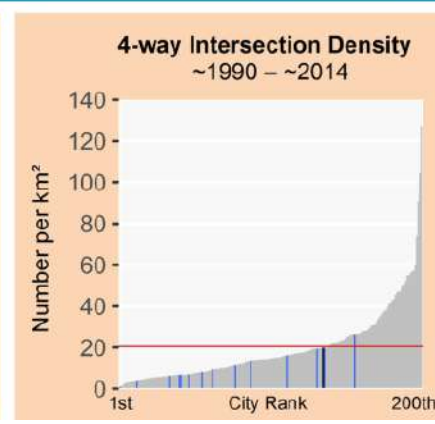
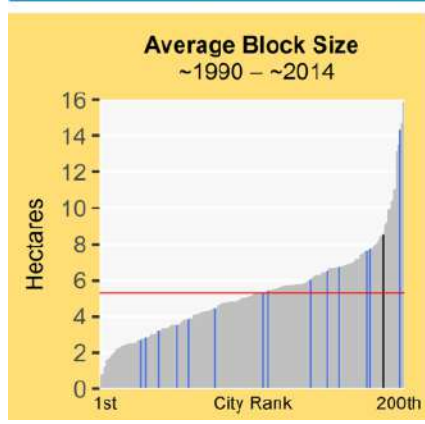
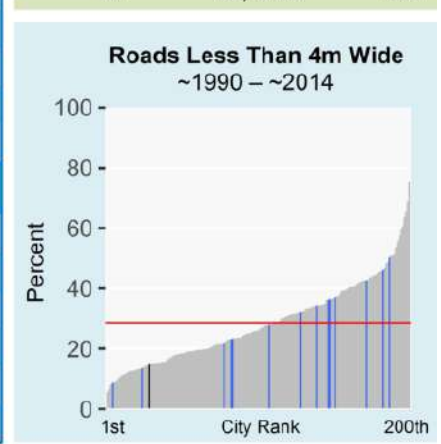
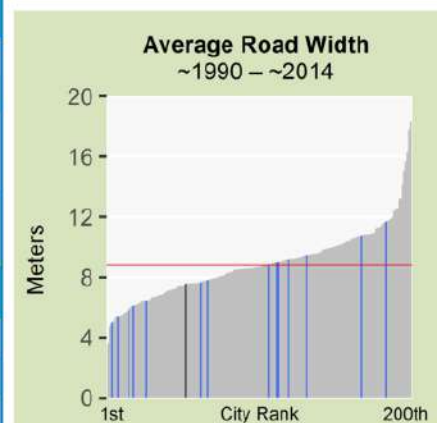
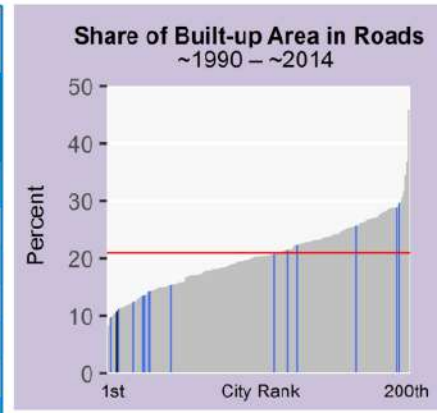
Arterial Roads



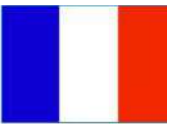
# Parepare, Indonesia (Southeast Asia)



Legend for Charts		
Parepare	Other cities in region	All other cities
		Global average
Metrics	Pre-1994	1994-2014
Roads		
Share of Built-Up Area Occupied by Roads	12%	10%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	7.6	6.3
Share of Roads less than 4m Wide	10%	14%
Share of Roads more than 16m Wide	0%	0%
Arterial Roads		
Density of Arterial Roads (km/km <sup>2</sup> )	2.4	1.7
Average Beeline Distance to Arterial Roads (m)	142	179
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	99%	98%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	40%	30%
Block Size, Plot Size, Intersection Density, and Walkability		
Share of Intersections that are 4-way	8%	10%
Average Block Size (ha)	4.9	8.5
3-way Intersection Density (number per km <sup>2</sup> )	65	75
4-way Intersection Density (number per km <sup>2</sup> )	10	20
Walkability Ratio	1.7	1.6
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		
Stages in the Evolution of Residential Layouts		
Share of Built-Up Area in Residential Use	75%	85%
Share of Residential Area Not Laid Out Before Occupation	60%	60%
Share of Residential Area Laid Out Before Occupation	39%	39%
Share of Residential Area in Informal Land Subdivisions	1%	13%
Share of Residential Area in Formal Land Subdivisions	37%	25%
Share of Residential Area in Housing Projects	0%	0%



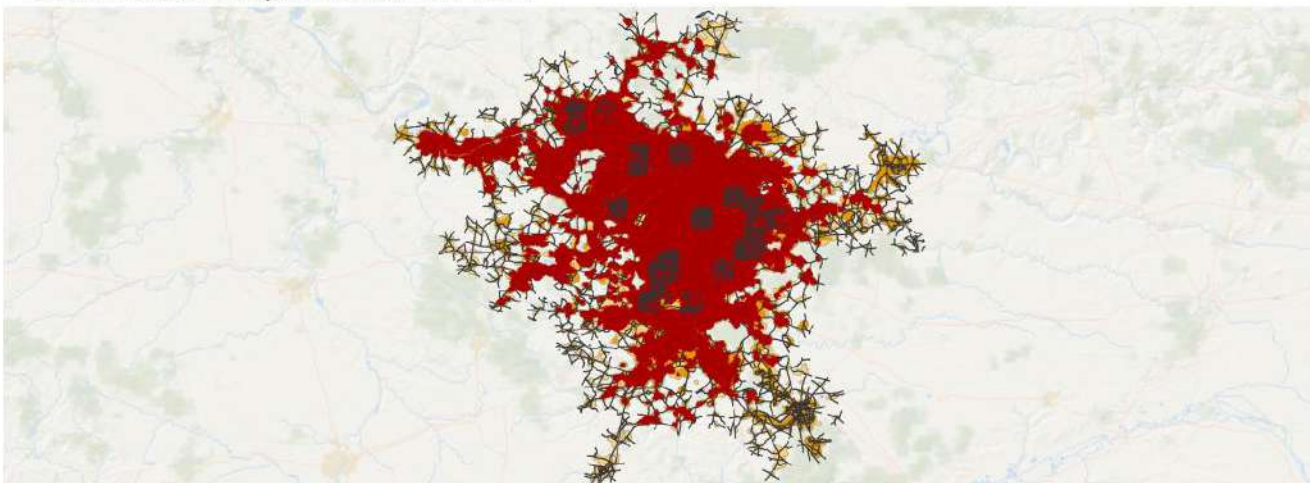
# Paris, France (Europe and Japan)



Selected Locales in Area Developed Before 1987



Selected Locales in Expansion Area, 1987-2014



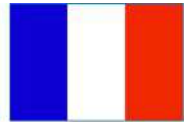
Paris, France  
1987-2014

0 20 40 km

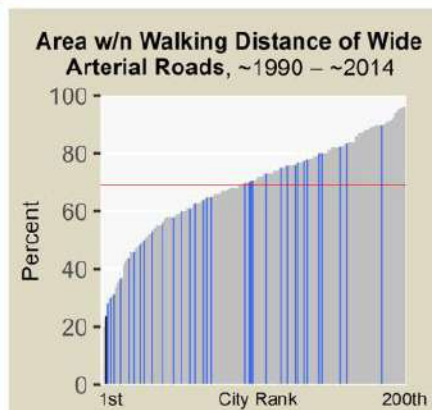
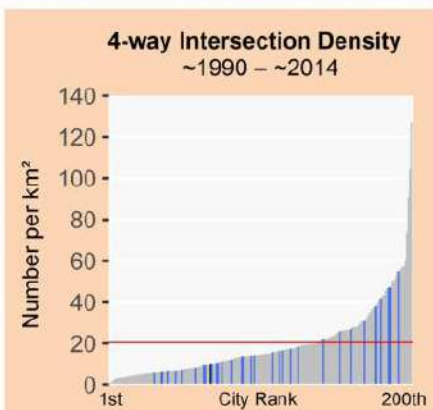
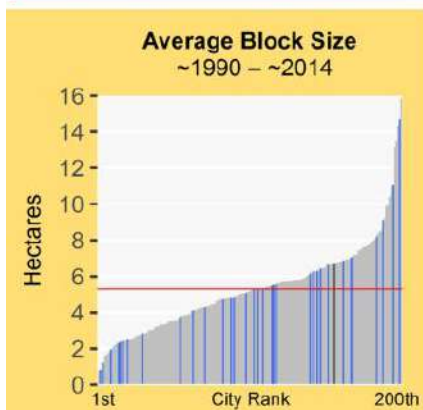
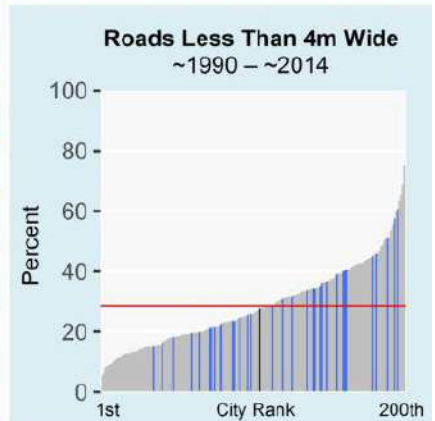
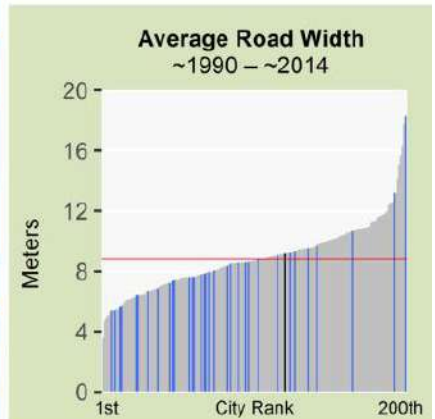
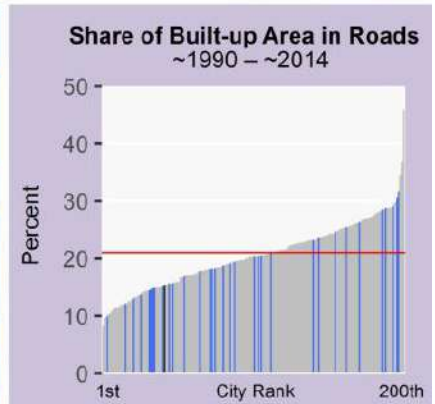
N

- Urban Extent in 1987
- Expansion, 1987 - 2000
- Expansion, 2000 - 2014
- Arterial Roads

# Paris, France (Europe and Japan)



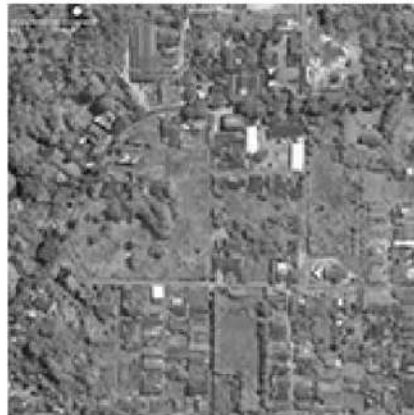
Legend for Charts			
	Paris	Other cities in region	Global average
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	20%		15%
Share of Built-Up Area that is Gridded or Partially Gridded	6%		0%
Average Road Width (m)	9.2		6.2
Share of Roads less than 4m Wide	9%		27%
Share of Roads more than 16m Wide	11%		5%
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	3.3		0.9
Average Beeline Distance to Arterial Roads (m)	110		973
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	99%		46%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	79%		24%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	20%		10%
Average Block Size (ha)	4.5		6.7
3-way Intersection Density (number per km <sup>2</sup> )	72		78
4-way Intersection Density (number per km <sup>2</sup> )	21		10
Walkability Ratio	1.6		1.6
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	447		545
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	76%		72%
Share of Residential Area Not Laid Out Before Occupation	22%		29%
Share of Residential Area Laid Out Before Occupation	69%		70%
Share of Residential Area in Informal Land Subdivisions	0%		1%
Share of Residential Area in Formal Land Subdivisions	63%		67%
Share of Residential Area in Housing Projects	14%		1%



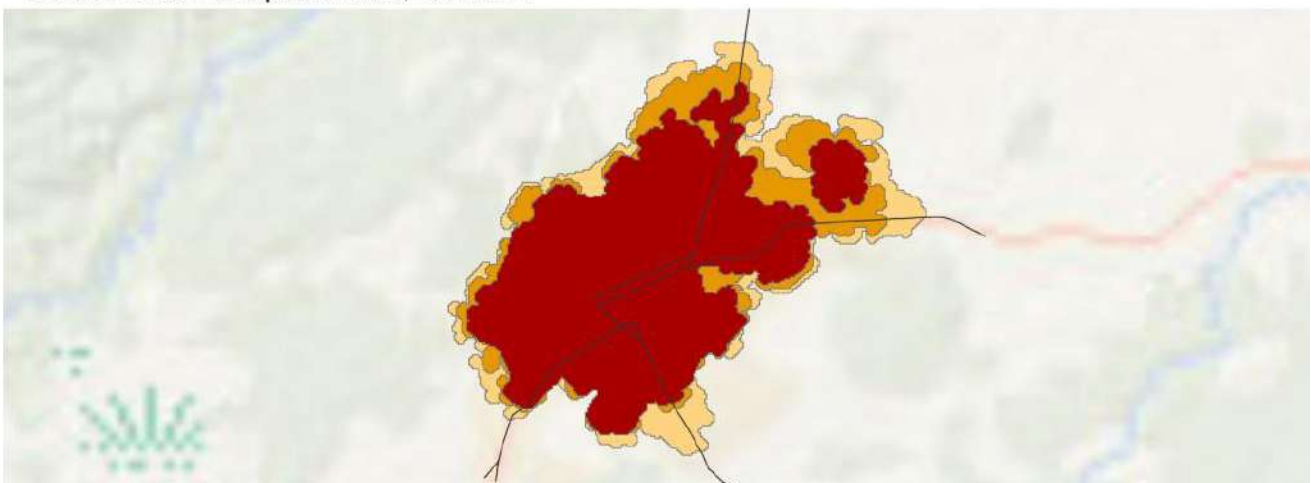
# Pematangsiantar, Indonesia (Southeast Asia)



Selected Locales in Area Developed Before 1994



Selected Locales in Expansion Area, 1994-2014



**Pematangsiantar, Indonesia**  
1994-2014

0 1 2 3 km

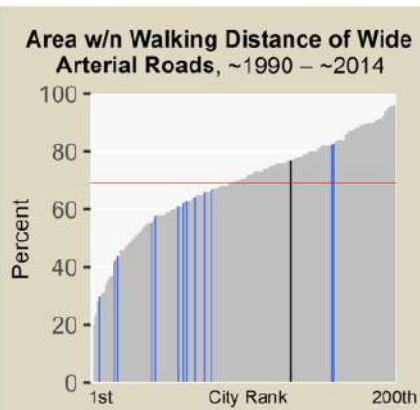
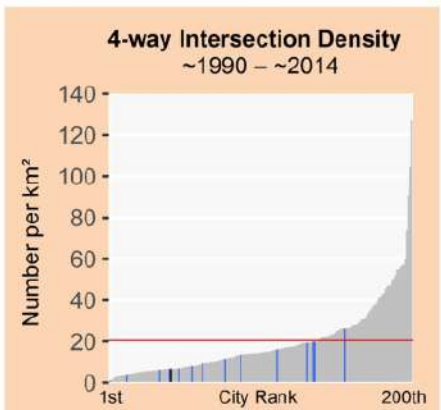
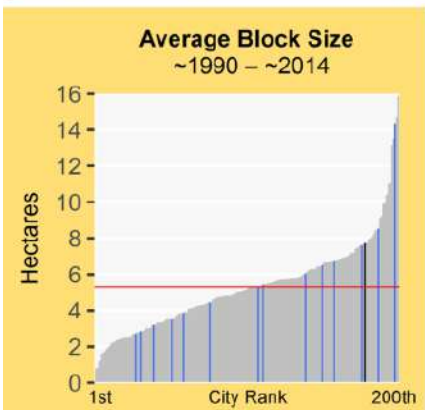
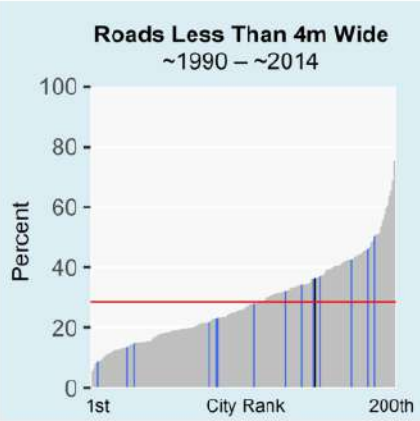
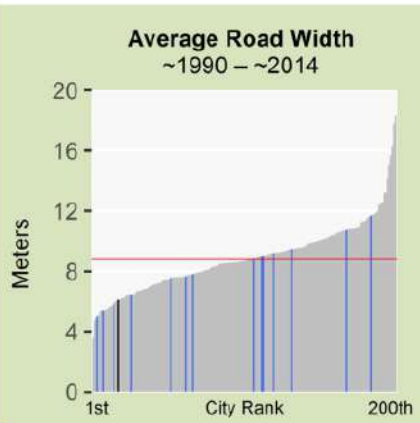
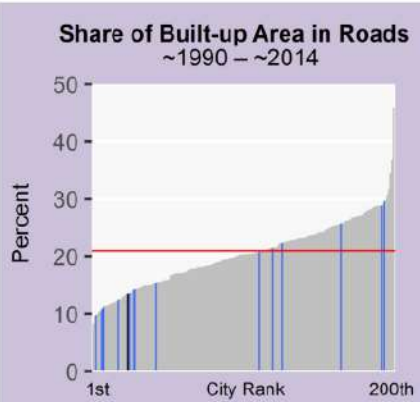
N

- Urban Extent in 1994
- Expansion, 1994 - 2001
- Expansion, 2001 - 2014
- Arterial Roads

# Pematangsiantar, Indonesia (Southeast Asia)



Legend for Charts			
	Pematangsiantar	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1994	1994-2014	
Roads			
Share of Built-Up Area Occupied by Roads	11%	13%	
Share of Built-Up Area that is Gridded or Partially Gridded	10%	0%	
Average Road Width (m)	6.1	5.0	
Share of Roads less than 4m Wide	25%	36%	
Share of Roads more than 16m Wide	1%	0%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	0.7	0.6	
Average Beeline Distance to Arterial Roads (m)	529	544	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	64%	64%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	75%	77%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	14%	4%	
Average Block Size (ha)	5.6	7.7	
3-way Intersection Density (number per km <sup>2</sup> )	74	108	
4-way Intersection Density (number per km <sup>2</sup> )	17	7	
Walkability Ratio	1.6	1.8	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )			
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	74%	62%	
Share of Residential Area Not Laid Out Before Occupation	40%	21%	
Share of Residential Area Laid Out Before Occupation	59%	78%	
Share of Residential Area in Informal Land Subdivisions	11%	58%	
Share of Residential Area in Formal Land Subdivisions	47%	19%	
Share of Residential Area in Housing Projects	0%	0%	



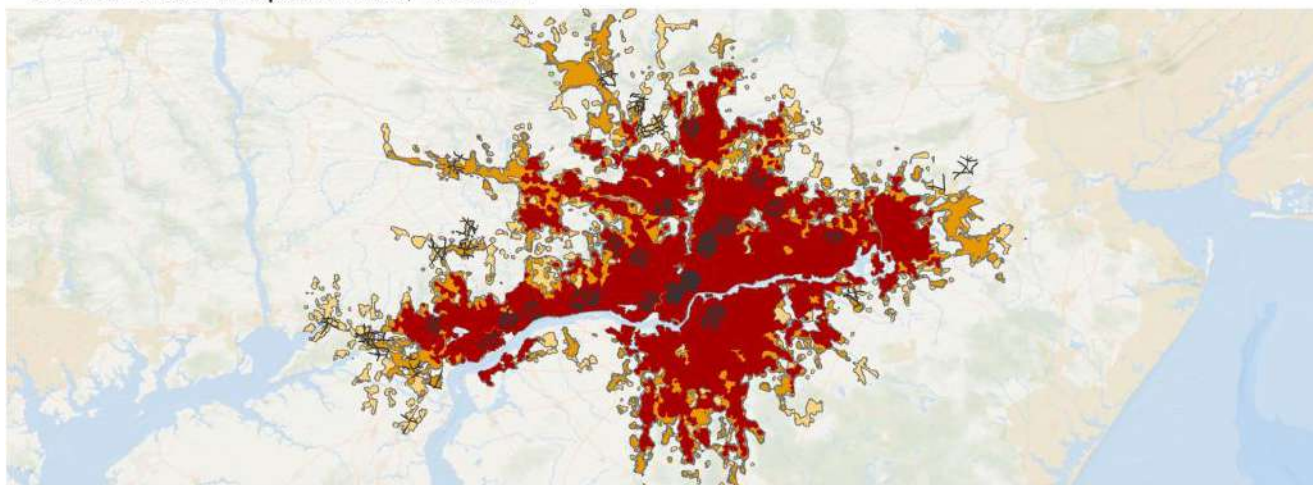
# Philadelphia, United States (Land-Rich Developed Countries)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



## Philadelphia, United States 1990-2014



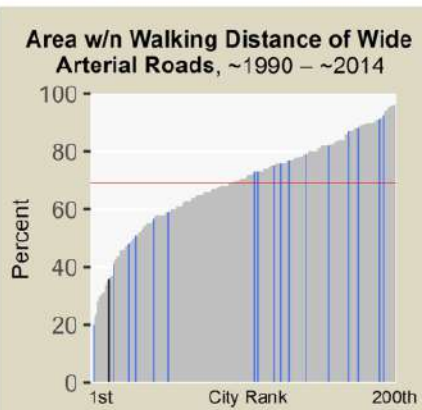
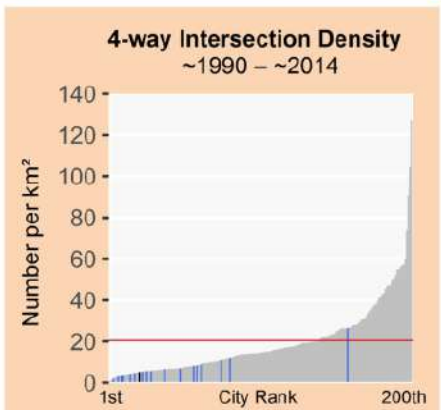
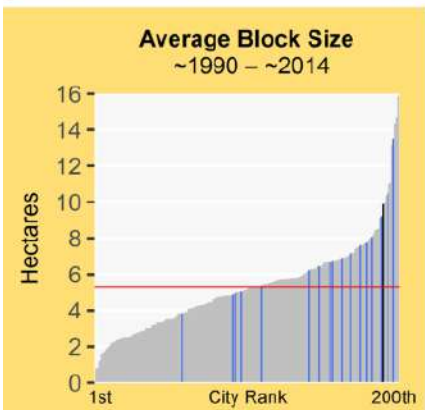
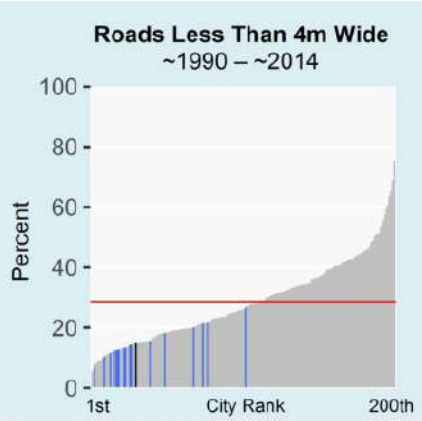
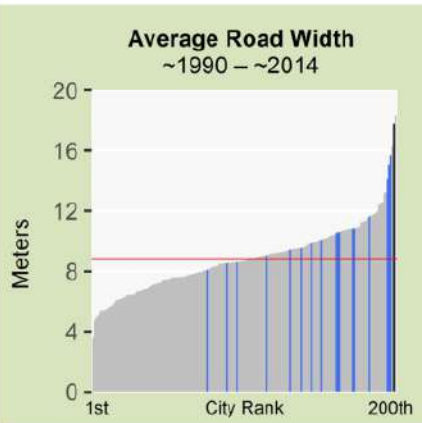
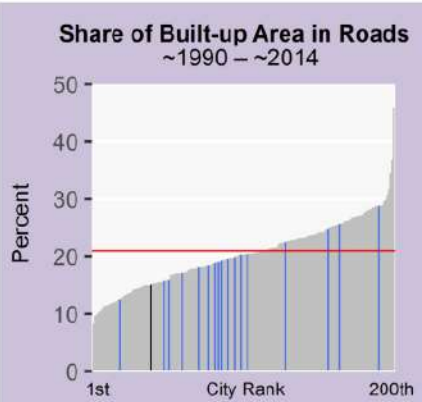
- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2014

Arterial Roads

# Philadelphia, United States (Land-Rich Developed Countries)



Legend for Charts			
	Philadelphia	Other cities in region	Global average
<b>Metrics</b>			
	Pre-1990	1990-2014	
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	21%	15%	
Share of Built-Up Area that is Gridded or Partially Gridded	7%	0%	
Average Road Width (m)	17.8	8.1	
Share of Roads less than 4m Wide	15%	14%	
Share of Roads more than 16m Wide	10%	6%	
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	1.8	0.9	
Average Beeline Distance to Arterial Roads (m)	223	394	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	93%	79%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	70%	36%	
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	14%	8%	
Average Block Size (ha)	3.6	9.9	
3-way Intersection Density (number per km <sup>2</sup> )	110	28	
4-way Intersection Density (number per km <sup>2</sup> )	17	5	
Walkability Ratio	1.8	1.6	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	709	986	
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	75%	85%	
Share of Residential Area Not Laid Out Before Occupation	7%	9%	
Share of Residential Area Laid Out Before Occupation	92%	90%	
Share of Residential Area in Informal Land Subdivisions	0%	0%	
Share of Residential Area in Formal Land Subdivisions	84%	85%	
Share of Residential Area in Housing Projects	7%	4%	



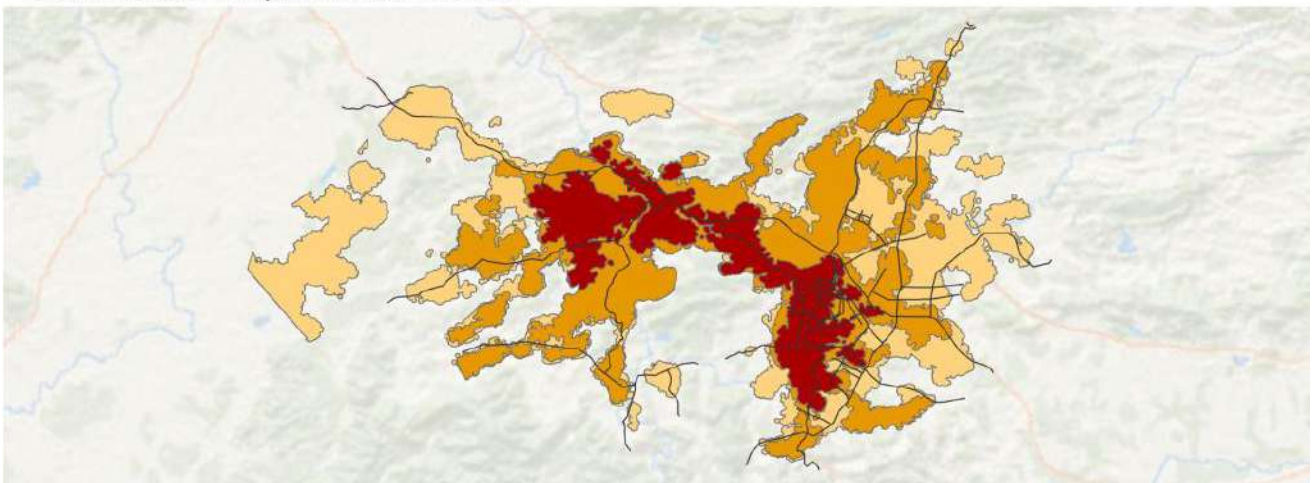
# Pingxiang, Jiangxi, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2013



Pingxiang, Jiangxi, China  
1989-2013

0 5 10 15 km

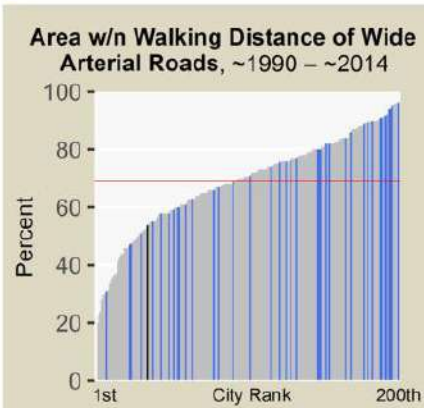
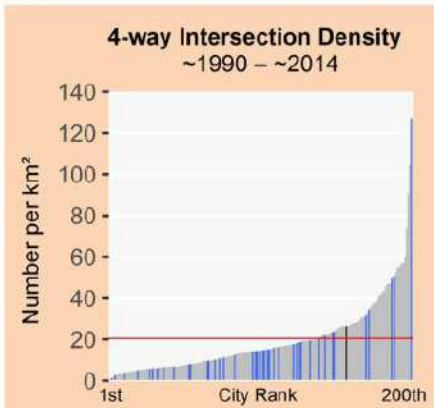
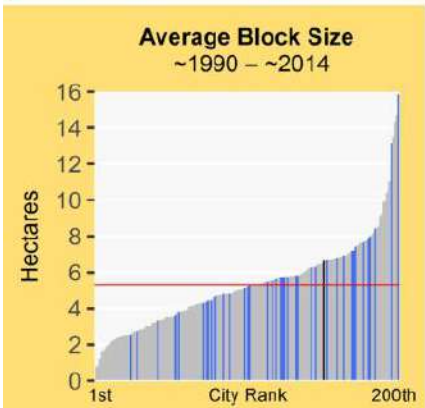
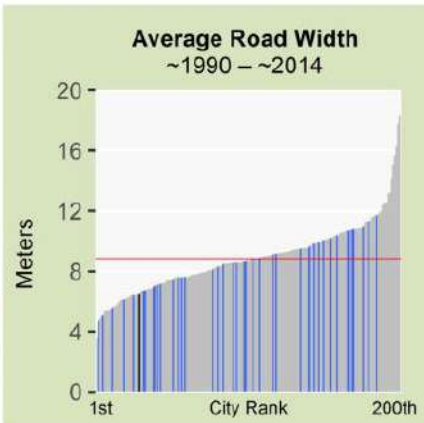
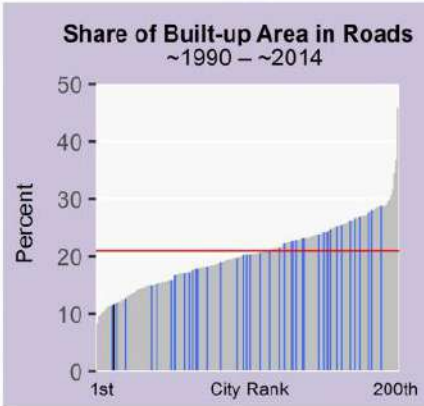
Urban Extent in 1989  
Expansion, 1989 - 1999  
Expansion, 1999 - 2013  
Arterial Roads



# Pingxiang, Jiangxi, China (East Asia and the Pacific)



Legend for Charts		
Pingxiang	Other cities in region	All other cities
		Global average
Metrics		
	Pre-1989	1989-2013
Roads		
Share of Built-Up Area Occupied by Roads	14%	11%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	6.5	4.0
Share of Roads less than 4m Wide	38%	63%
Share of Roads more than 16m Wide	7%	1%
Arterial Roads		
Density of Arterial Roads (km/km <sup>2</sup> )	1.1	0.7
Average Beeline Distance to Arterial Roads (m)	510	771
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	66%	63%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	46%	53%
Block Size, Plot Size, Intersection Density, and Walkability		
Share of Intersections that are 4-way	8%	8%
Average Block Size (ha)	6.5	6.6
3-way Intersection Density (number per km <sup>2</sup> )	54	102
4-way Intersection Density (number per km <sup>2</sup> )	12	27
Walkability Ratio	1.5	1.3
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	170	
Stages in the Evolution of Residential Layouts		
Share of Built-Up Area in Residential Use	66%	83%
Share of Residential Area Not Laid Out Before Occupation	80%	93%
Share of Residential Area Laid Out Before Occupation	19%	6%
Share of Residential Area in Informal Land Subdivisions	5%	3%
Share of Residential Area in Formal Land Subdivisions	7%	0%
Share of Residential Area in Housing Projects	7%	2%



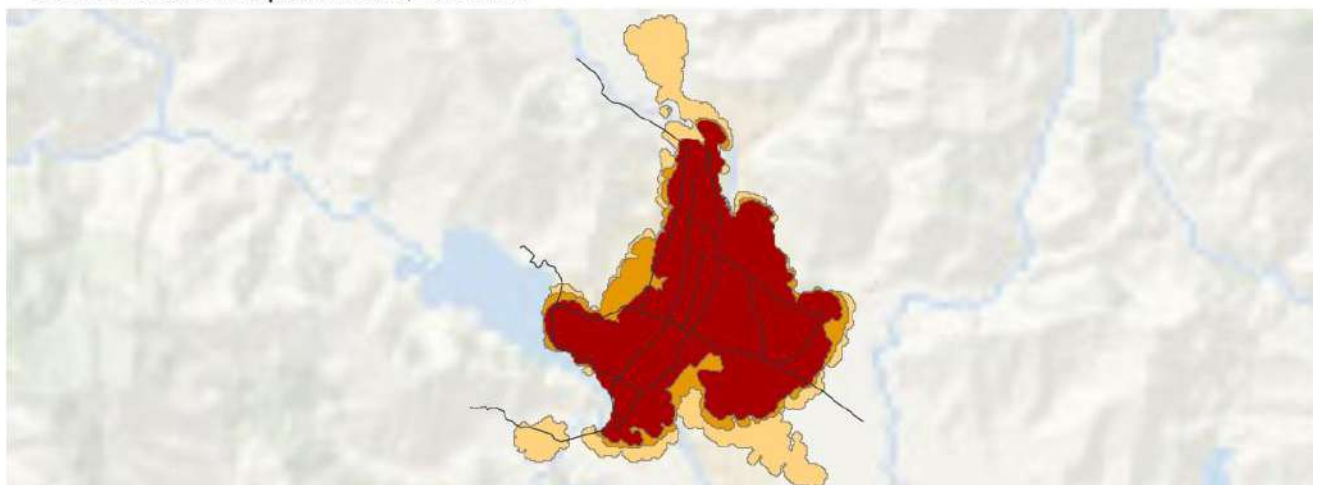
# Pokhara, Nepal (South and Central Asia)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2013



## Pokhara, Nepal 1989-2013



- Urban Extent in 1989
- Expansion, 1989 - 2000
- Expansion, 2000 - 2013

Arterial Roads

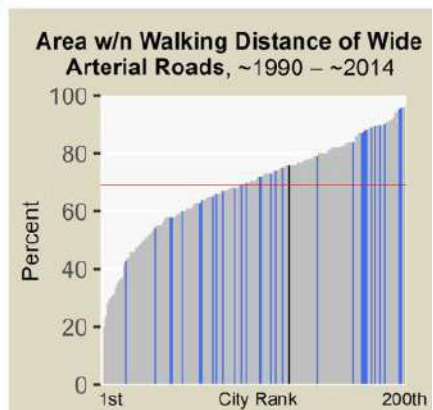
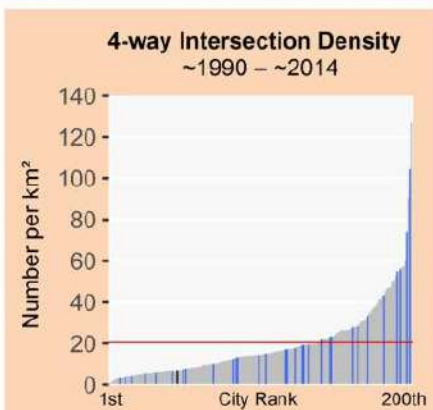
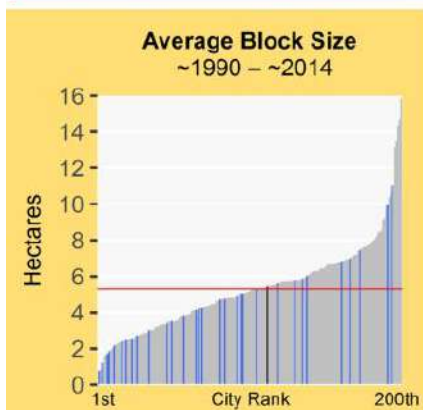
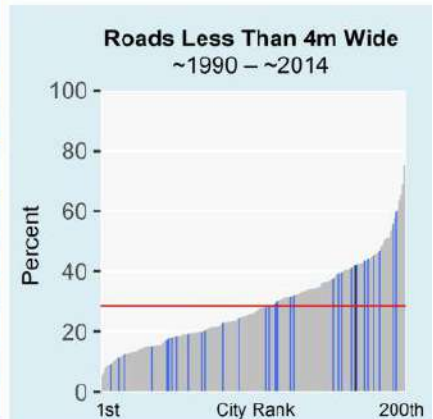
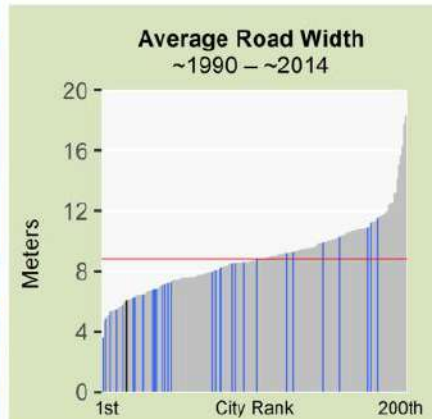
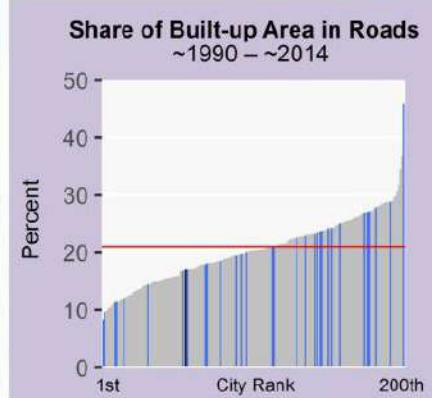
# Pokhara, Nepal (South and Central Asia)



### Legend for Charts

Pokhara | Other cities in region | All other cities | Global average

Metrics	Pre-1989	1989-2013
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	16%	17%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	6.0	4.8
Share of Roads less than 4m Wide	29%	42%
Share of Roads more than 16m Wide	2%	0%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.0	1.4
Average Beeline Distance to Arterial Roads (m)	190	253
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	94%	89%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	77%	76%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	10%	4%
Average Block Size (ha)	3.5	5.4
3-way Intersection Density (number per km <sup>2</sup> )	100	115
4-way Intersection Density (number per km <sup>2</sup> )	10	7
Walkability Ratio	1.7	1.7
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	59%	66%
Share of Residential Area Not Laid Out Before Occupation	82%	65%
Share of Residential Area Laid Out Before Occupation	17%	34%
Share of Residential Area in Informal Land Subdivisions	14%	28%
Share of Residential Area in Formal Land Subdivisions	1%	0%
Share of Residential Area in Housing Projects	1%	5%



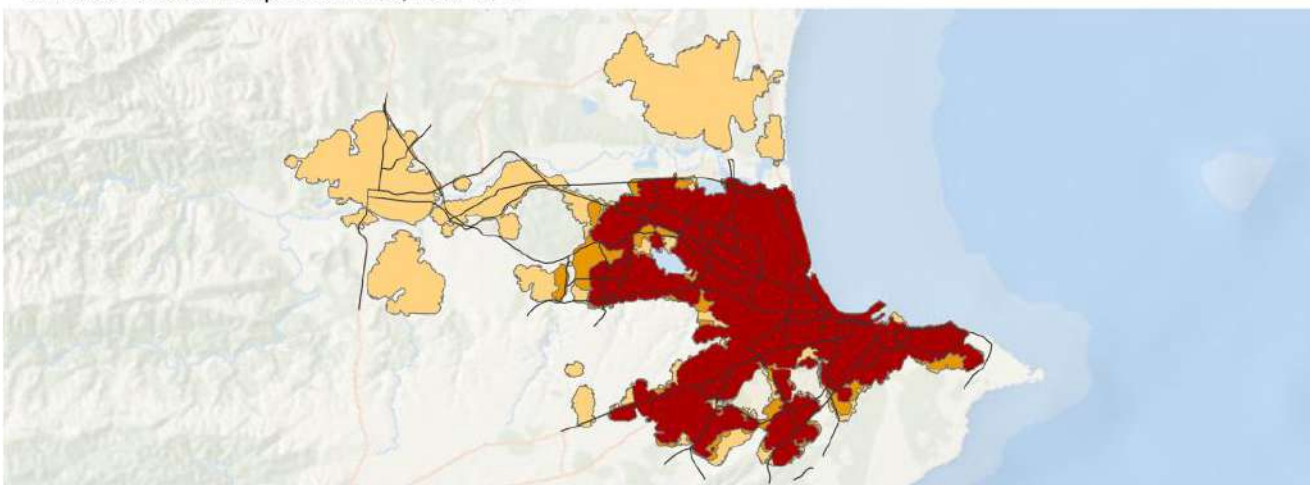
# Port Elizabeth, South Africa (Sub-Saharan Africa)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013




## Port Elizabeth, South Africa 1990-2013



- Urban Extent in 1990
- Expansion, 1990 - 2001
- Expansion, 2001 - 2013

Arterial Roads

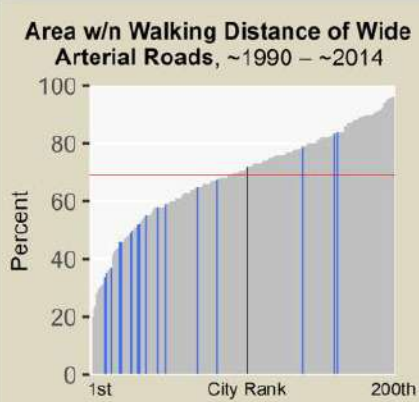
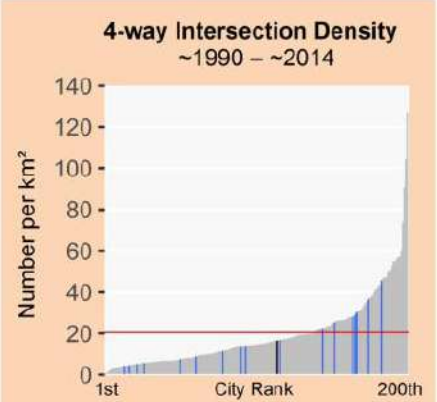
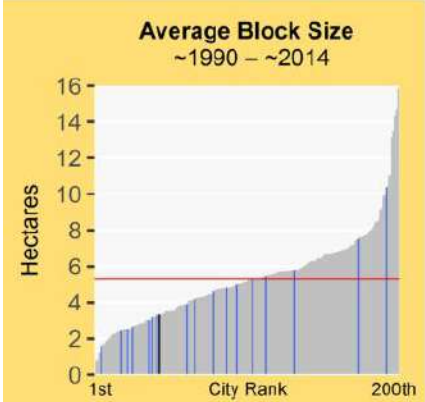
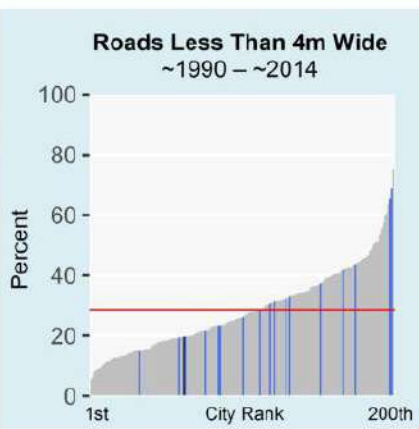
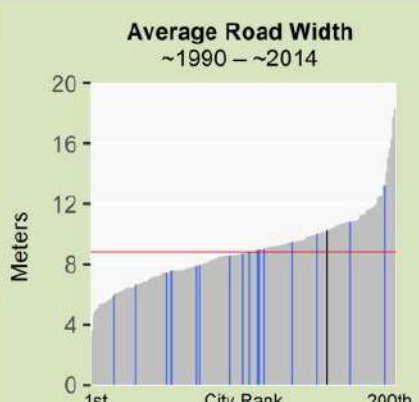
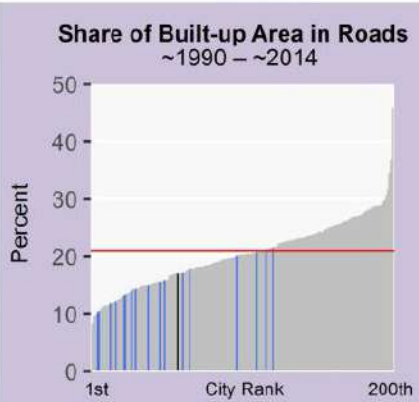
# Port Elizabeth, South Africa (Sub-Saharan Africa)



**Legend for Charts**

Port Elizabeth | Other cities in region | All other cities | Global average

Metrics	Pre-1990	1990-2013
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	22%	17%
Share of Built-Up Area that is Gridded or Partially Gridded	2%	0%
Average Road Width (m)	10.3	7.0
Share of Roads less than 4m Wide	10%	19%
Share of Roads more than 16m Wide	14%	2%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.1	0.9
Average Beeline Distance to Arterial Roads (m)	370	601
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	81%	71%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	78%	72%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	8%	13%
Average Block Size (ha)	4.8	3.3
3-way Intersection Density (number per km <sup>2</sup> )	90	93
4-way Intersection Density (number per km <sup>2</sup> )	11	17
Walkability Ratio	1.8	1.8
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	297	290
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	646	755
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	72%	83%
Share of Residential Area Not Laid Out Before Occupation	1%	7%
Share of Residential Area Laid Out Before Occupation	98%	92%
Share of Residential Area in Informal Land Subdivisions	5%	20%
Share of Residential Area in Formal Land Subdivisions	83%	69%
Share of Residential Area in Housing Projects	10%	2%



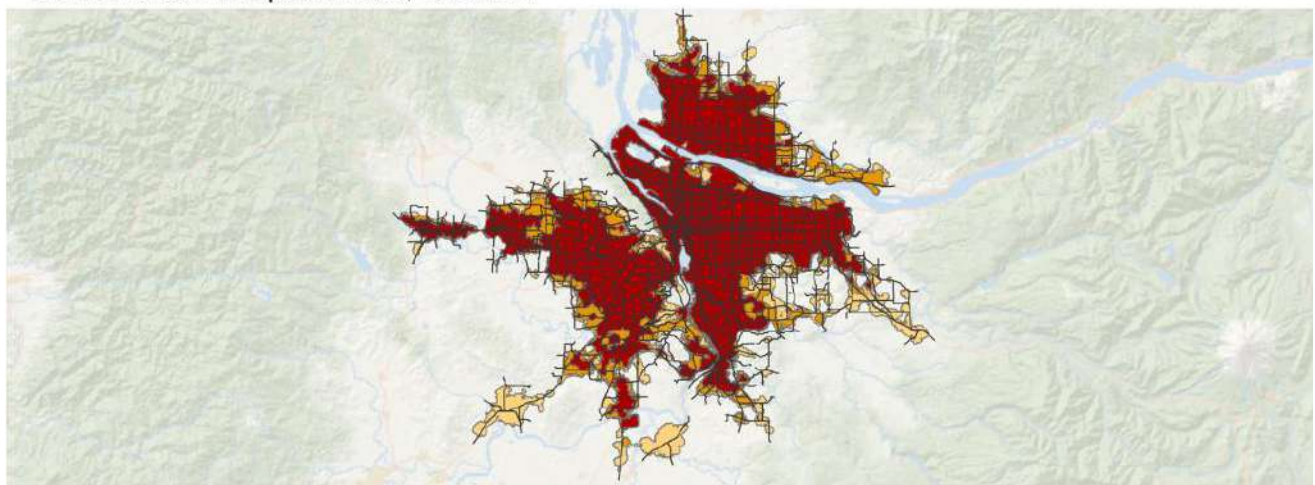
# Portland, OR, United States (Land-Rich Developed Countries)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



Portland, OR, United States  
1990-2014

0 10 20 30 40 km

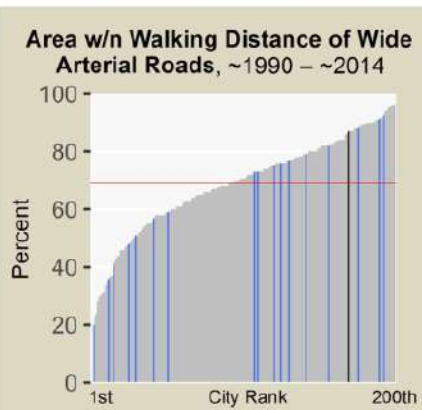
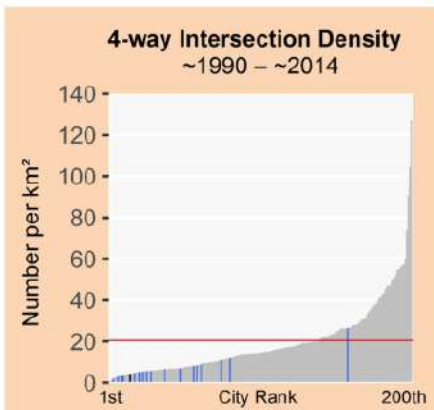
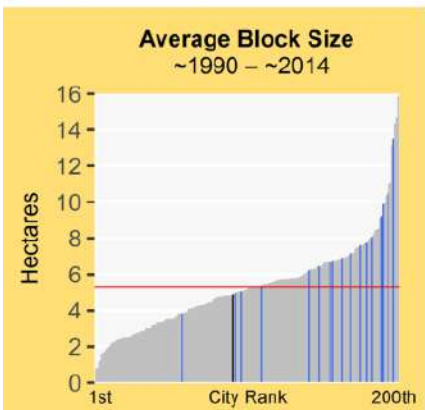
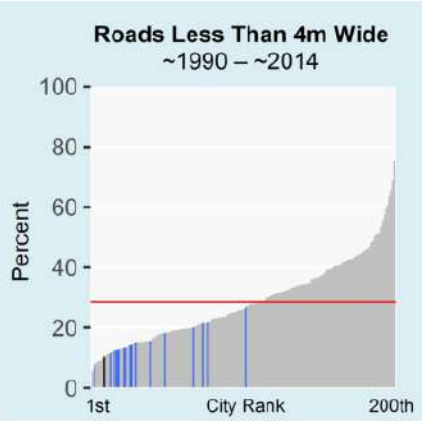
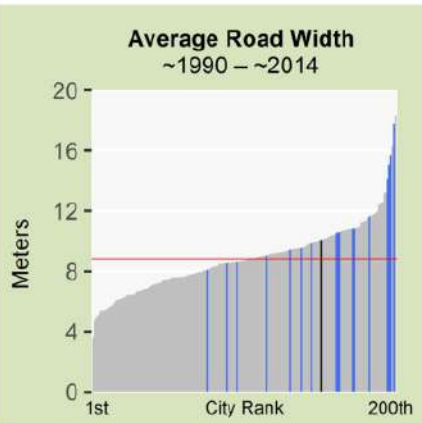
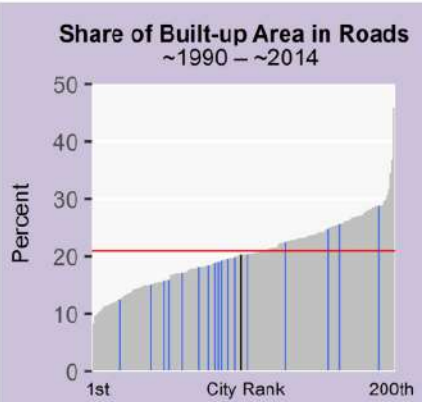
N

- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2014
- Arterial Roads

# Portland, OR, United States (Land-Rich Developed Countries)



Legend for Charts			
	Portland	Other cities in region	All other cities
<b>Metrics</b>			
		Pre-1990	1990-2014
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads		23%	20%
Share of Built-Up Area that is Gridded or Partially Gridded		12%	0%
Average Road Width (m)		10.1	10.0
Share of Roads less than 4m Wide		18%	10%
Share of Roads more than 16m Wide		14%	7%
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )		2.0	1.7
Average Beeline Distance to Arterial Roads (m)		189	218
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads		96%	95%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)		92%	87%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way		17%	3%
Average Block Size (ha)		4.3	4.9
3-way Intersection Density (number per km <sup>2</sup> )		98	60
4-way Intersection Density (number per km <sup>2</sup> )		21	4
Walkability Ratio		1.6	1.8
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		640	842
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use		73%	90%
Share of Residential Area Not Laid Out Before Occupation		2%	27%
Share of Residential Area Laid Out Before Occupation		97%	72%
Share of Residential Area in Informal Land Subdivisions		0%	0%
Share of Residential Area in Formal Land Subdivisions		87%	64%
Share of Residential Area in Housing Projects		9%	7%



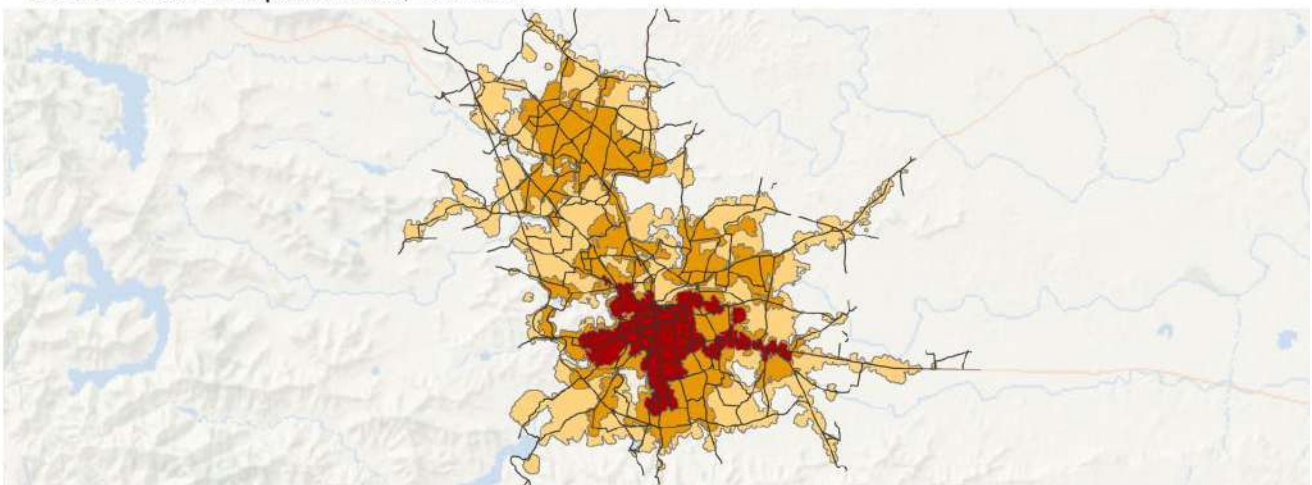
# Pune, India (South and Central Asia)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2011



**Pune, India**  
1991-2011

0 5 10 15 20 km

N

- Urban Extent in 1991
- Expansion, 1991 - 2001
- Expansion, 2001 - 2011
- Arterial Roads



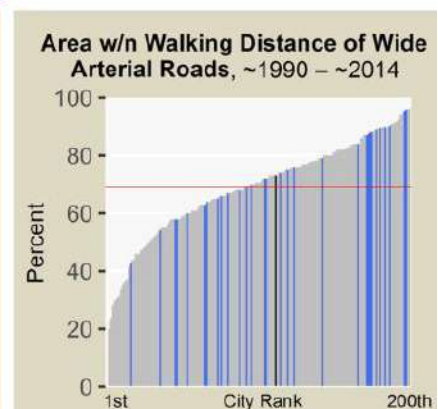
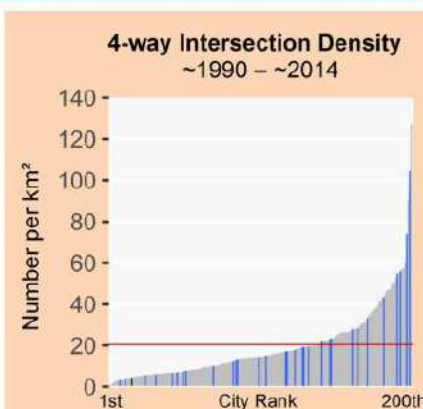
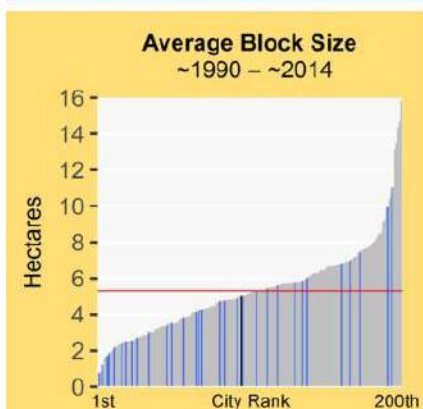
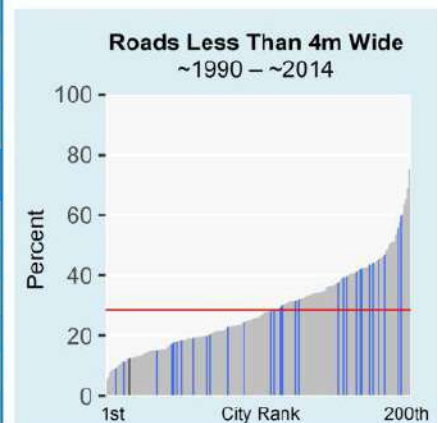
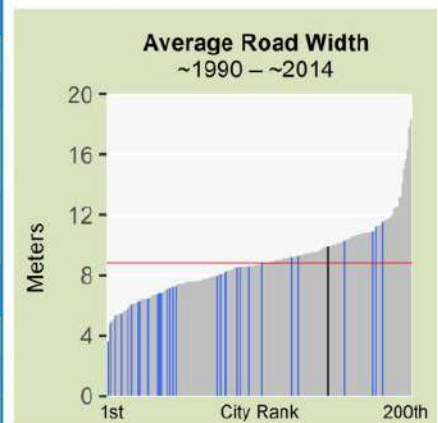
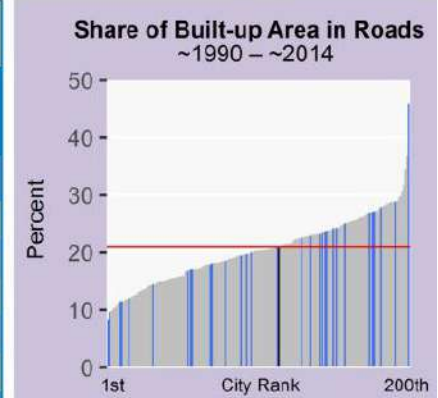
# Pune, India (South and Central Asia)



### Legend for Charts

Pune | Other cities in region | All other cities | Global average

Metrics	Pre-1991	1991-2011
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	20%	21%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	9.9	7.8
Share of Roads less than 4m Wide	6%	12%
Share of Roads more than 16m Wide	12%	6%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.1	1.4
Average Beeline Distance to Arterial Roads (m)	167	264
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	98%	91%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	90%	73%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	10%	3%
Average Block Size (ha)	3.1	5.1
3-way Intersection Density (number per km <sup>2</sup> )	114	96
4-way Intersection Density (number per km <sup>2</sup> )	14	5
Walkability Ratio	1.6	2.0
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	316	270
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	71%	55%
Share of Residential Area Not Laid Out Before Occupation	22%	27%
Share of Residential Area Laid Out Before Occupation	77%	72%
Share of Residential Area in Informal Land Subdivisions	0%	23%
Share of Residential Area in Formal Land Subdivisions	73%	30%
Share of Residential Area in Housing Projects	3%	18%



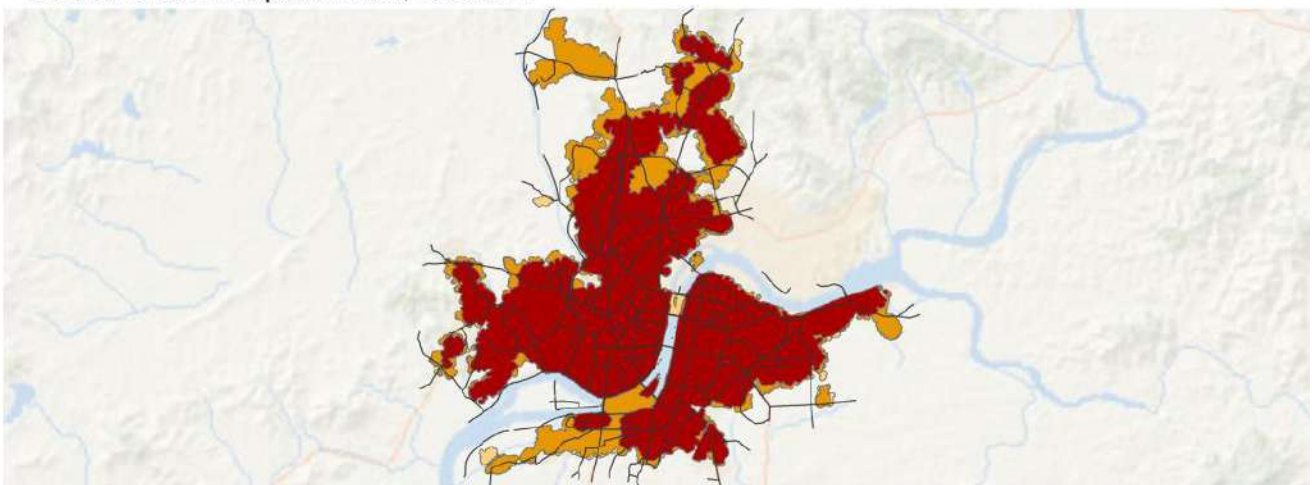
# Pyongyang, Korea Dem. Rep. (East Asia and the Pacific)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



## Pyongyang, Korea Dem. Rep. 1990-2014



- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2014

Arterial Roads

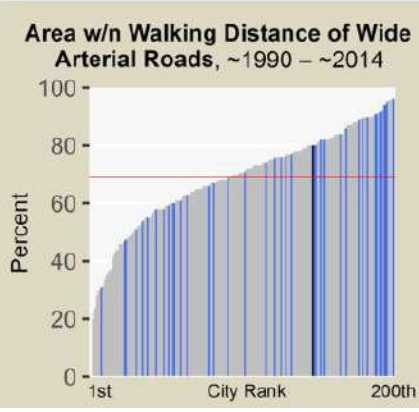
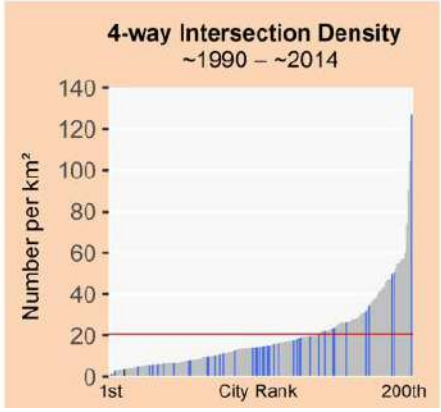
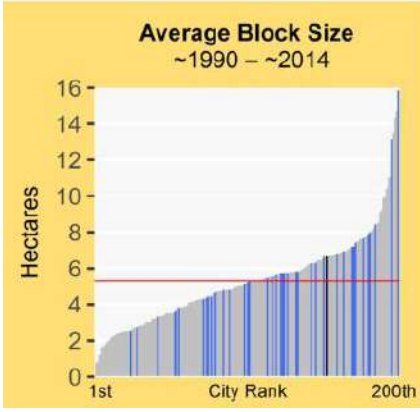
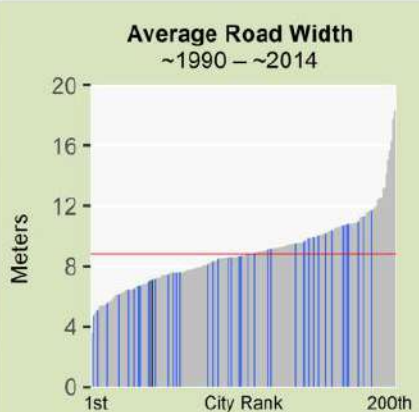
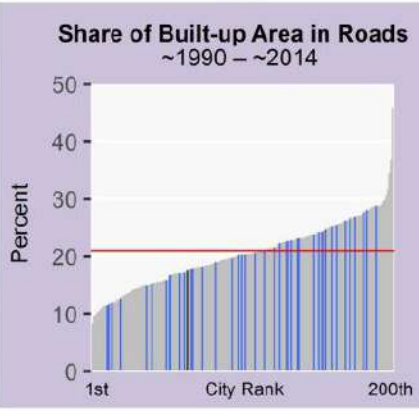
# Pyongyang, Korea Dem. Rep. (East Asia and the Pacific)



**Legend for Charts**

Pyongyang | Other cities in region | All other cities | Global average

Metrics	Pre-1990	1990-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	22%	17%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	7.1	4.5
Share of Roads less than 4m Wide	30%	55%
Share of Roads more than 16m Wide	6%	2%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.1	1.9
Average Beeline Distance to Arterial Roads (m)	172	195
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	97%	95%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	86%	80%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	5%	2%
Average Block Size (ha)	4.2	6.7
3-way Intersection Density (number per km <sup>2</sup> )	131	92
4-way Intersection Density (number per km <sup>2</sup> )	9	4
Walkability Ratio	1.8	2.2
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		289
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	46%	29%
Share of Residential Area Not Laid Out Before Occupation	46%	52%
Share of Residential Area Laid Out Before Occupation	53%	47%
Share of Residential Area in Informal Land Subdivisions	8%	45%
Share of Residential Area in Formal Land Subdivisions	32%	0%
Share of Residential Area in Housing Projects	12%	2%



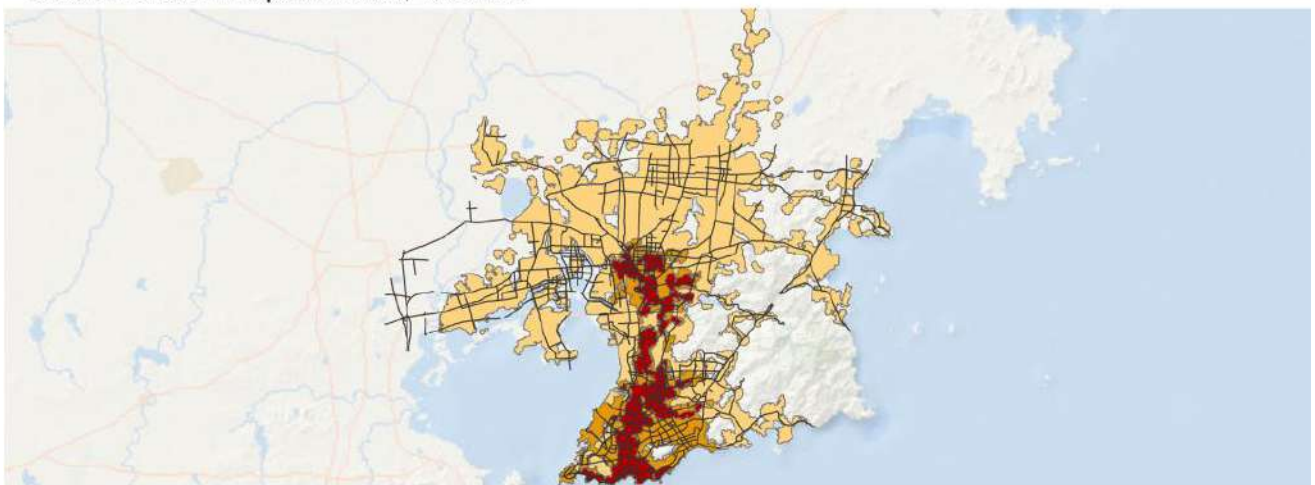
## Qingdao, Shandong, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013



Qingdao, Shandong, China  
1990-2013

0 10 20 30 40 km

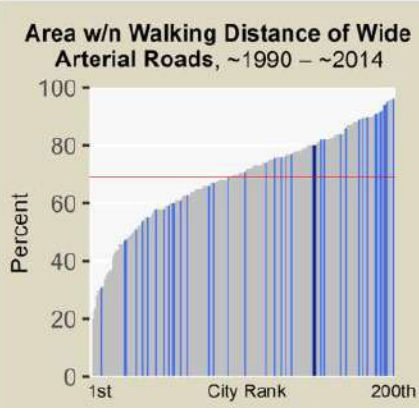
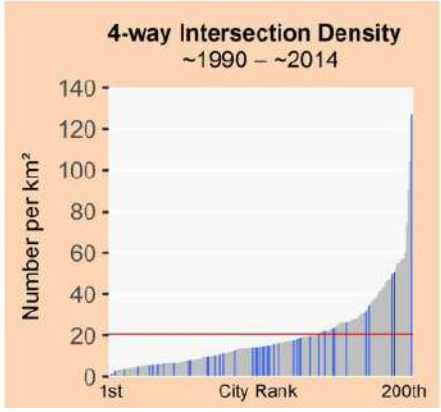
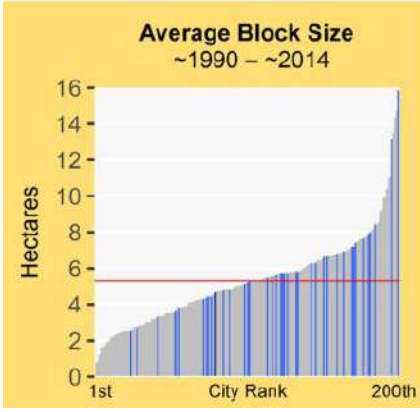
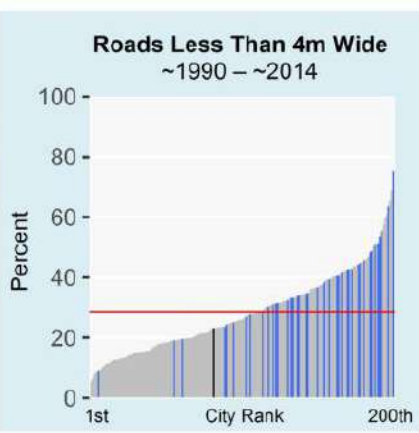
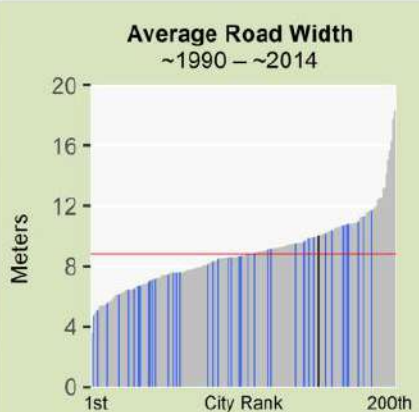
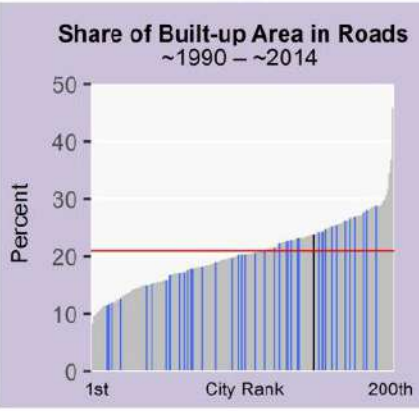


Urban Extent in 1990  
Expansion, 1990 - 2000  
Expansion, 2000 - 2013

Arterial Roads

# Qingdao, Shandong, China (East Asia and the Pacific)

Legend for Charts				
	Qingdao	Other cities in region	All other cities	Global average
<b>Legend for Charts</b>				
	Qingdao	Other cities in region	All other cities	Global average
Metrics	Pre-1990	1990-2013		
<b>Roads</b>				
Share of Built-Up Area Occupied by Roads	26%	24%		
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%		
Average Road Width (m)	10.1	8.3		
Share of Roads less than 4m Wide	21%	23%		
Share of Roads more than 16m Wide	18%	9%		
<b>Arterial Roads</b>				
Density of Arterial Roads (km/km <sup>2</sup> )	2.1	1.2		
Average Beeline Distance to Arterial Roads (m)	168	380		
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	98%	83%		
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	97%	80%		
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>				
Share of Intersections that are 4-way	16%	13%		
Average Block Size (ha)	3.5	4.7		
3-way Intersection Density (number per km <sup>2</sup> )	160	168		
4-way Intersection Density (number per km <sup>2</sup> )	33	51		
Walkability Ratio	1.5	1.5		
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )				
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )				
<b>Stages in the Evolution of Residential Layouts</b>				
Share of Built-Up Area in Residential Use	50%	56%		
Share of Residential Area Not Laid Out Before Occupation	5%	0%		
Share of Residential Area Laid Out Before Occupation	94%	99%		
Share of Residential Area in Informal Land Subdivisions	11%	23%		
Share of Residential Area in Formal Land Subdivisions	20%	11%		
Share of Residential Area in Housing Projects	63%	64%		



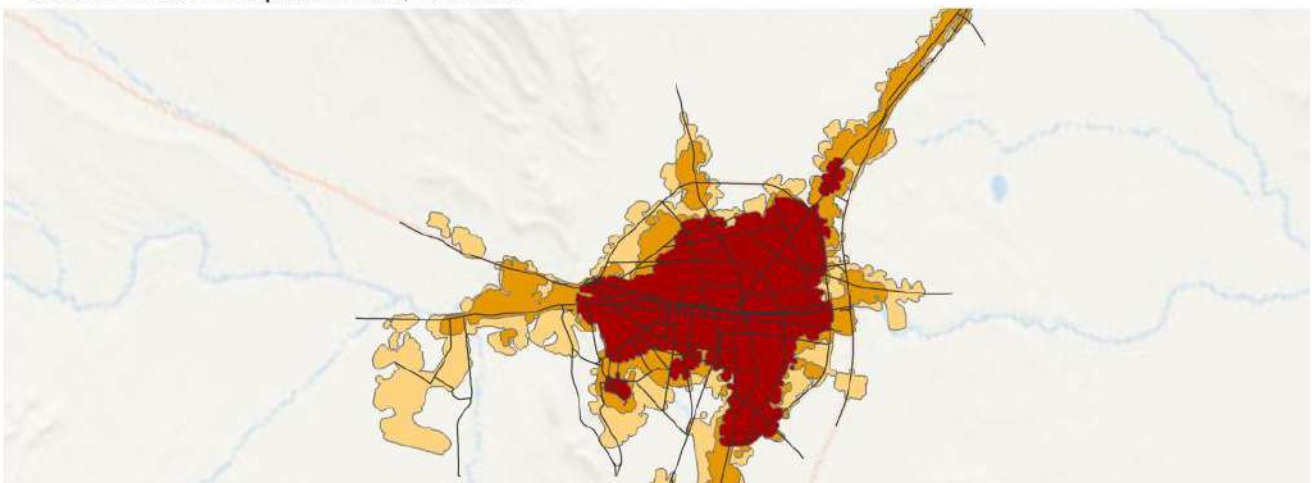
# Qom, Iran (South and Central Asia)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2010



**Qom, Iran  
1990-2010**

0 5 10 km

Urban Extent in 1990

Expansion, 1990 - 2001

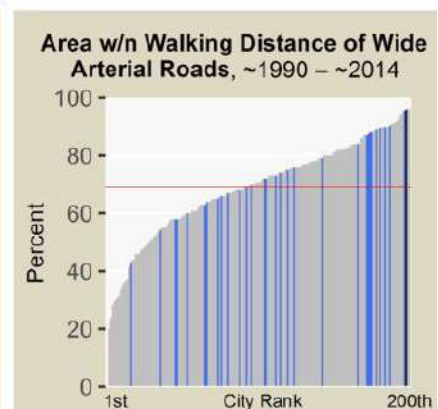
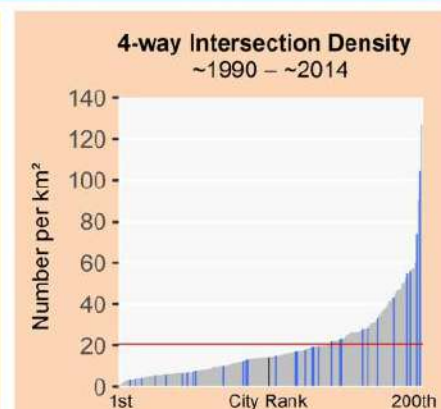
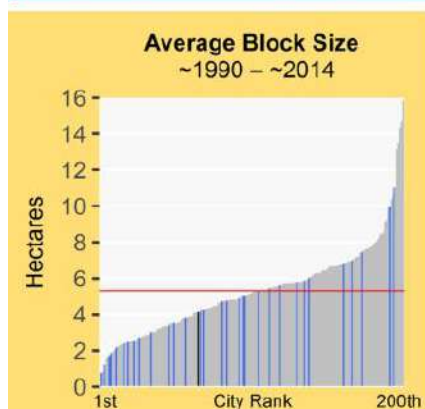
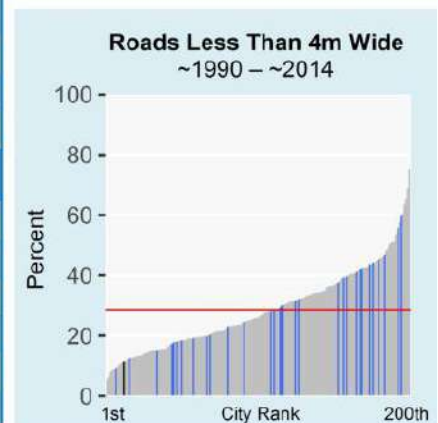
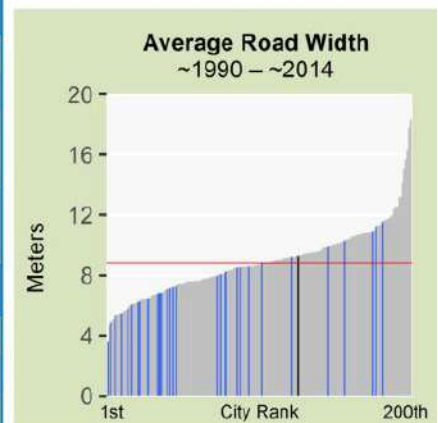
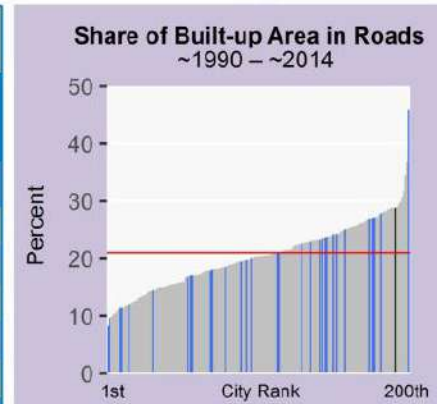
Expansion, 2001 - 2010

Arterial Roads

# Qom, Iran (South and Central Asia)



Legend for Charts			
	Qom	Other cities in region	All other cities
			Global average —
Metrics			
	Pre-1990	1990-2010	
Roads			
Share of Built-Up Area Occupied by Roads	26%	28%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%	
Average Road Width (m)	9.3	10.5	
Share of Roads less than 4m Wide	13%	11%	
Share of Roads more than 16m Wide	14%	16%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	2.8	2.0	
Average Beeline Distance to Arterial Roads (m)	127	218	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	100%	94%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	100%	96%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	14%	11%	
Average Block Size (ha)	1.8	4.2	
3-way Intersection Density (number per km <sup>2</sup> )	164	139	
4-way Intersection Density (number per km <sup>2</sup> )	26	15	
Walkability Ratio	1.6	1.7	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		166	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	74%	77%	
Share of Residential Area Not Laid Out Before Occupation	9%	1%	
Share of Residential Area Laid Out Before Occupation	90%	98%	
Share of Residential Area in Informal Land Subdivisions	2%	14%	
Share of Residential Area in Formal Land Subdivisions	83%	58%	
Share of Residential Area in Housing Projects	3%	25%	



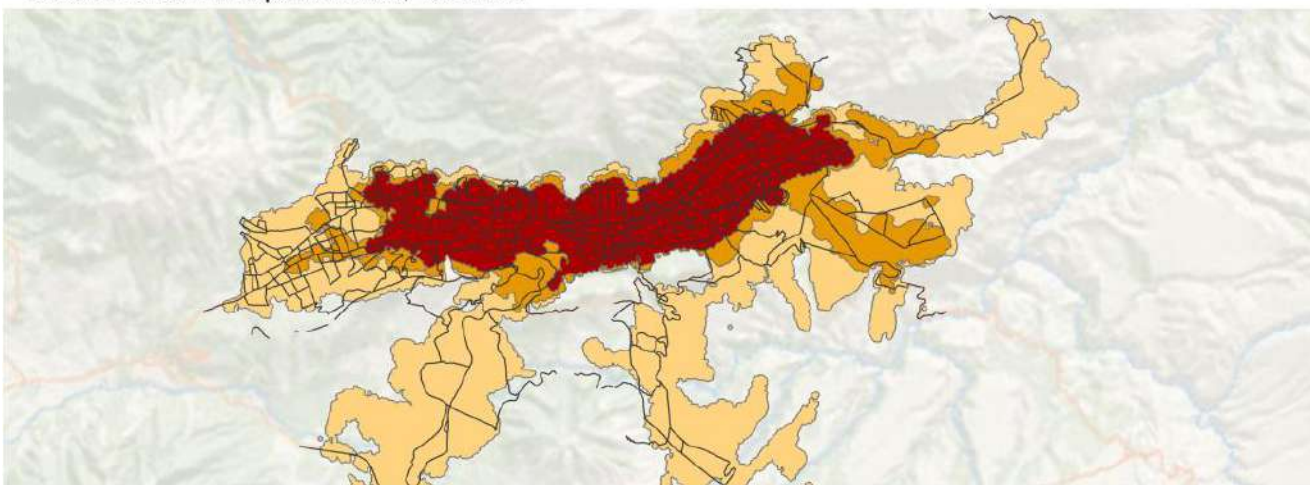
# Quito, Ecuador (Latin America and the Caribbean)



Selected Locales in Area Developed Before 1988



Selected Locales in Expansion Area, 1988-2013



Quito, Ecuador  
1988-2013

0 5 10 15 km

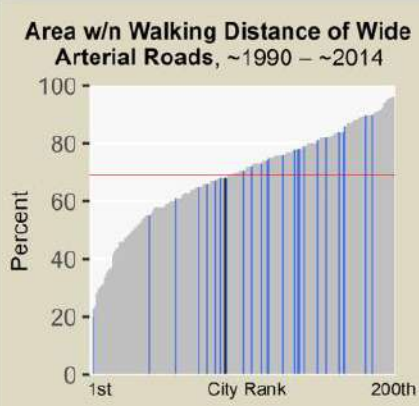
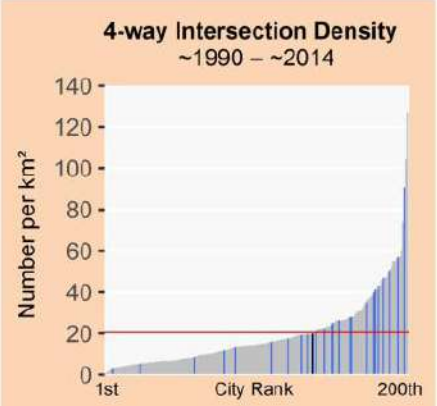
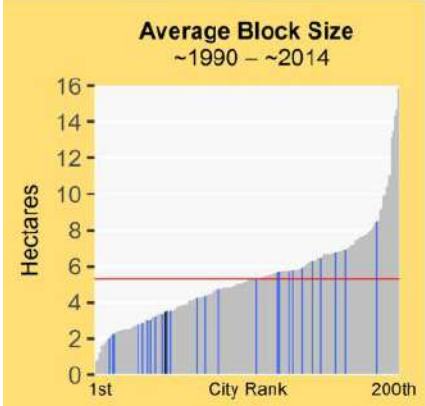
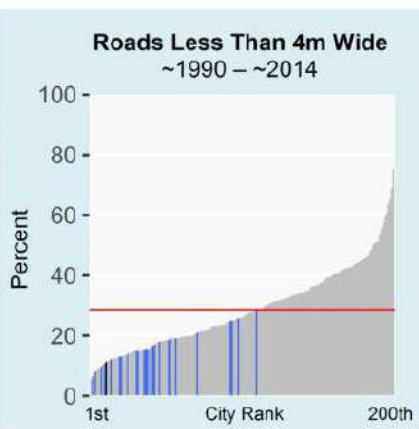
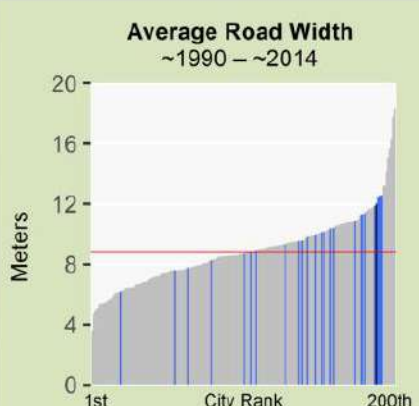
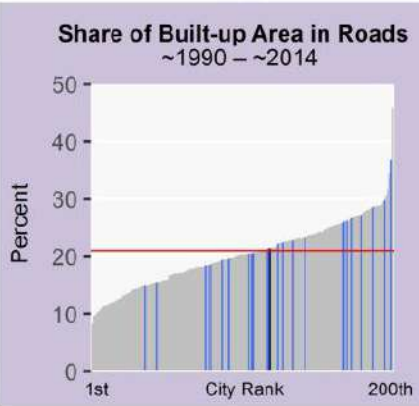
Urban Extent in 1988  
Expansion, 1988 - 2000  
Expansion, 2000 - 2013  
Arterial Roads



# Quito, Ecuador (Latin America and the Caribbean)



Legend for Charts		
	Quito	Other cities in region
	All other cities	Global average
Metrics	Pre-1988	1988-2013
Roads		
Share of Built-Up Area Occupied by Roads	23%	21%
Share of Built-Up Area that is Gridded or Partially Gridded	7%	2%
Average Road Width (m)	12.0	7.8
Share of Roads less than 4m Wide	5%	11%
Share of Roads more than 16m Wide	19%	4%
Arterial Roads		
Density of Arterial Roads (km/km <sup>2</sup> )	3.1	1.6
Average Beeline Distance to Arterial Roads (m)	101	367
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	100%	83%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	94%	68%
Block Size, Plot Size, Intersection Density, and Walkability		
Share of Intersections that are 4-way	19%	13%
Average Block Size (ha)	2.8	3.5
3-way Intersection Density (number per km <sup>2</sup> )	93	120
4-way Intersection Density (number per km <sup>2</sup> )	25	20
Walkability Ratio	1.6	1.8
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		543
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	336	374
Stages in the Evolution of Residential Layouts		
Share of Built-Up Area in Residential Use	56%	75%
Share of Residential Area Not Laid Out Before Occupation	1%	13%
Share of Residential Area Laid Out Before Occupation	98%	86%
Share of Residential Area in Informal Land Subdivisions	0%	17%
Share of Residential Area in Formal Land Subdivisions	89%	67%
Share of Residential Area in Housing Projects	8%	1%



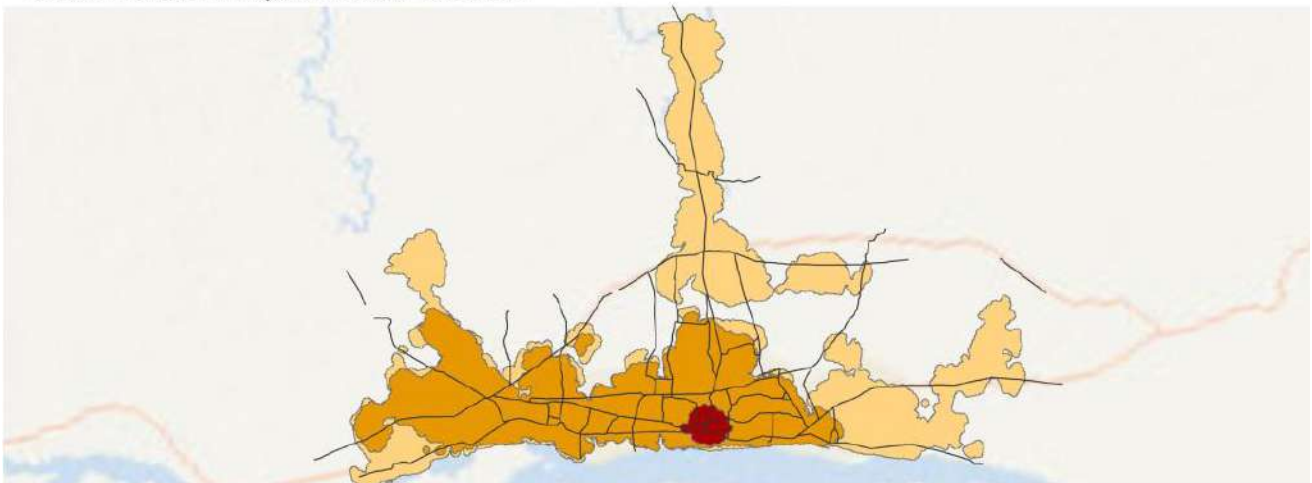
# Rajshahi, Bangladesh (South and Central Asia)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2010



**Rajshahi, Bangladesh**  
1990-2010

0 2 4 6 8 km

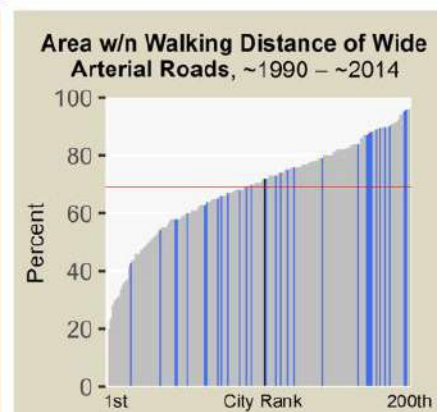
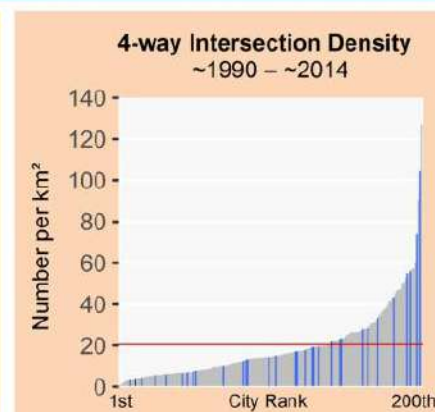
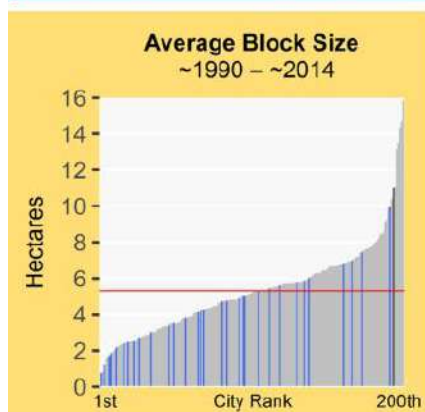
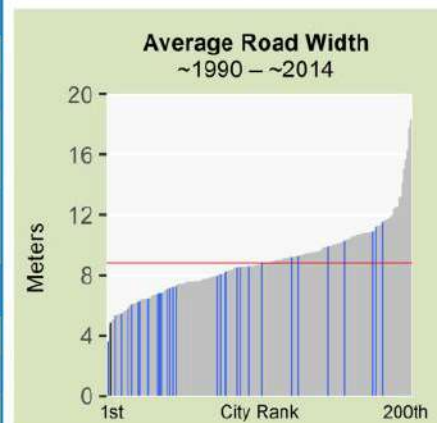
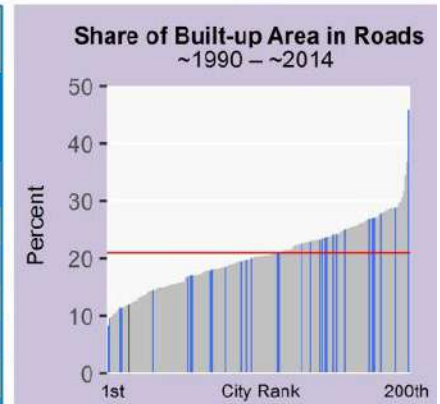
N

- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2010
- Arterial Roads

# Rajshahi, Bangladesh (South and Central Asia)



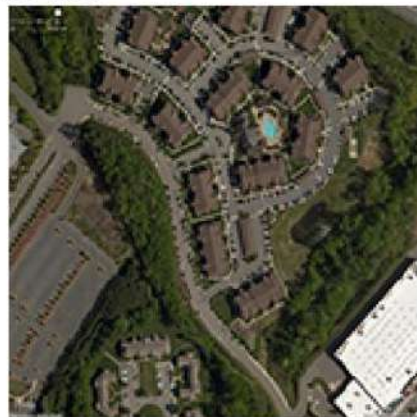
Legend for Charts		
	Rajshahi	Other cities in region   All other cities   Global average
Rajshahi		
Metrics	Pre-1990	1990-2010
Roads		
Share of Built-Up Area Occupied by Roads	9%	12%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	4.8	4.9
Share of Roads less than 4m Wide	47%	43%
Share of Roads more than 16m Wide	3%	2%
Arterial Roads		
Density of Arterial Roads (km/km <sup>2</sup> )	4.2	1.6
Average Beeline Distance to Arterial Roads (m)	59	204
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	100%	94%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	100%	72%
Block Size, Plot Size, Intersection Density, and Walkability		
Share of Intersections that are 4-way	12%	6%
Average Block Size (ha)	3.3	11.0
3-way Intersection Density (number per km <sup>2</sup> )	93	49
4-way Intersection Density (number per km <sup>2</sup> )	17	4
Walkability Ratio	1.5	1.6
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		360
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		
Stages in the Evolution of Residential Layouts		
Share of Built-Up Area in Residential Use	84%	83%
Share of Residential Area Not Laid Out Before Occupation	100%	85%
Share of Residential Area Laid Out Before Occupation	0%	14%
Share of Residential Area in Informal Land Subdivisions	0%	14%
Share of Residential Area in Formal Land Subdivisions	0%	0%
Share of Residential Area in Housing Projects	0%	0%



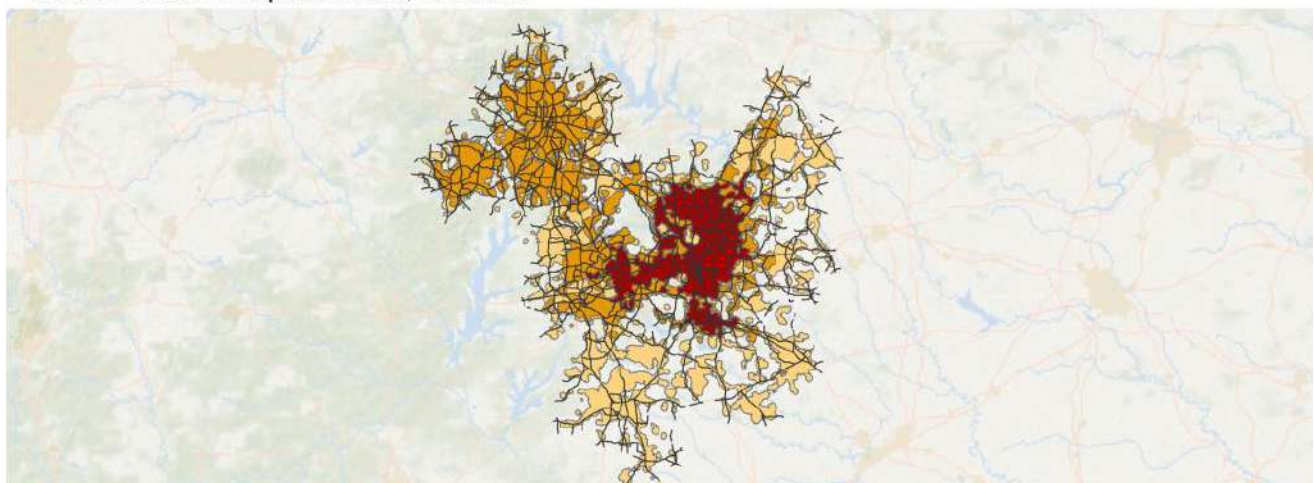
# Raleigh, United States (Land-Rich Developed Countries)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013



## Raleigh, United States 1990-2013



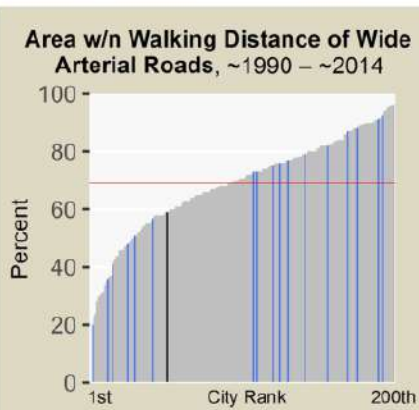
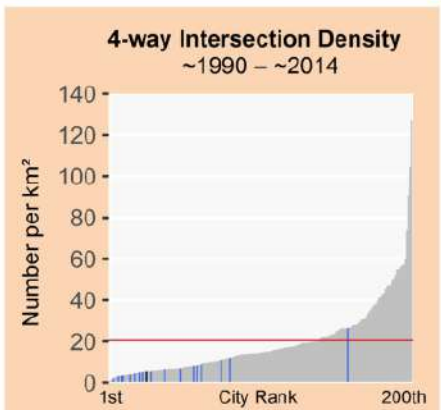
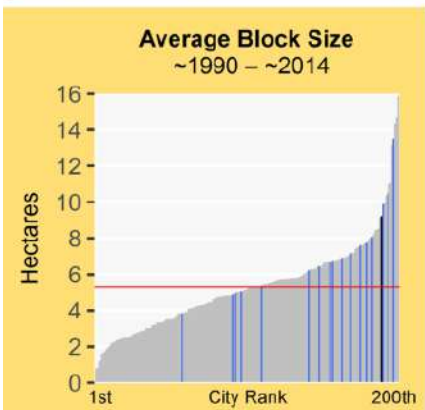
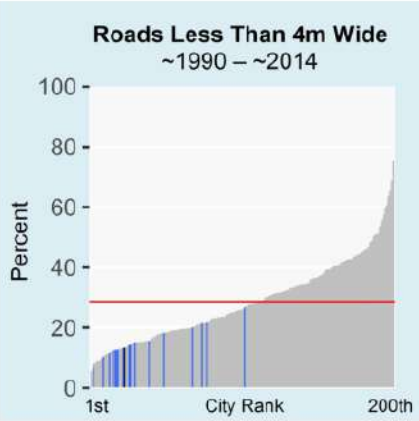
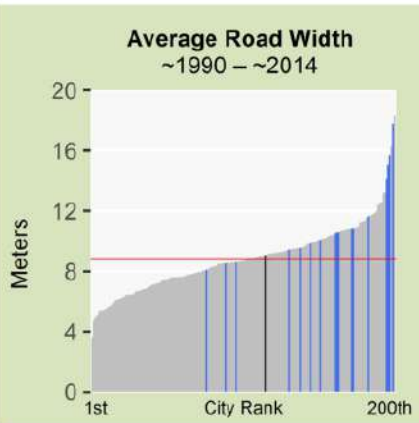
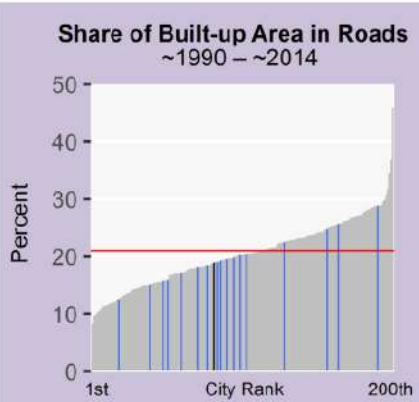
- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2013

Arterial Roads

# Raleigh, United States (Land-Rich Developed Countries)



Legend for Charts			
	Raleigh	Other cities in region	All other cities
			Global average
Metrics	Pre-1990	1990-2013	
Roads			
Share of Built-Up Area Occupied by Roads	20%	18%	
Share of Built-Up Area that is Gridded or Partially Gridded	2%	0%	
Average Road Width (m)	9.1	9.5	
Share of Roads less than 4m Wide	7%	13%	
Share of Roads more than 16m Wide	9%	8%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	1.8	1.2	
Average Beeline Distance to Arterial Roads (m)	182	338	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	97%	85%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	90%	59%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	10%	6%	
Average Block Size (ha)	4.9	9.2	
3-way Intersection Density (number per km <sup>2</sup> )	82	56	
4-way Intersection Density (number per km <sup>2</sup> )	11	6	
Walkability Ratio	2.0	1.8	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	1166	521	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	83%	88%	
Share of Residential Area Not Laid Out Before Occupation	6%	4%	
Share of Residential Area Laid Out Before Occupation	93%	95%	
Share of Residential Area in Informal Land Subdivisions	0%	0%	
Share of Residential Area in Formal Land Subdivisions	78%	78%	
Share of Residential Area in Housing Projects	15%	17%	



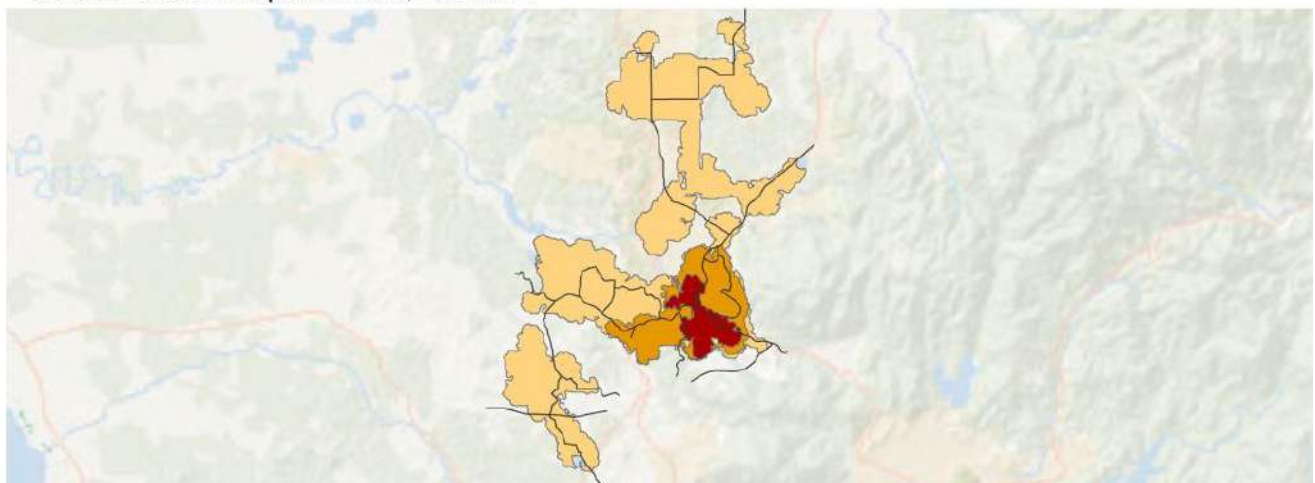
# Rawang, Malaysia (Southeast Asia)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2014



**Rawang, Malaysia**  
1989-2014

0 5 10 15 km

N

- Urban Extent in 1989
- Expansion, 1989 - 2001
- Expansion, 2001 - 2014
- Arterial Roads

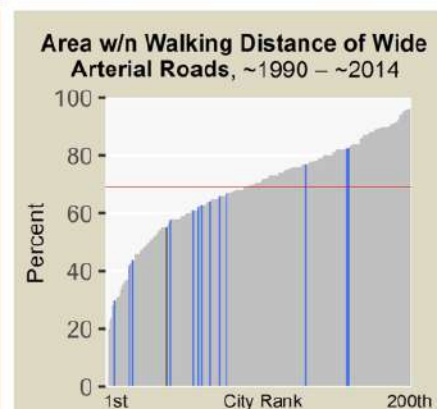
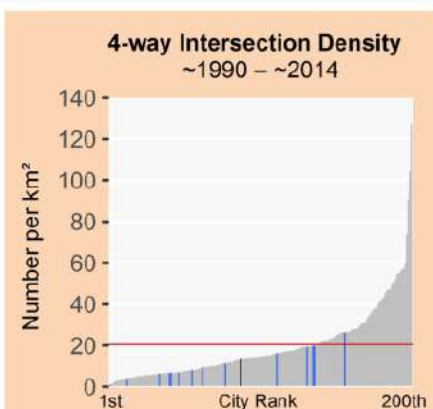
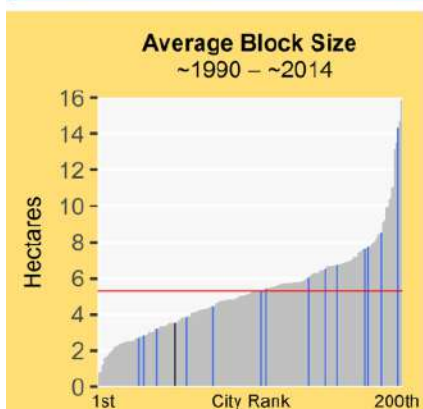
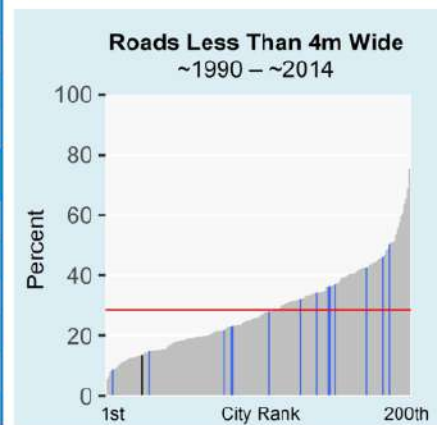
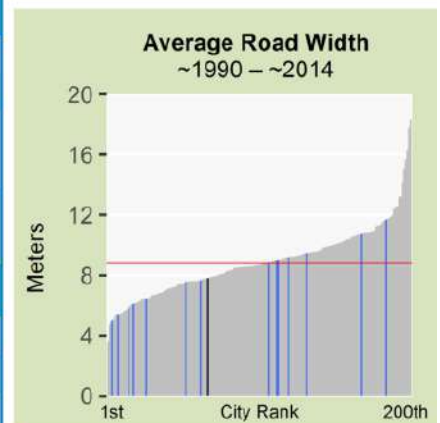
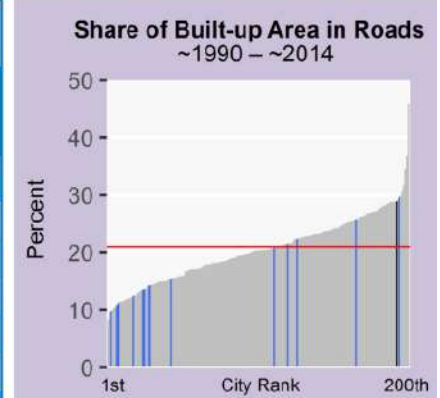
# Rawang, Malaysia (Southeast Asia)



### Legend for Charts

Rawang | Other cities in region | All other cities | Global average

Metrics	Pre-1989	1989-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	24%	28%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	7.8	9.2
Share of Roads less than 4m Wide	13%	13%
Share of Roads more than 16m Wide	5%	14%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.1	0.7
Average Beeline Distance to Arterial Roads (m)	341	558
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	82%	65%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	66%	55%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	6%	5%
Average Block Size (ha)	2.3	3.5
3-way Intersection Density (number per km <sup>2</sup> )	163	141
4-way Intersection Density (number per km <sup>2</sup> )	17	14
Walkability Ratio	2.9	2.1
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	376	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	319	1175
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	62%	53%
Share of Residential Area Not Laid Out Before Occupation	3%	4%
Share of Residential Area Laid Out Before Occupation	97%	95%
Share of Residential Area in Informal Land Subdivisions	14%	14%
Share of Residential Area in Formal Land Subdivisions	66%	35%
Share of Residential Area in Housing Projects	16%	45%



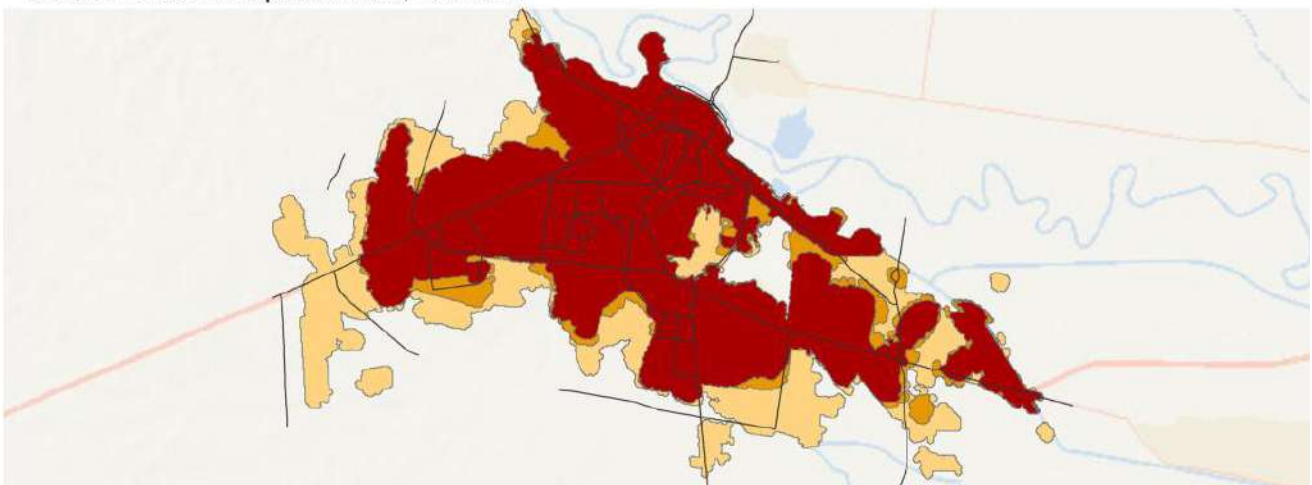
# Reynosa, Mexico (Latin America and the Caribbean)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2013



**Reynosa, Mexico**  
1991-2013

0 5 10 km

N

- Urban Extent in 1991
- Expansion, 1991 - 2000
- Expansion, 2000 - 2013
- Arterial Roads



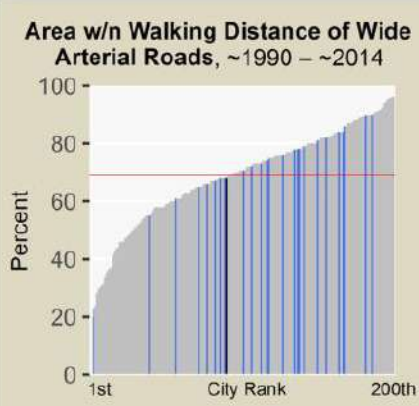
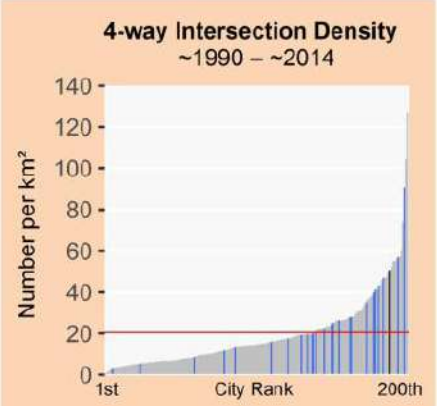
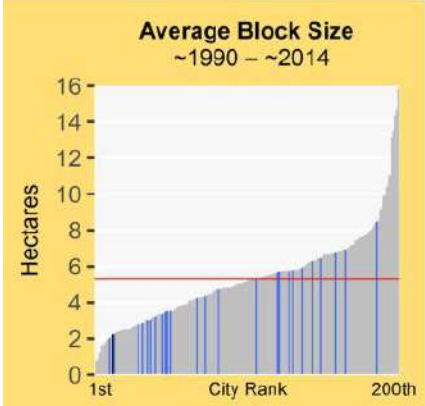
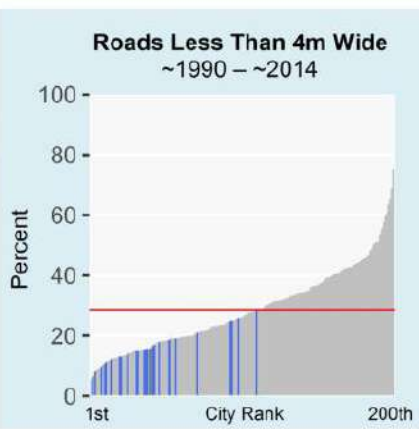
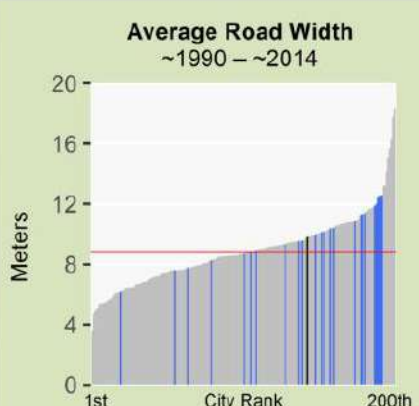
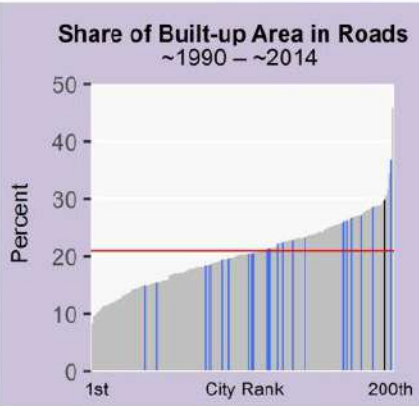
# Reynosa, Mexico (Latin America and the Caribbean)



**Legend for Charts**

Reynosa | Other cities in region | All other cities | Global average

Metrics	Pre-1991	1991-2013
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	26%	29%
Share of Built-Up Area that is Gridded or Partially Gridded	30%	5%
Average Road Width (m)	9.8	8.7
Share of Roads less than 4m Wide	10%	15%
Share of Roads more than 16m Wide	10%	5%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.1	0.9
Average Beeline Distance to Arterial Roads (m)	384	478
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	78%	70%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	77%	68%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	29%	26%
Average Block Size (ha)	2.7	2.2
3-way Intersection Density (number per km <sup>2</sup> )	114	141
4-way Intersection Density (number per km <sup>2</sup> )	43	51
Walkability Ratio	1.9	1.9
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	377	178
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	260	157
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	67%	79%
Share of Residential Area Not Laid Out Before Occupation	6%	3%
Share of Residential Area Laid Out Before Occupation	93%	96%
Share of Residential Area in Informal Land Subdivisions	31%	30%
Share of Residential Area in Formal Land Subdivisions	55%	14%
Share of Residential Area in Housing Projects	6%	50%



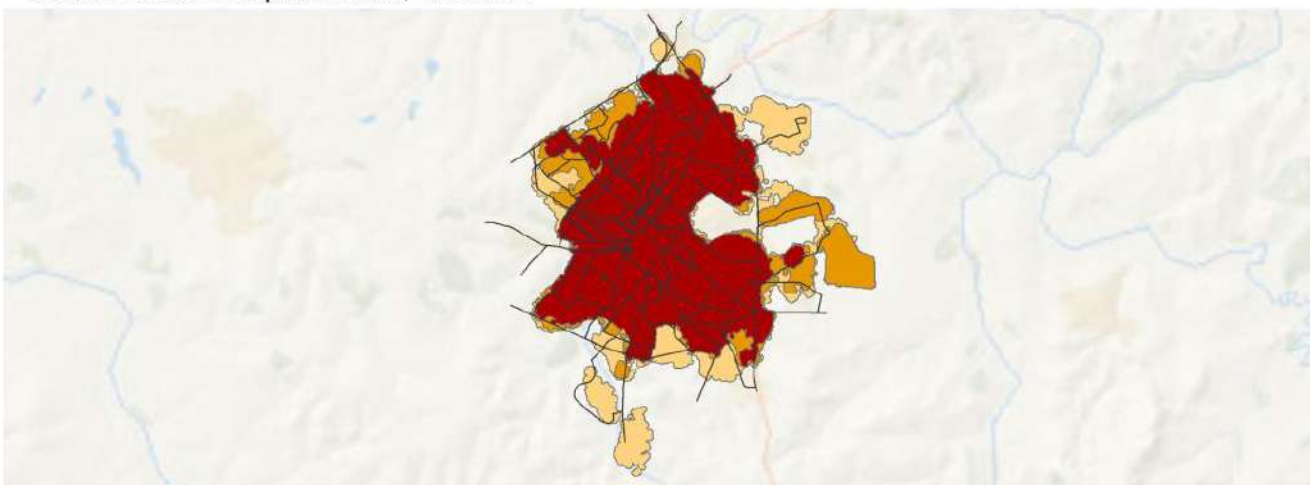
# Ribeirao Preto, Brazil (Latin America and the Caribbean)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



## Ribeirao Preto, Brazil 1990-2014



- Urban Extent in 1990
- Expansion, 1990 - 2001
- Expansion, 2001 - 2014

Arterial Roads

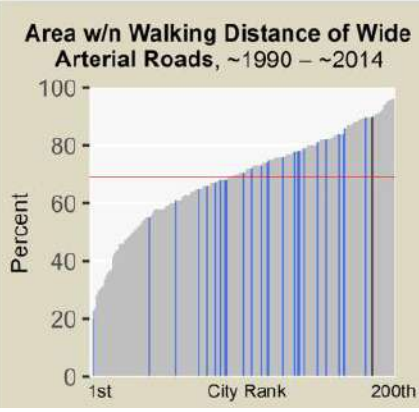
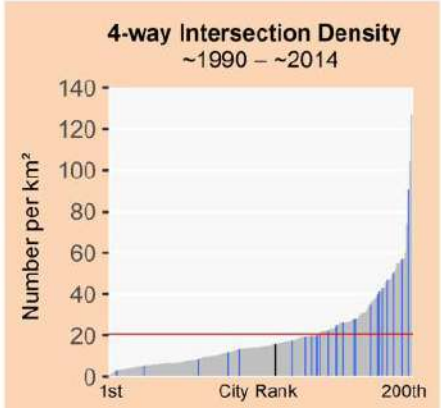
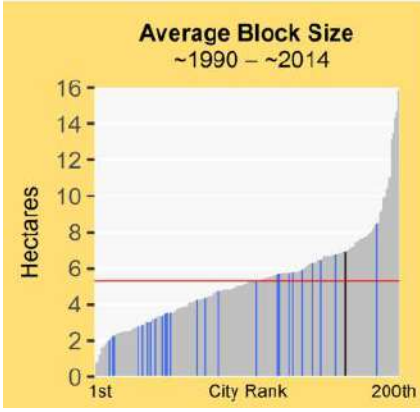
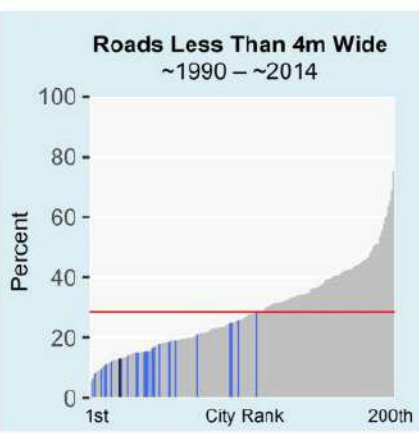
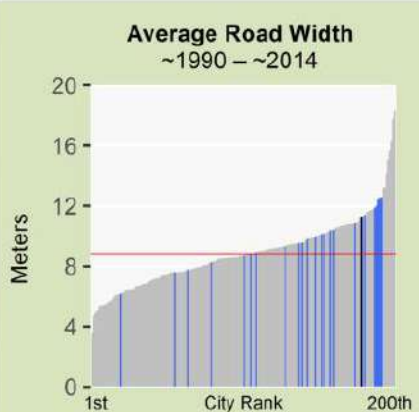
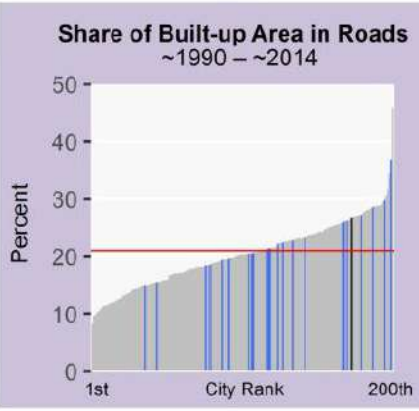
# Ribeirao Preto, Brazil (Latin America and the Caribbean)



**Legend for Charts**

Ribeirao Preto | Other cities in region | All other cities | Global average —

Metrics	Pre-1990	1990-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	28%	26%
Share of Built-Up Area that is Gridded or Partially Gridded	42%	5%
Average Road Width (m)	11.3	8.0
Share of Roads less than 4m Wide	6%	12%
Share of Roads more than 16m Wide	15%	5%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.2	1.8
Average Beeline Distance to Arterial Roads (m)	171	200
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	98%	96%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	92%	90%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	33%	12%
Average Block Size (ha)	3.7	6.9
3-way Intersection Density (number per km <sup>2</sup> )	95	91
4-way Intersection Density (number per km <sup>2</sup> )	46	16
Walkability Ratio	1.8	1.8
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		3208
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	303	513
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	76%	81%
Share of Residential Area Not Laid Out Before Occupation	3%	7%
Share of Residential Area Laid Out Before Occupation	96%	92%
Share of Residential Area in Informal Land Subdivisions	0%	16%
Share of Residential Area in Formal Land Subdivisions	90%	70%
Share of Residential Area in Housing Projects	6%	4%





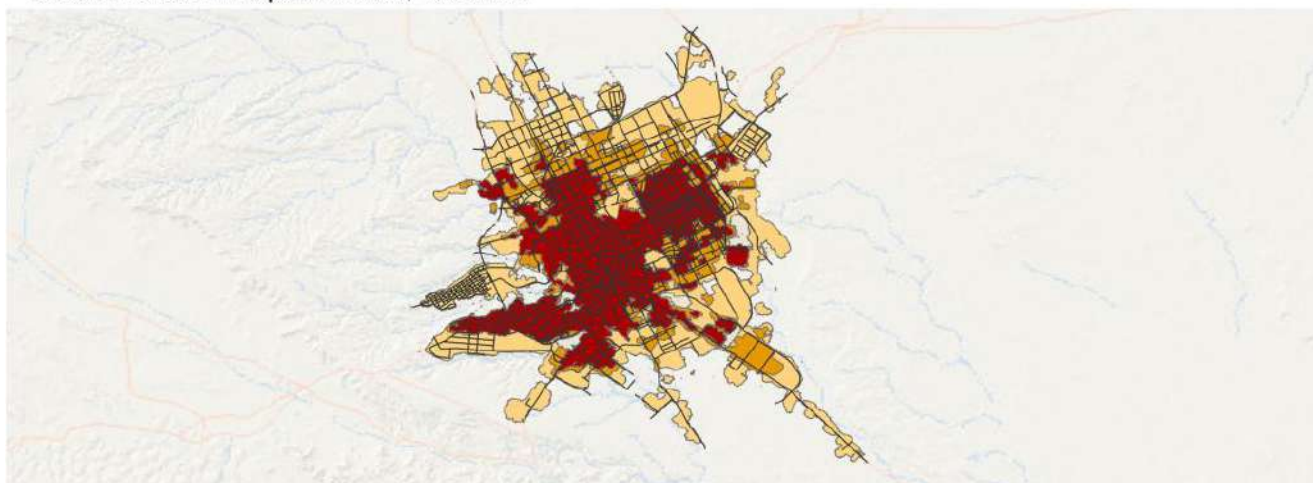
# Riyadh, Saudi Arabia (Western Asia and North Africa)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013



## Riyadh, Saudi Arabia 1990-2013



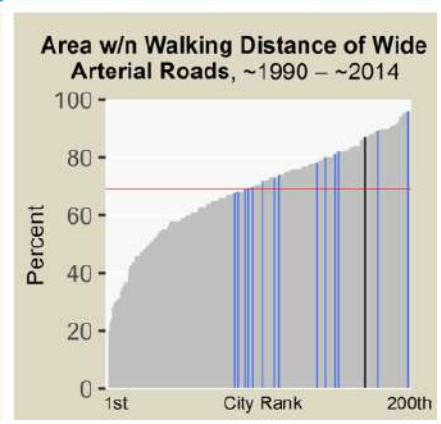
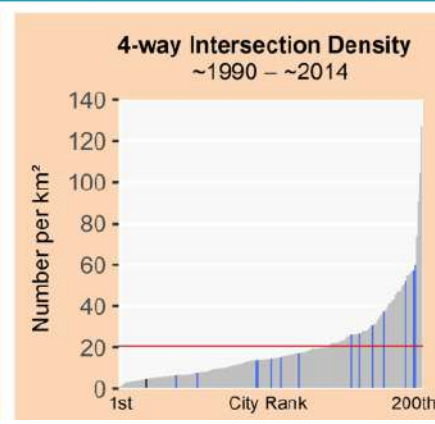
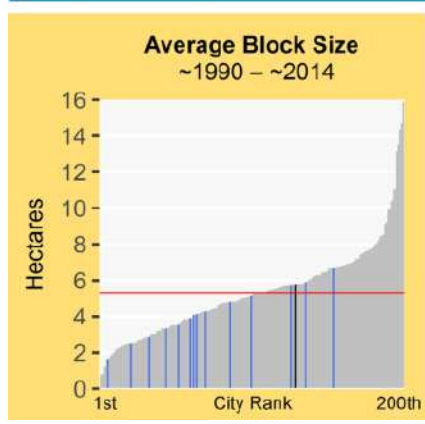
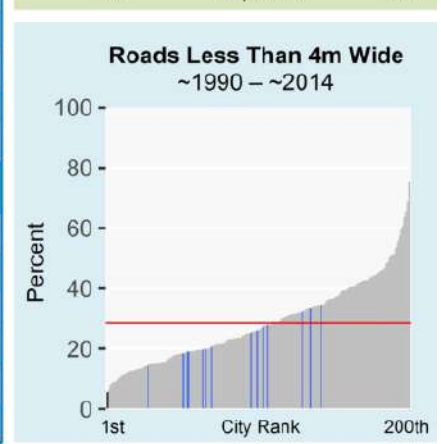
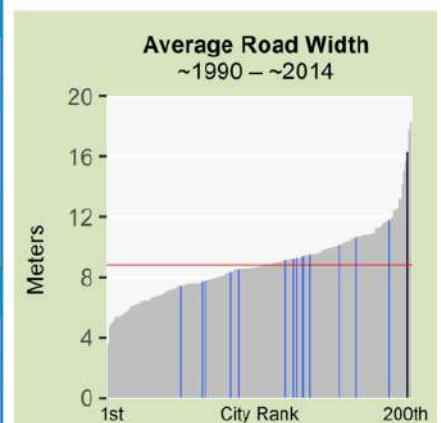
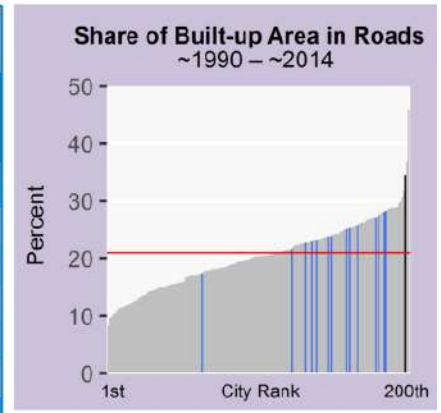
- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2013

Arterial Roads

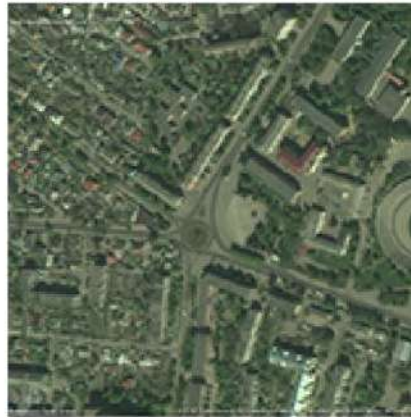
# Riyadh, Saudi Arabia (Western Asia and North Africa)



Legend for Charts			
	Riyadh	Other cities in region	All other cities
			Global average —
Metrics			
	Pre-1990	1990-2013	
Roads			
Share of Built-Up Area Occupied by Roads	35%	34%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%	
Average Road Width (m)	16.3	15.5	
Share of Roads less than 4m Wide	4%	5%	
Share of Roads more than 16m Wide	36%	38%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	2.2	1.6	
Average Beeline Distance to Arterial Roads (m)	178	304	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	96%	87%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	96%	87%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	8%	3%	
Average Block Size (ha)	3.3	5.8	
3-way Intersection Density (number per km <sup>2</sup> )	150	111	
4-way Intersection Density (number per km <sup>2</sup> )	16	5	
Walkability Ratio	1.6	1.8	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	448	432	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	75%	53%	
Share of Residential Area Not Laid Out Before Occupation	2%	4%	
Share of Residential Area Laid Out Before Occupation	97%	95%	
Share of Residential Area in Informal Land Subdivisions	3%	5%	
Share of Residential Area in Formal Land Subdivisions	87%	77%	
Share of Residential Area in Housing Projects	6%	12%	



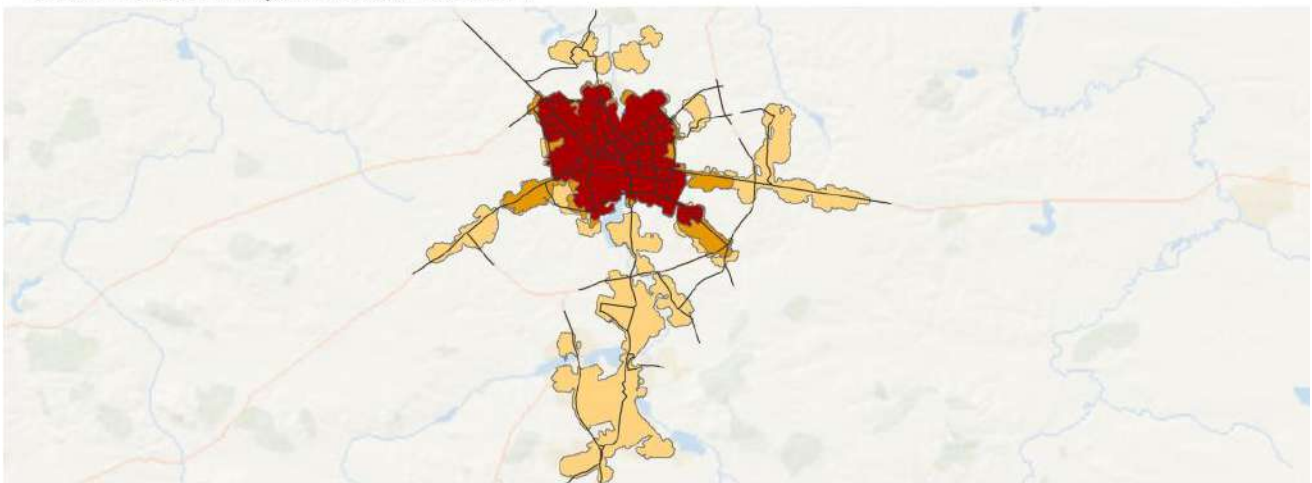
# Rovno, Ukraine (Europe and Japan)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



## Rovno, Ukraine 1990-2014



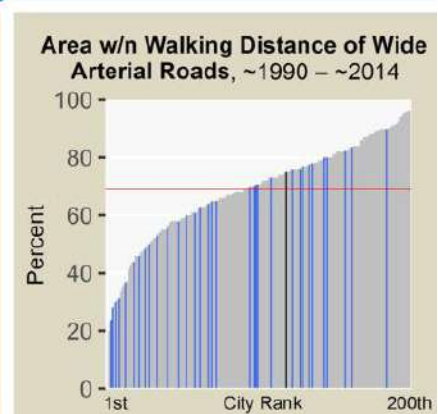
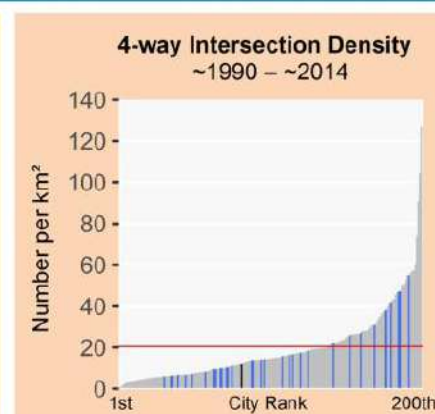
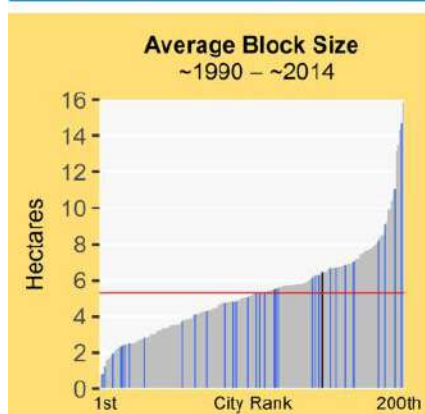
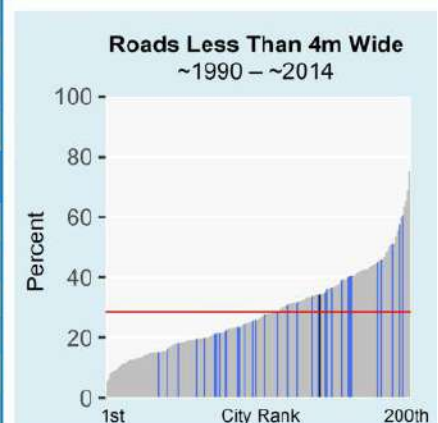
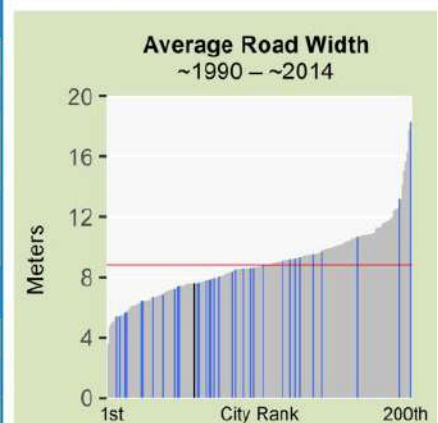
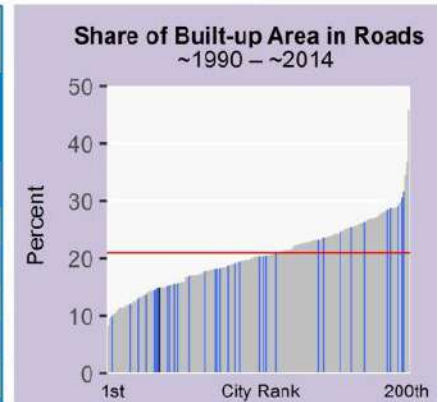
- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2014

Arterial Roads

# Rovno, Ukraine (Europe and Japan)



Legend for Charts			
	Rovno	Other cities in region	All other cities
			Global average —
Metrics			
	Pre-1990	1990-2014	
Roads			
Share of Built-Up Area Occupied by Roads	20%	15%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%	
Average Road Width (m)	7.6	5.8	
Share of Roads less than 4m Wide	28%	34%	
Share of Roads more than 16m Wide	8%	3%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	2.0	1.4	
Average Beeline Distance to Arterial Roads (m)	179	313	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	97%	86%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	88%	75%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	7%	9%	
Average Block Size (ha)	3.9	6.5	
3-way Intersection Density (number per km <sup>2</sup> )	132	86	
4-way Intersection Density (number per km <sup>2</sup> )	14	12	
Walkability Ratio	1.7	1.6	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		1326	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	776	1071	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	53%	74%	
Share of Residential Area Not Laid Out Before Occupation	21%	48%	
Share of Residential Area Laid Out Before Occupation	78%	51%	
Share of Residential Area in Informal Land Subdivisions	0%	34%	
Share of Residential Area in Formal Land Subdivisions	48%	16%	
Share of Residential Area in Housing Projects	29%	1%	



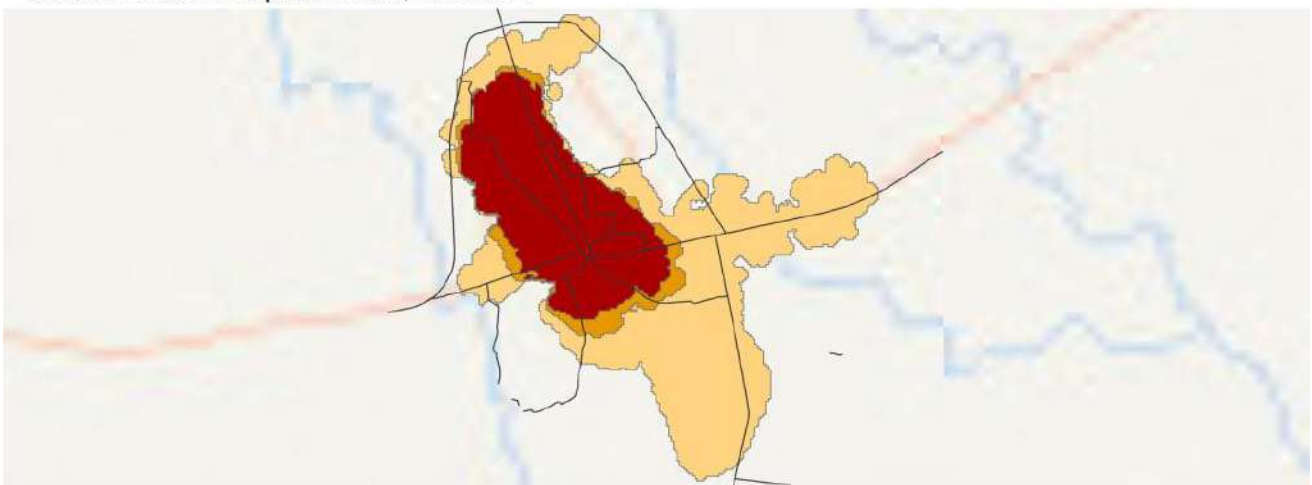
# Saidpur, Bangladesh (South and Central Asia)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



## Saidpur, Bangladesh 1990-2014



- Urban Extent in 1990
- Expansion, 1990 - 2001
- Expansion, 2001 - 2014

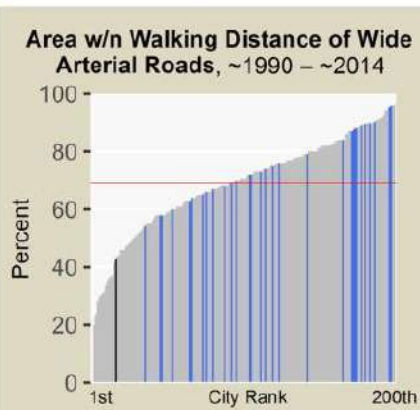
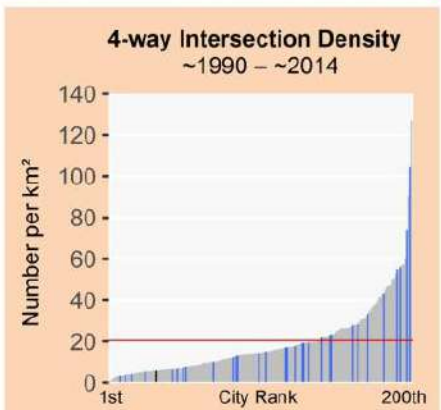
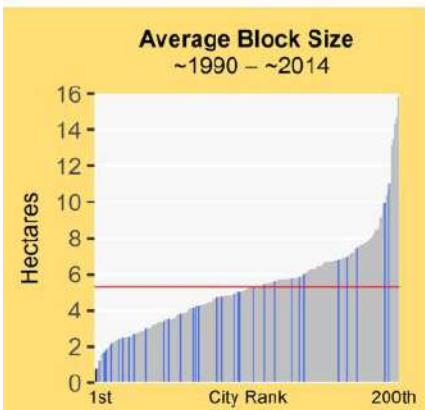
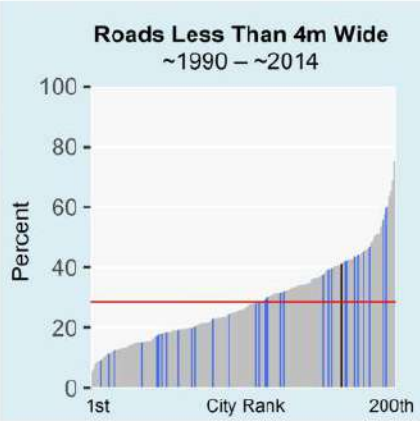
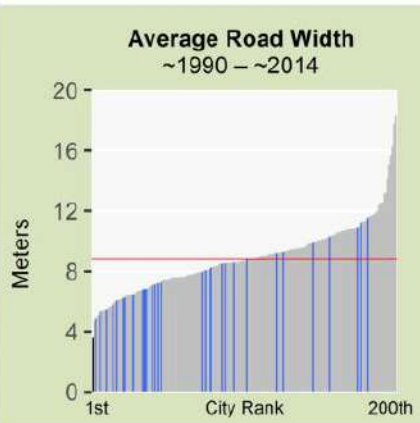
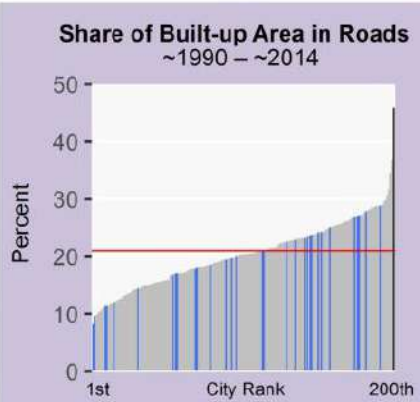
Arterial Roads



# Saidpur, Bangladesh (South and Central Asia)



Legend for Charts			
	Saidpur	Other cities in region	Global average
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	9%		14%
Share of Built-Up Area that is Gridded or Partially Gridded			
Average Road Width (m)	3.6		4.7
Share of Roads less than 4m Wide	65%		45%
Share of Roads more than 16m Wide	0%		0%
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	2.8		1.9
Average Beeline Distance to Arterial Roads (m)	98		173
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	100%		96%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	15%		43%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	8%		5%
Average Block Size (ha)	2.8		9.7
3-way Intersection Density (number per km <sup>2</sup> )	103		77
4-way Intersection Density (number per km <sup>2</sup> )	17		6
Walkability Ratio	1.4		1.5
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )			
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	82%		70%
Share of Residential Area Not Laid Out Before Occupation	89%		85%
Share of Residential Area Laid Out Before Occupation	10%		14%
Share of Residential Area in Informal Land Subdivisions	10%		3%
Share of Residential Area in Formal Land Subdivisions	0%		0%
Share of Residential Area in Housing Projects	0%		11%



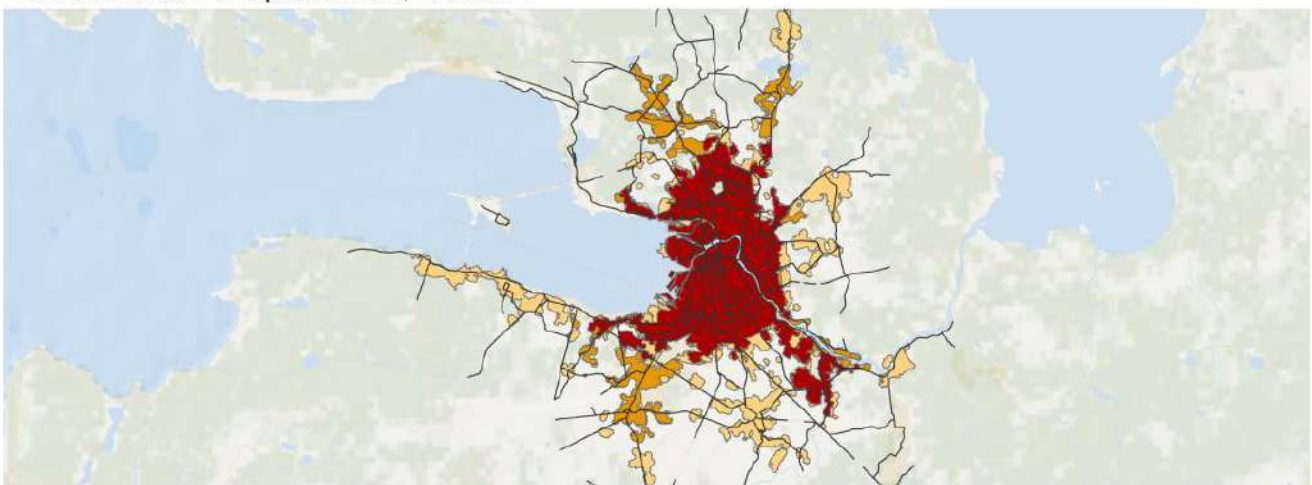
# Saint Petersburg, Russia (Europe and Japan)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



## Saint Petersburg, Russia 1990-2014

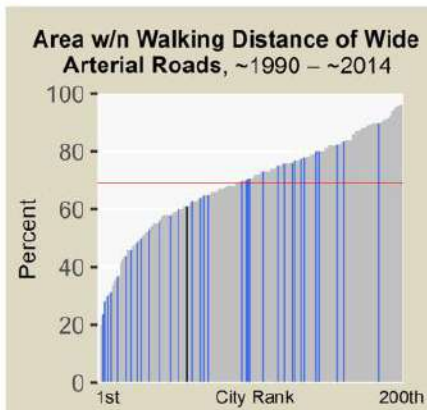
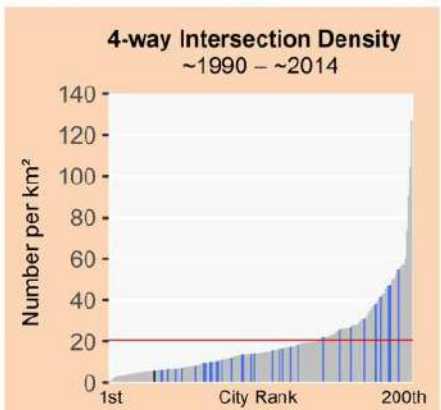
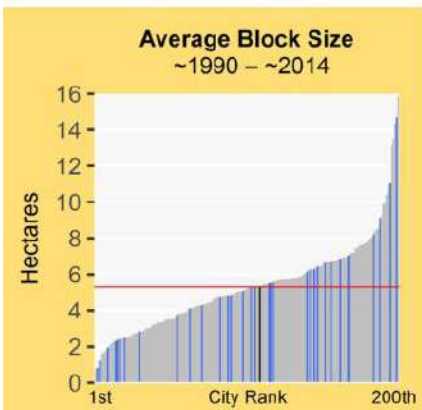
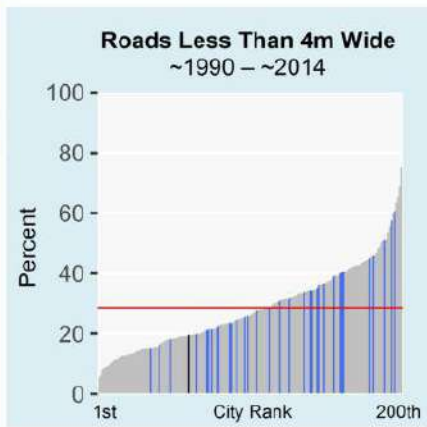
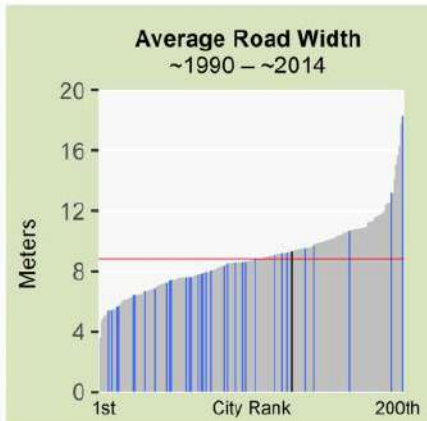
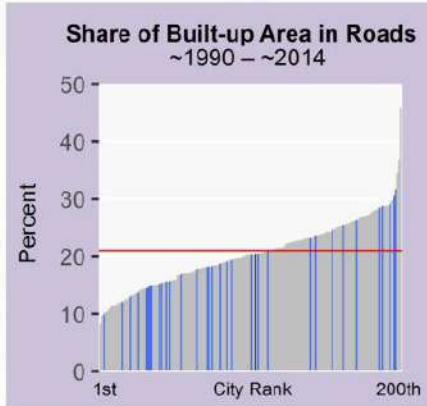


- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2014

Arterial Roads

# Saint Petersburg, Russia (Europe and Japan)

Legend for Charts			
	Saint Petersburg	Other cities in region	All other cities
			Global average —
Metrics	Pre-1990	1990-2014	
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	26%	20%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	5%	
Average Road Width (m)	9.3	8.1	
Share of Roads less than 4m Wide	13%	19%	
Share of Roads more than 16m Wide	13%	9%	
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	1.2	0.9	
Average Beeline Distance to Arterial Roads (m)	433	523	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	78%	70%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	76%	61%	
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	11%	6%	
Average Block Size (ha)	3.3	5.3	
3-way Intersection Density (number per km <sup>2</sup> )	133	77	
4-way Intersection Density (number per km <sup>2</sup> )	20	6	
Walkability Ratio	1.7	1.8	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		736	
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	66%	82%	
Share of Residential Area Not Laid Out Before Occupation	12%	30%	
Share of Residential Area Laid Out Before Occupation	87%	69%	
Share of Residential Area in Informal Land Subdivisions	18%	34%	
Share of Residential Area in Formal Land Subdivisions	43%	24%	
Share of Residential Area in Housing Projects	25%	10%	



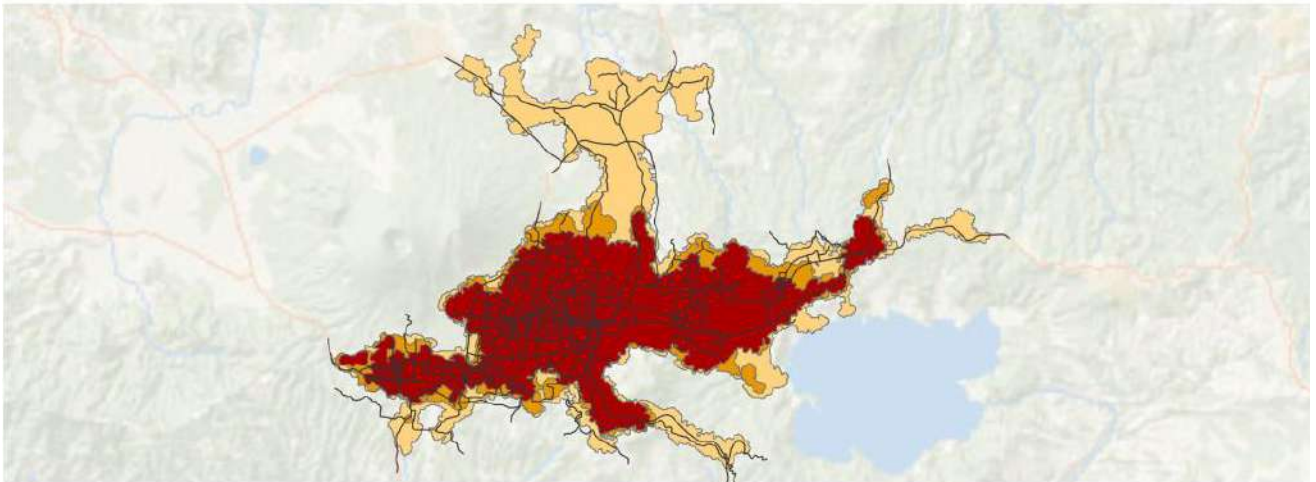
# San Salvador, El Salvador (Latin America and the Caribbean)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2014




**San Salvador, El Salvador**  
1991-2014

0 5 10 15 20 km

■ Urban Extent in 1991  
■ Expansion, 1991 - 1999  
■ Expansion, 1999 - 2014  
— Arterial Roads

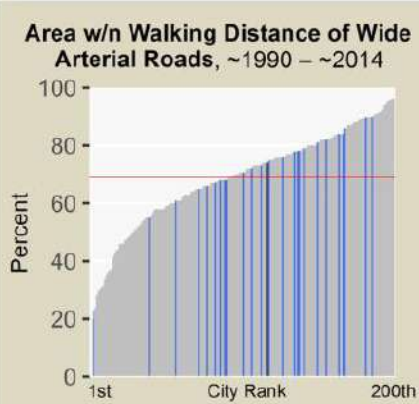
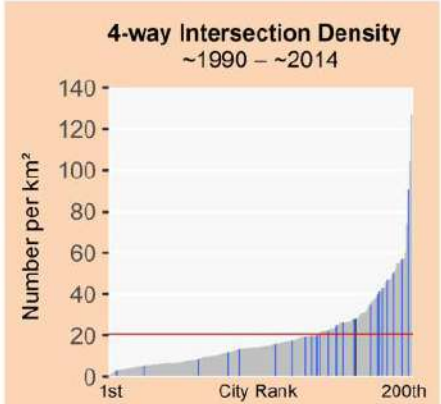
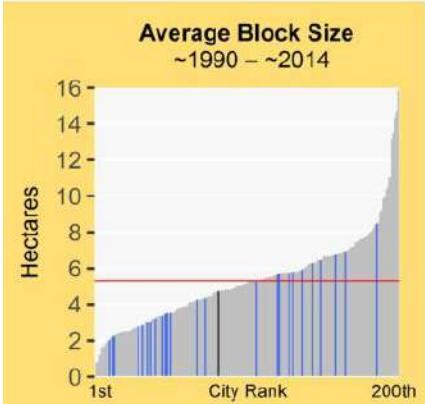
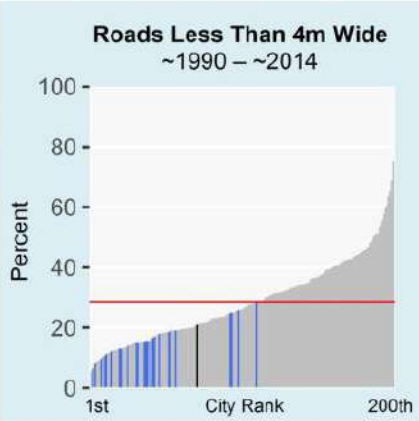
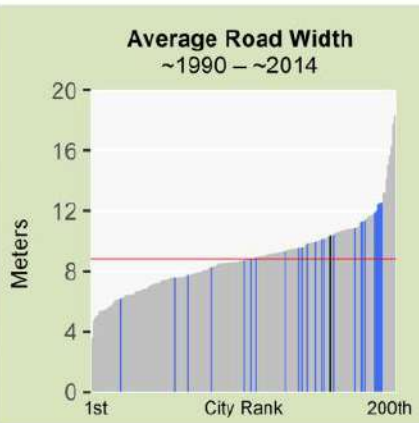
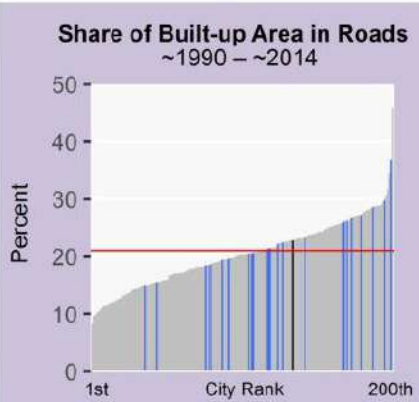
# San Salvador, El Salvador (Latin America and the Caribbean)



**Legend for Charts**

San Salvador | Other cities in region | All other cities | Global average

Metrics	Pre-1991	1991-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	24%	22%
Share of Built-Up Area that is Gridded or Partially Gridded	5%	0%
Average Road Width (m)	10.4	8.1
Share of Roads less than 4m Wide	7%	20%
Share of Roads more than 16m Wide	13%	8%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.8	2.0
Average Beeline Distance to Arterial Roads (m)	155	212
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	96%	93%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	82%	74%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	17%	12%
Average Block Size (ha)	2.1	4.8
3-way Intersection Density (number per km <sup>2</sup> )	94	104
4-way Intersection Density (number per km <sup>2</sup> )	22	28
Walkability Ratio	1.6	1.8
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		77
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	91	157
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	68%	78%
Share of Residential Area Not Laid Out Before Occupation	18%	26%
Share of Residential Area Laid Out Before Occupation	81%	73%
Share of Residential Area in Informal Land Subdivisions	17%	24%
Share of Residential Area in Formal Land Subdivisions	61%	40%
Share of Residential Area in Housing Projects	2%	8%



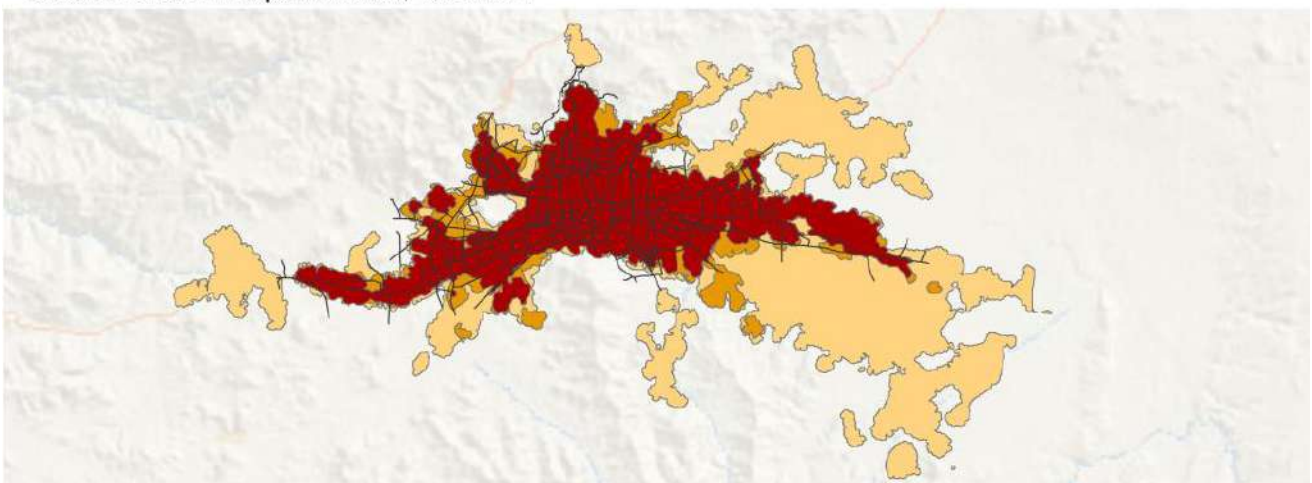
# Sana, Yemen (Western Asia and North Africa)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2014




**Sana, Yemen  
1989-2014**

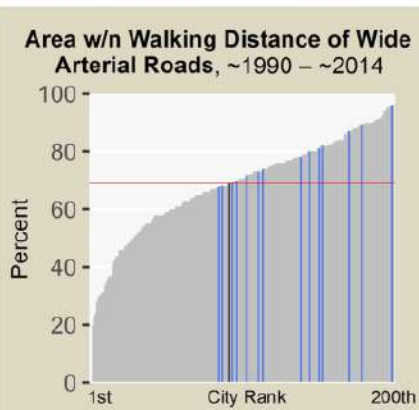
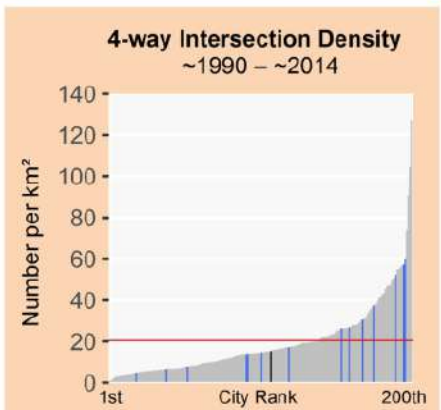
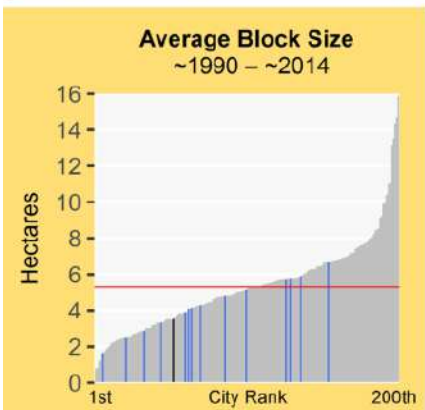
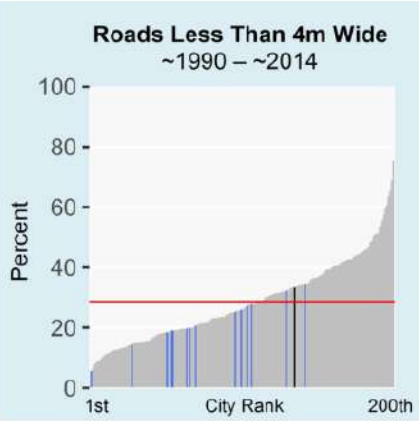
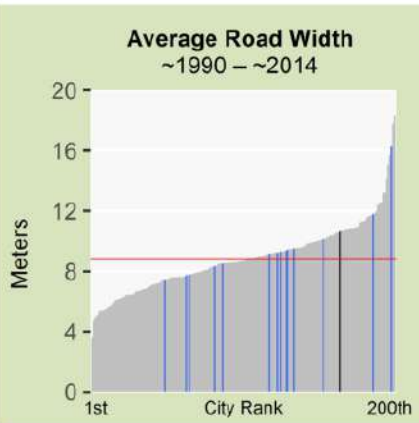
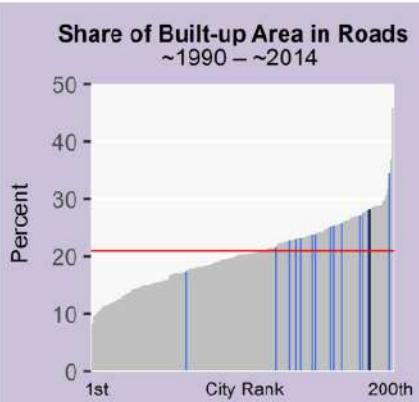
0 5 10 15 20 km

Urban Extent in 1989  
Expansion, 1989 - 2000  
Expansion, 2000 - 2014  
Arterial Roads

# Sana, Yemen (Western Asia and North Africa)



Legend for Charts			
	Sana	Other cities in region	All other cities
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	29%		28%
Share of Built-Up Area that is Gridded or Partially Gridded	0%		0%
Average Road Width (m)	10.7		7.8
Share of Roads less than 4m Wide	15%		33%
Share of Roads more than 16m Wide	15%		10%
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	2.2		1.0
Average Beeline Distance to Arterial Roads (m)	219		767
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	92%		70%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	90%		69%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	12%		5%
Average Block Size (ha)	2.3		3.5
3-way Intersection Density (number per km <sup>2</sup> )	172		218
4-way Intersection Density (number per km <sup>2</sup> )	26		15
Walkability Ratio	1.7		1.7
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			221
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	193		407
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	62%		67%
Share of Residential Area Not Laid Out Before Occupation	30%		56%
Share of Residential Area Laid Out Before Occupation	69%		43%
Share of Residential Area in Informal Land Subdivisions	17%		35%
Share of Residential Area in Formal Land Subdivisions	49%		8%
Share of Residential Area in Housing Projects	3%		0%



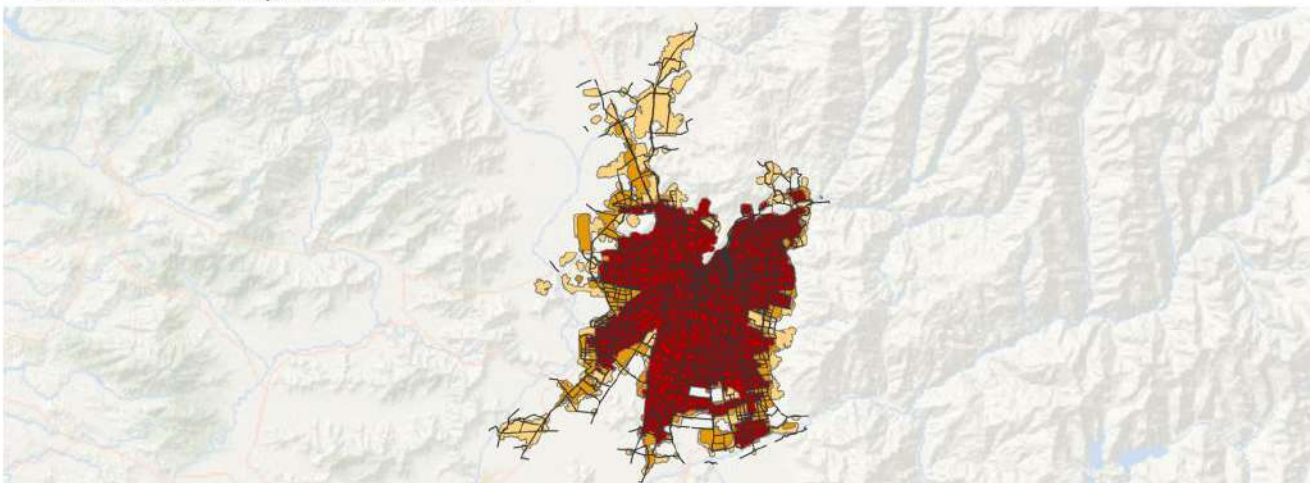
# Santiago, Chile (Latin America and the Caribbean)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



## Santiago, Chile 1990-2014



- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2014

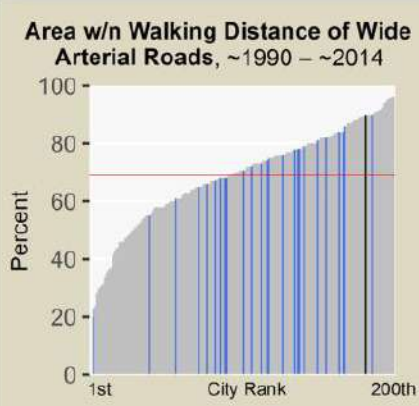
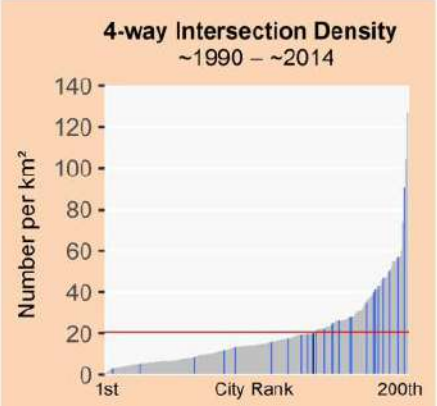
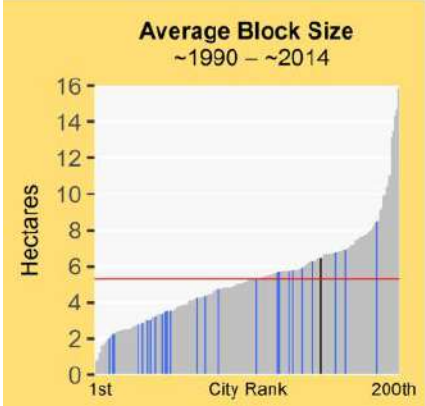
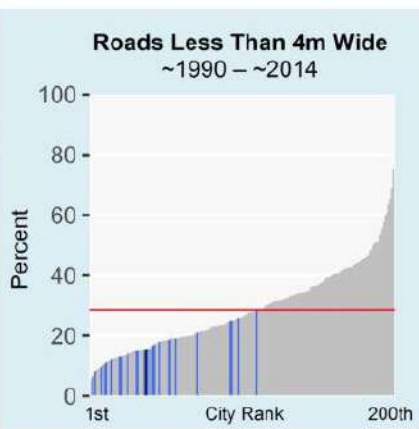
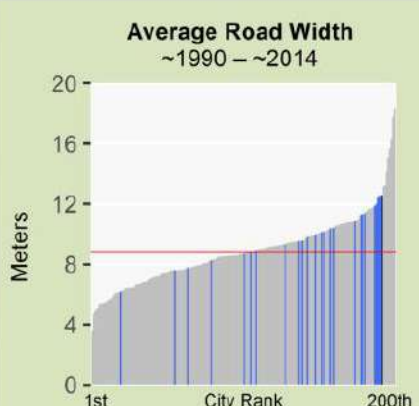
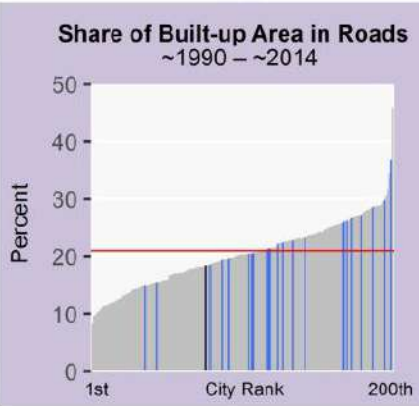
Arterial Roads



# Santiago, Chile (Latin America and the Caribbean)



Legend for Charts			
	Santiago	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1990	1990-2014	
Roads			
Share of Built-Up Area Occupied by Roads	25%	18%	
Share of Built-Up Area that is Gridded or Partially Gridded	37%	5%	
Average Road Width (m)	12.6	7.9	
Share of Roads less than 4m Wide	4%	15%	
Share of Roads more than 16m Wide	26%	10%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	3.0	2.4	
Average Beeline Distance to Arterial Roads (m)	126	199	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	99%	94%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	99%	90%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	33%	13%	
Average Block Size (ha)	3.5	6.5	
3-way Intersection Density (number per km <sup>2</sup> )	61	117	
4-way Intersection Density (number per km <sup>2</sup> )	26	20	
Walkability Ratio	1.6	2.0	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	493	282	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	64%	77%	
Share of Residential Area Not Laid Out Before Occupation	2%	16%	
Share of Residential Area Laid Out Before Occupation	93%	83%	
Share of Residential Area in Informal Land Subdivisions	0%	5%	
Share of Residential Area in Formal Land Subdivisions	89%	63%	
Share of Residential Area in Housing Projects	8%	14%	



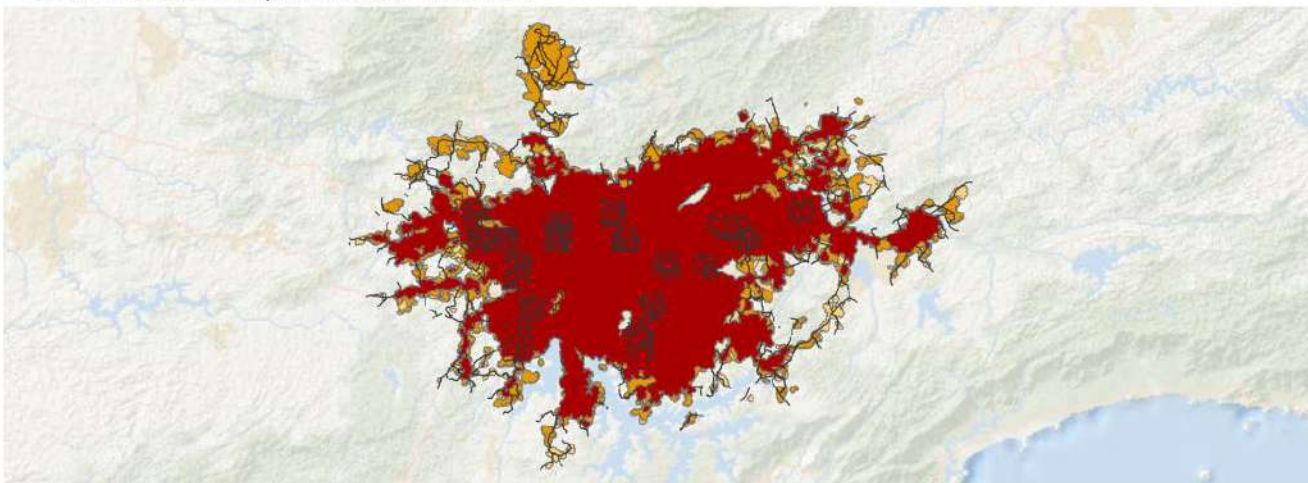
# Sao Paulo, Brazil (Latin America and the Caribbean)



Selected Locales in Area Developed Before 1988



Selected Locales in Expansion Area, 1988-2014



## Sao Paulo, Brazil 1988-2014



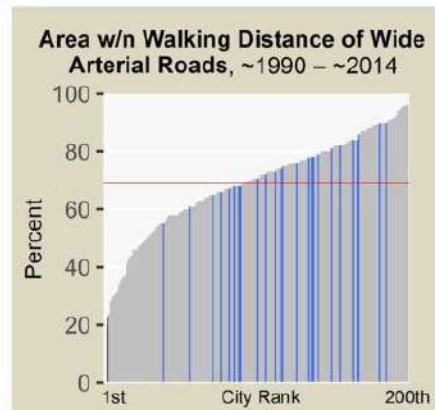
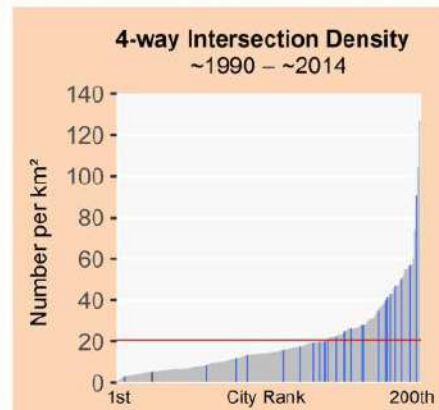
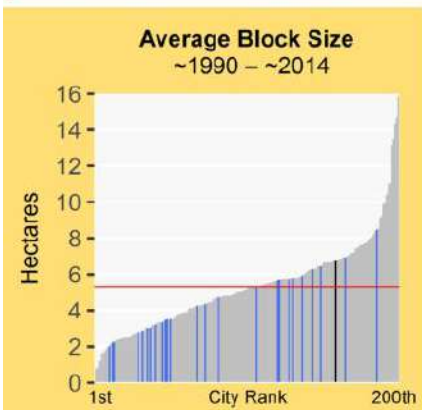
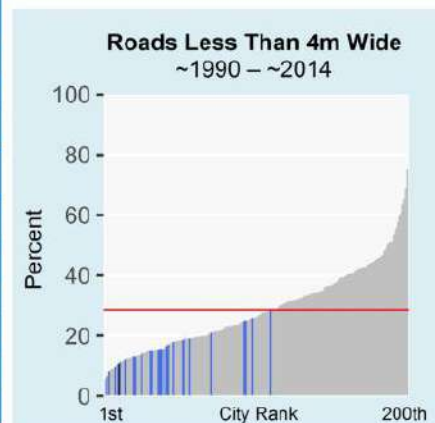
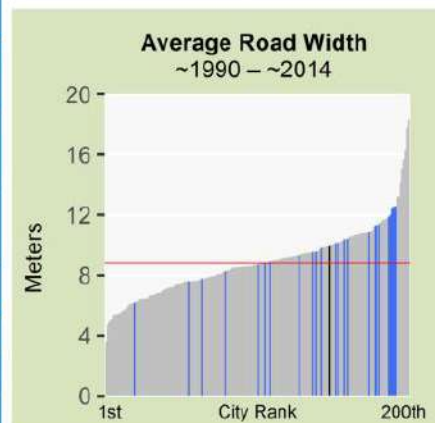
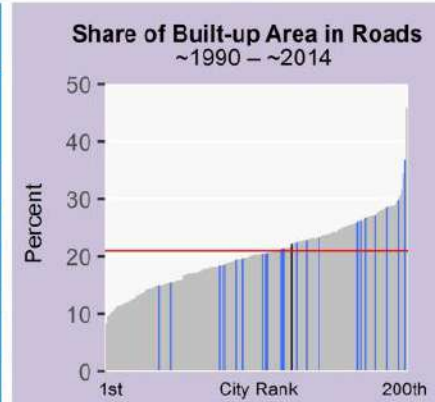
- Urban Extent in 1988
- Expansion, 1988 - 2000
- Expansion, 2000 - 2014

Arterial Roads

# Sao Paulo, Brazil (Latin America and the Caribbean)



Legend for Charts		
	Sao Paulo	Other cities in region
	All other cities	Global average
Metrics		
	Pre-1988	1988-2014
Roads		
Share of Built-Up Area Occupied by Roads	23%	22%
Share of Built-Up Area that is Gridded or Partially Gridded	21%	2%
Average Road Width (m)	9.9	7.2
Share of Roads less than 4m Wide	4%	10%
Share of Roads more than 16m Wide	18%	1%
Arterial Roads		
Density of Arterial Roads (km/km <sup>2</sup> )	2.4	0.5
Average Beeline Distance to Arterial Roads (m)	162	1268
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	99%	39%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	78%	23%
Block Size, Plot Size, Intersection Density, and Walkability		
Share of Intersections that are 4-way	26%	6%
Average Block Size (ha)	3.5	6.7
3-way Intersection Density (number per km <sup>2</sup> )	67	83
4-way Intersection Density (number per km <sup>2</sup> )	18	5
Walkability Ratio	1.8	1.7
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	286	
Stages in the Evolution of Residential Layouts		
Share of Built-Up Area in Residential Use	72%	71%
Share of Residential Area Not Laid Out Before Occupation	1%	22%
Share of Residential Area Laid Out Before Occupation	92%	77%
Share of Residential Area in Informal Land Subdivisions	3%	23%
Share of Residential Area in Formal Land Subdivisions	91%	49%
Share of Residential Area in Housing Projects	3%	4%



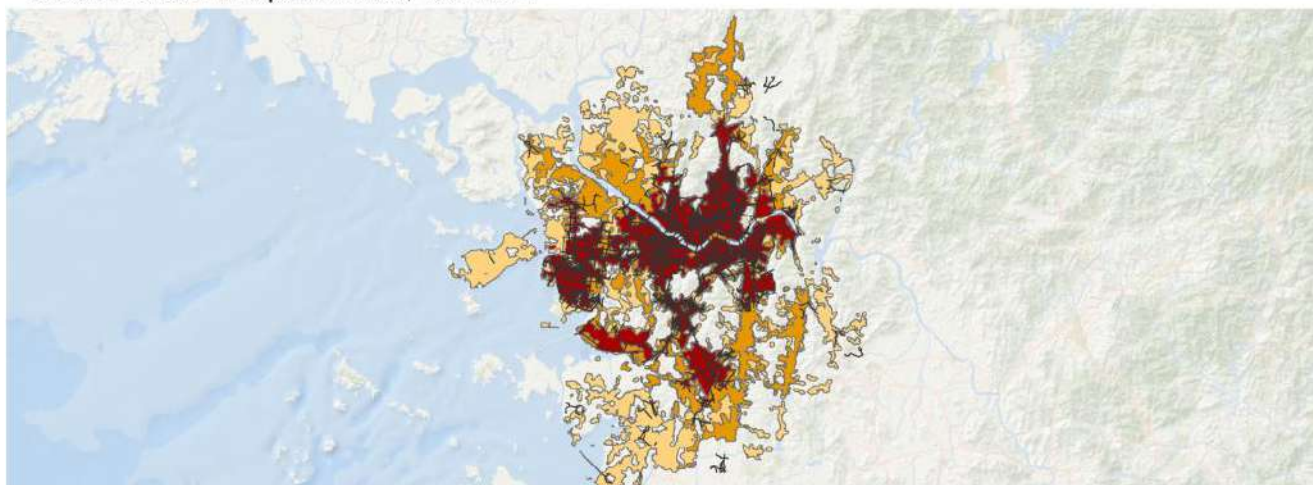
# Seoul, Korea Rep. (East Asia and the Pacific)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2014




Seoul, Korea Rep. 1991-2014

0 20 40 60 80 km

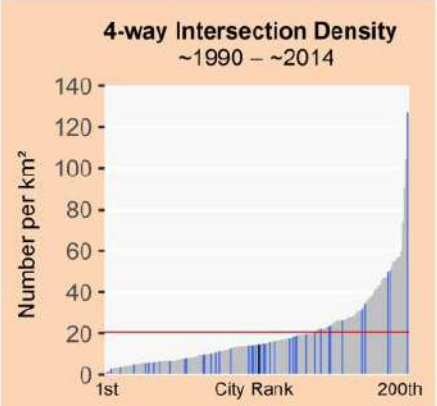
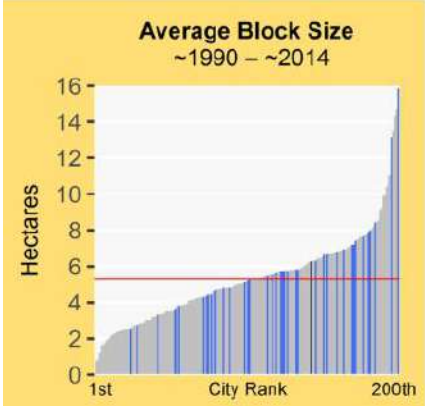
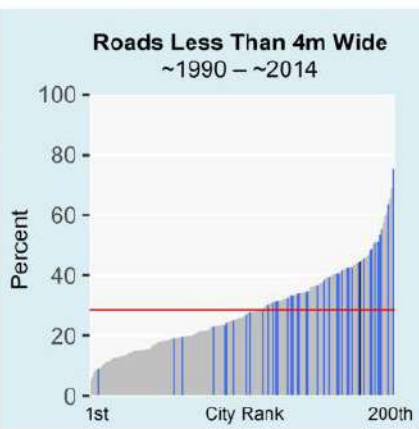
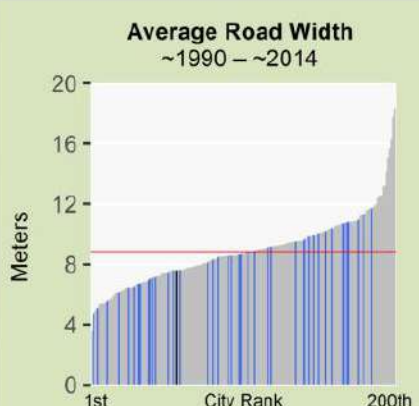
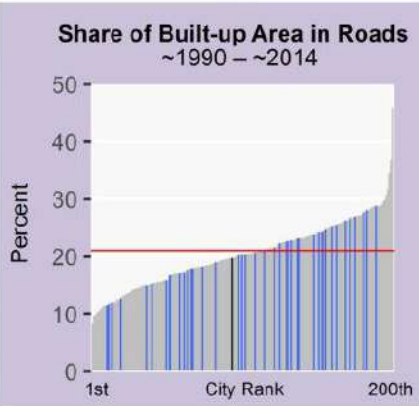
N

- Urban Extent in 1991
- Expansion, 1991 - 2000
- Expansion, 2000 - 2014
- Arterial Roads

# Seoul, Korea Rep. (East Asia and the Pacific)



Legend for Charts		
	Seoul	Other cities in region
	All other cities	Global average
Metrics	Pre-1991	1991-2014
Roads		
Share of Built-Up Area Occupied by Roads	21%	19%
Share of Built-Up Area that is Gridded or Partially Gridded	5%	0%
Average Road Width (m)	7.6	5.6
Share of Roads less than 4m Wide	32%	44%
Share of Roads more than 16m Wide	10%	4%
Arterial Roads		
Density of Arterial Roads (km/km <sup>2</sup> )	2.5	0.8
Average Beeline Distance to Arterial Roads (m)	177	478
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	95%	71%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	93%	47%
Block Size, Plot Size, Intersection Density, and Walkability		
Share of Intersections that are 4-way	15%	9%
Average Block Size (ha)	2.4	6.3
3-way Intersection Density (number per km <sup>2</sup> )	132	96
4-way Intersection Density (number per km <sup>2</sup> )	29	15
Walkability Ratio	1.8	1.5
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	242	
Stages in the Evolution of Residential Layouts		
Share of Built-Up Area in Residential Use	55%	42%
Share of Residential Area Not Laid Out Before Occupation	7%	65%
Share of Residential Area Laid Out Before Occupation	92%	34%
Share of Residential Area in Informal Land Subdivisions	2%	6%
Share of Residential Area in Formal Land Subdivisions	54%	7%
Share of Residential Area in Housing Projects	35%	21%



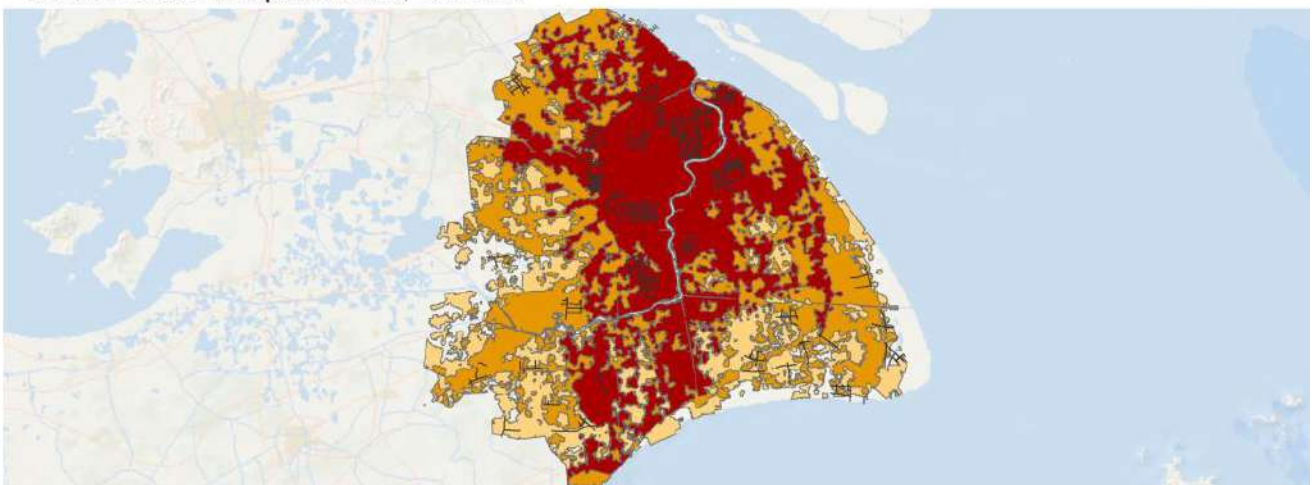
# Shanghai, Shanghai, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2015



Shanghai, Shanghai, China  
1991-2015

0 10 20 30 km

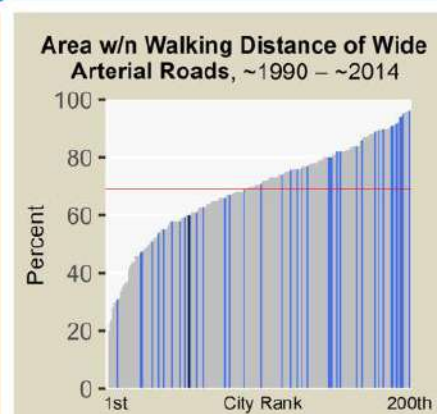
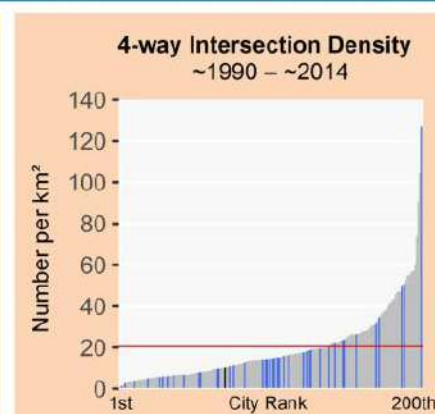
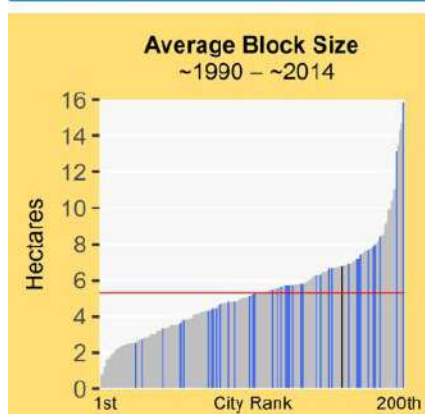
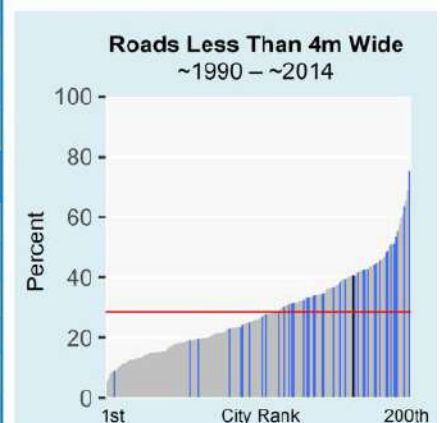
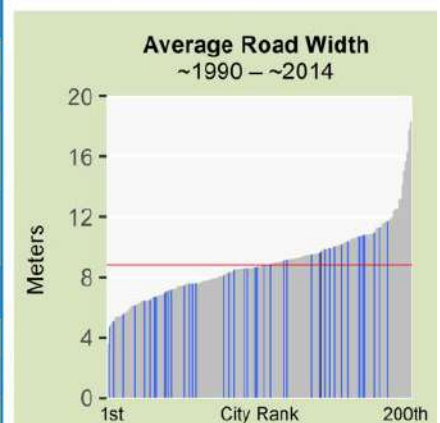
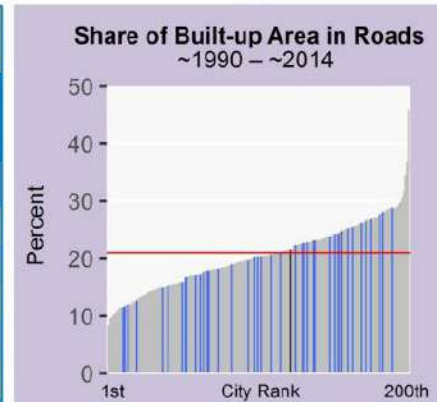
Urban Extent in 1991  
Expansion, 1991 - 2000  
Expansion, 2000 - 2015

Arterial Roads

# Shanghai, Shanghai, China (East Asia and the Pacific)



Legend for Charts		
	Shangha	Other cities in region   All other cities   Global average
Metrics	Pre-1991	1991-2015
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	27%	21%
Share of Built-Up Area that is Gridded or Partially Gridded	2%	7%
Average Road Width (m)	9.7	8.2
Share of Roads less than 4m Wide	16%	40%
Share of Roads more than 16m Wide	24%	14%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.7	0.7
Average Beeline Distance to Arterial Roads (m)	229	1286
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	93%	63%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	93%	60%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	20%	13%
Average Block Size (ha)	6.1	6.8
3-way Intersection Density (number per km <sup>2</sup> )	67	81
4-way Intersection Density (number per km <sup>2</sup> )	18	10
Walkability Ratio	1.6	1.7
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	302	
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	51%	46%
Share of Residential Area Not Laid Out Before Occupation	11%	45%
Share of Residential Area Laid Out Before Occupation	82%	54%
Share of Residential Area in Informal Land Subdivisions	6%	16%
Share of Residential Area in Formal Land Subdivisions	38%	10%
Share of Residential Area in Housing Projects	43%	27%



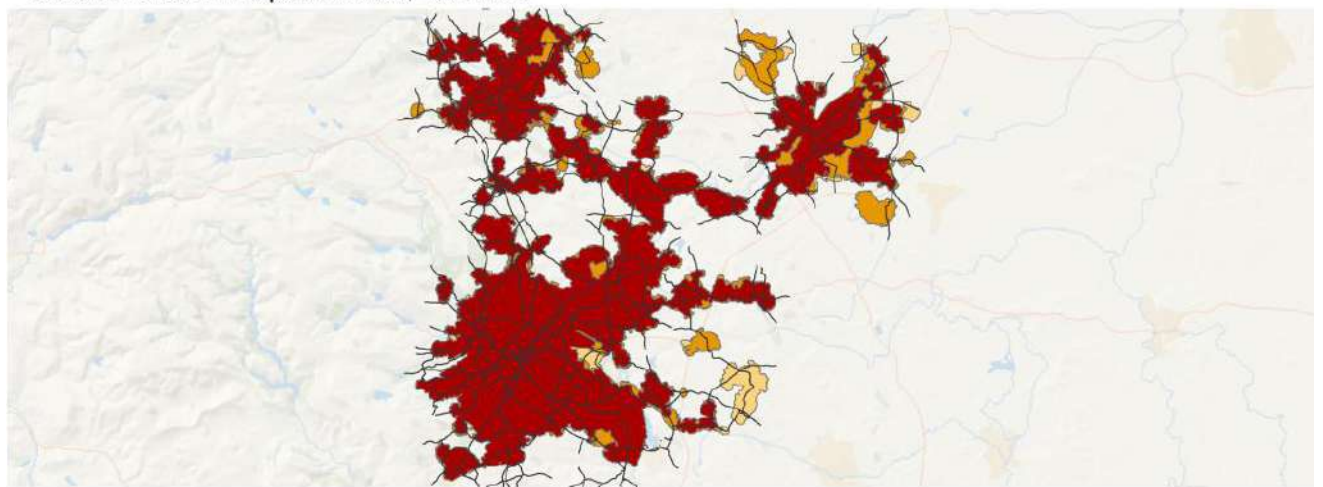
# Sheffield, United Kingdom (Europe and Japan)



Selected Locales in Area Developed Before 1992



Selected Locales in Expansion Area, 1992-2013



Sheffield, United Kingdom  
1992-2013

0 5 10 15 20 km

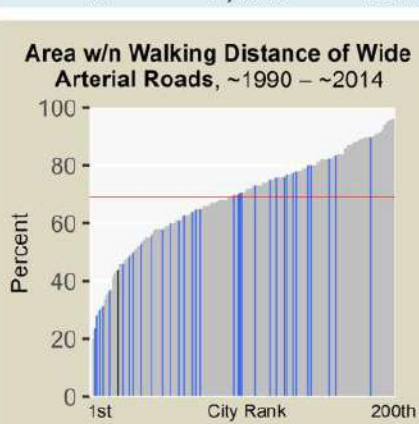
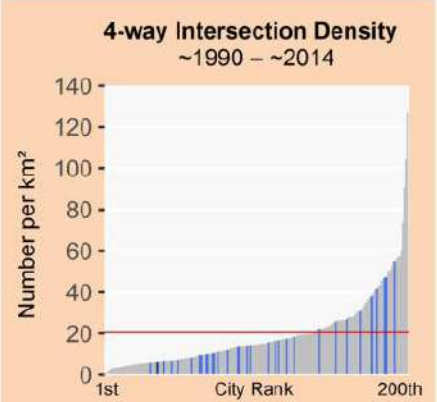
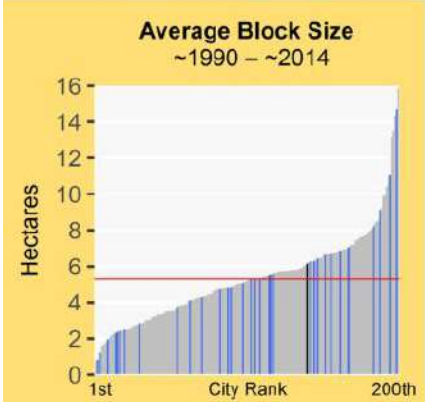
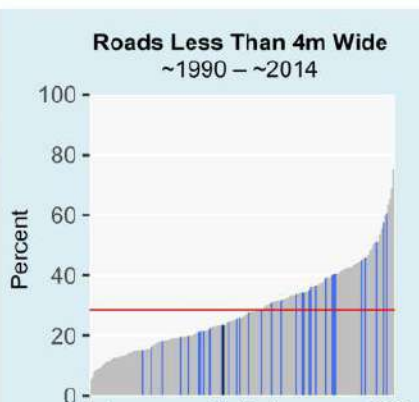
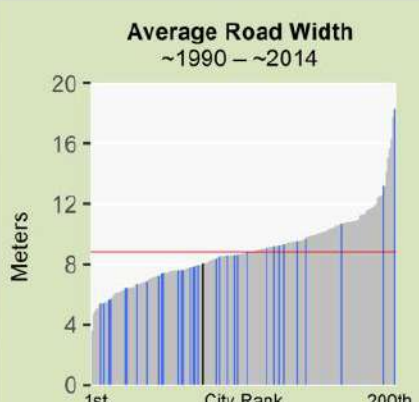
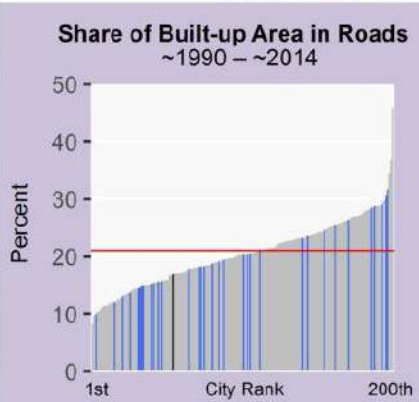
N

- Urban Extent in 1992
- Expansion, 1992 - 2002
- Expansion, 2002 - 2013
- Arterial Roads



# Sheffield, United Kingdom (Europe and Japan)

Legend for Charts			
	Sheffield	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1992	1992-2013	
Roads			
Share of Built-Up Area Occupied by Roads	18%	16%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%	
Average Road Width (m)	8.0	7.5	
Share of Roads less than 4m Wide	24%	23%	
Share of Roads more than 16m Wide	6%	4%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	1.6	1.5	
Average Beeline Distance to Arterial Roads (m)	220	234	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	94%	93%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	46%	44%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	7%	6%	
Average Block Size (ha)	3.4	6.2	
3-way Intersection Density (number per km <sup>2</sup> )	98	63	
4-way Intersection Density (number per km <sup>2</sup> )	10	6	
Walkability Ratio	1.6	1.5	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	525	144	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	68%	73%	
Share of Residential Area Not Laid Out Before Occupation	2%	5%	
Share of Residential Area Laid Out Before Occupation	97%	94%	
Share of Residential Area in Informal Land Subdivisions	0%	3%	
Share of Residential Area in Formal Land Subdivisions	90%	77%	
Share of Residential Area in Housing Projects	6%	13%	



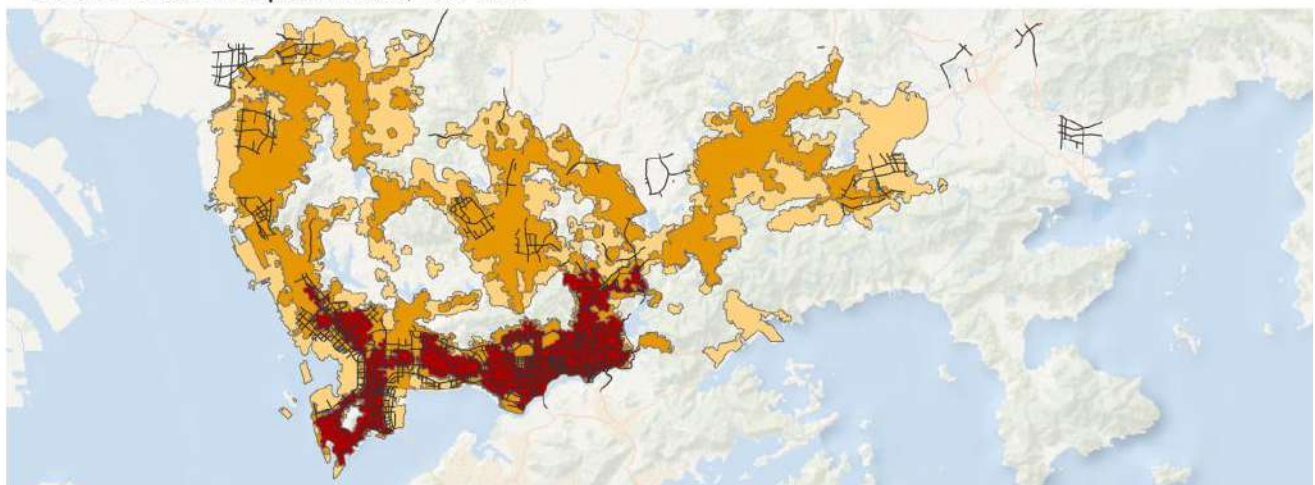
# Shenzhen, Guangdong, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1987



Selected Locales in Expansion Area, 1987-2013



Shenzhen, Guangdong, China  
1987-2013

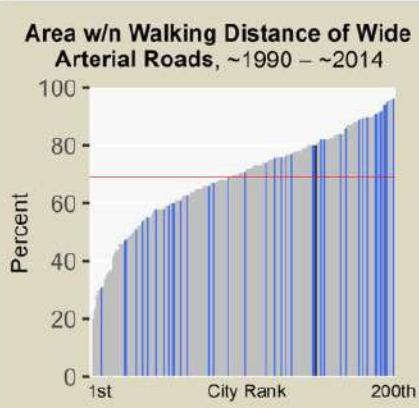
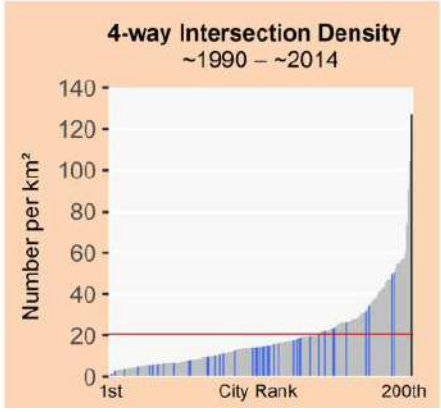
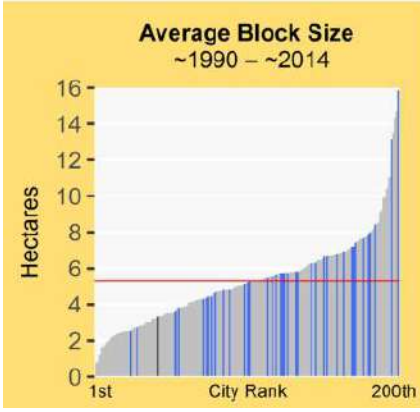
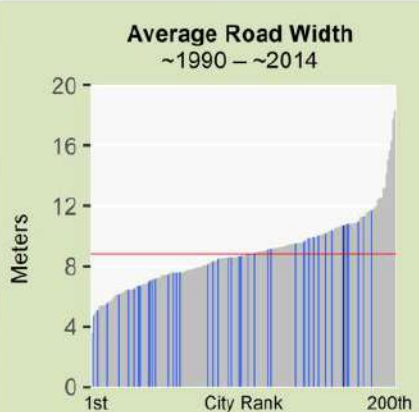
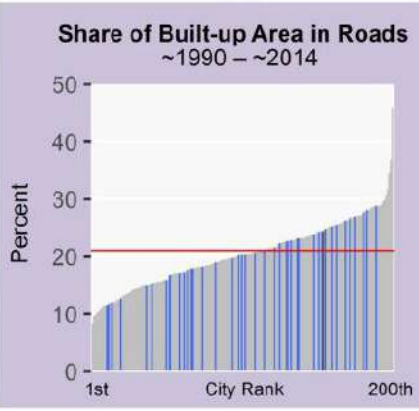
0 5 10 15 20 25 km

Urban Extent in 1987  
Expansion, 1987 - 2000  
Expansion, 2000 - 2013

Arterial Roads

# Shenzhen, Guangdong, China (East Asia and the Pacific)

Legend for Charts			
	Shenzhen	Other cities in region	All other cities
			Global average —
Metrics	Pre-1987	1987-2013	
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	26%	24%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%	
Average Road Width (m)	10.7	8.4	
Share of Roads less than 4m Wide	20%	33%	
Share of Roads more than 16m Wide	17%	14%	
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	2.8	1.0	
Average Beeline Distance to Arterial Roads (m)	148	444	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	97%	80%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	97%	80%	
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	6%	18%	
Average Block Size (ha)	3.0	3.3	
3-way Intersection Density (number per km <sup>2</sup> )	132	251	
4-way Intersection Density (number per km <sup>2</sup> )	12	82	
Walkability Ratio	1.8	1.7	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		158	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	302	214	
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	44%	46%	
Share of Residential Area Not Laid Out Before Occupation	8%	38%	
Share of Residential Area Laid Out Before Occupation	91%	61%	
Share of Residential Area in Informal Land Subdivisions	0%	4%	
Share of Residential Area in Formal Land Subdivisions	51%	39%	
Share of Residential Area in Housing Projects	40%	17%	



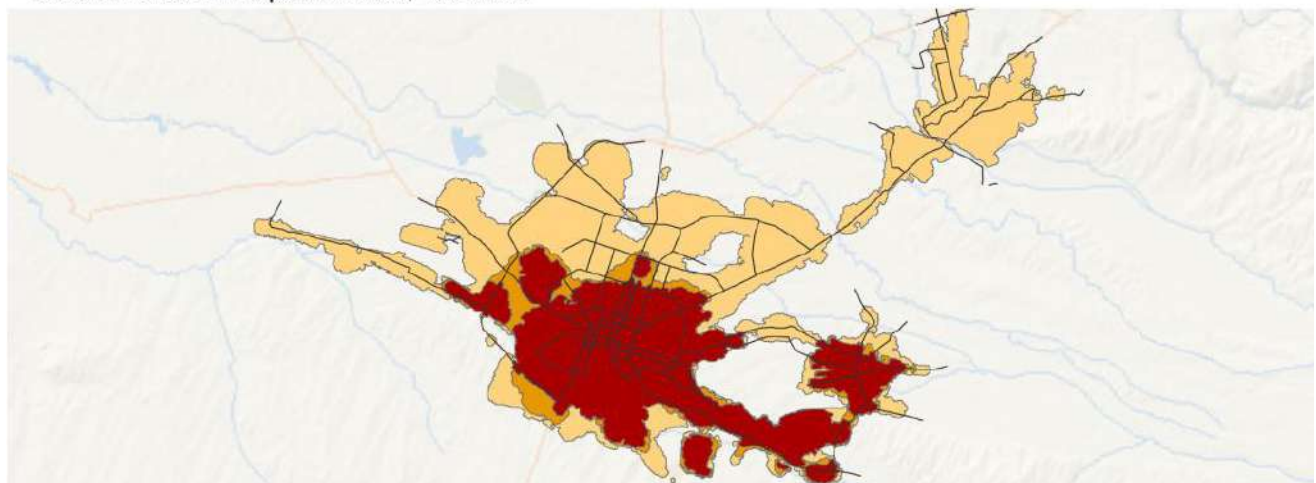
# Shymkent, Kazakhstan (South and Central Asia)



Selected Locales in Area Developed Before 1993



Selected Locales in Expansion Area, 1993-2013



**Shymkent, Kazakhstan**  
1993-2013

0 5 10 15 20 km

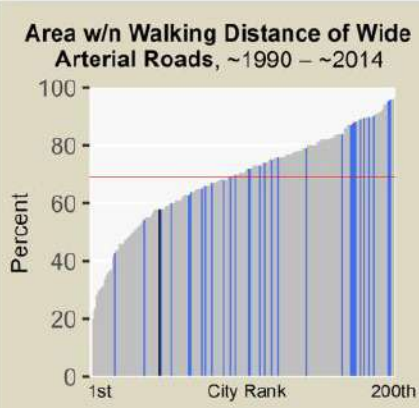
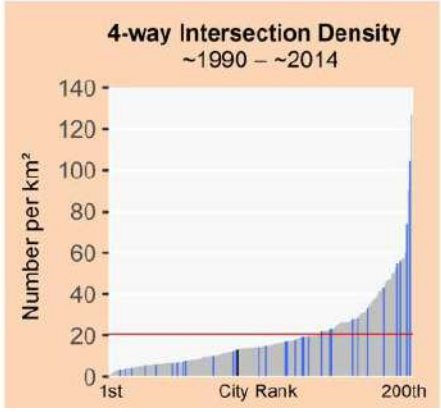
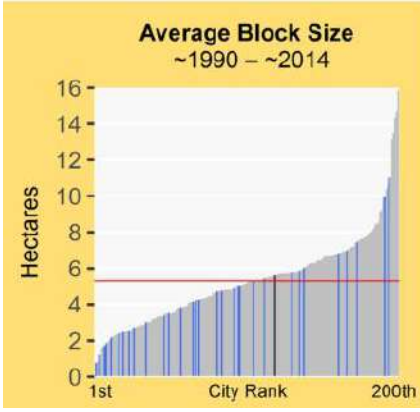
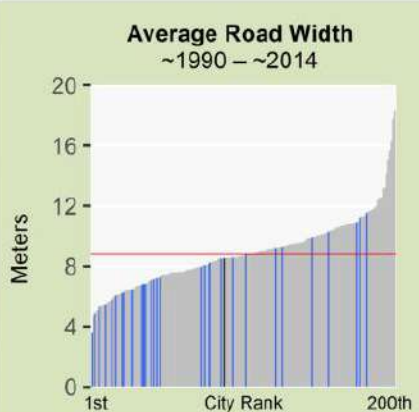
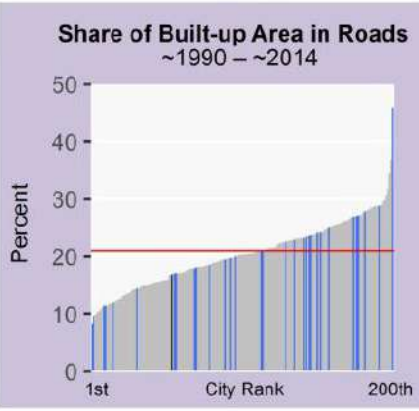
N

- Urban Extent in 1993
- Expansion, 1993 - 2000
- Expansion, 2000 - 2013
- Arterial Roads

# Shymkent, Kazakhstan (South and Central Asia)



Legend for Charts			
	Shymkent	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1993	1993-2013	
Roads			
Share of Built-Up Area Occupied by Roads	14%	16%	
Share of Built-Up Area that is Gridded or Partially Gridded	7%	0%	
Average Road Width (m)	8.5	7.7	
Share of Roads less than 4m Wide	13%	17%	
Share of Roads more than 16m Wide	8%	7%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	1.2	0.9	
Average Beeline Distance to Arterial Roads (m)	461	469	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	75%	74%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	65%	57%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	14%	14%	
Average Block Size (ha)	6.4	5.6	
3-way Intersection Density (number per km <sup>2</sup> )	44	65	
4-way Intersection Density (number per km <sup>2</sup> )	8	13	
Walkability Ratio	1.7	1.8	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	1144	959	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	729	879	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	71%	86%	
Share of Residential Area Not Laid Out Before Occupation	19%	13%	
Share of Residential Area Laid Out Before Occupation	80%	86%	
Share of Residential Area in Informal Land Subdivisions	23%	62%	
Share of Residential Area in Formal Land Subdivisions	45%	21%	
Share of Residential Area in Housing Projects	11%	3%	



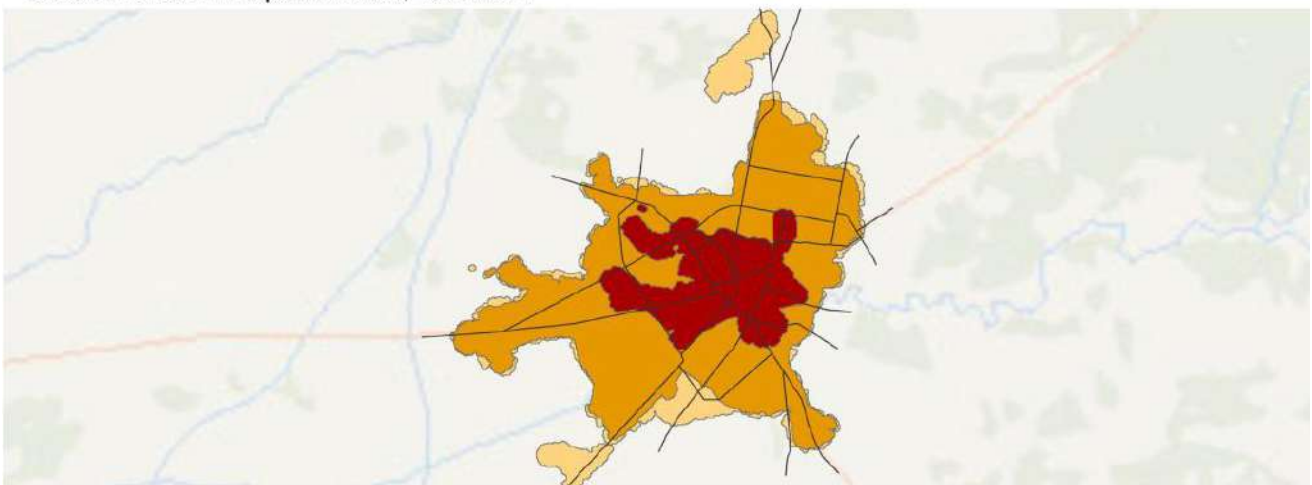
# Sialkot, Pakistan (South and Central Asia)



Selected Locales in Area Developed Before 1992



Selected Locales in Expansion Area, 1992-2014



## Sialkot, Pakistan 1992-2014



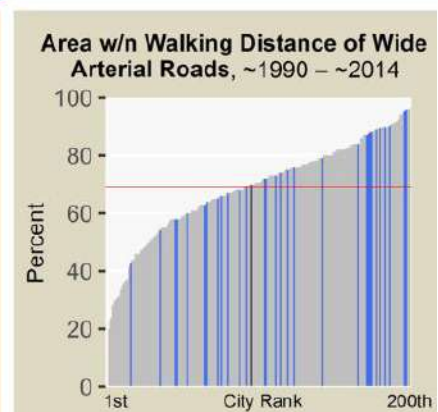
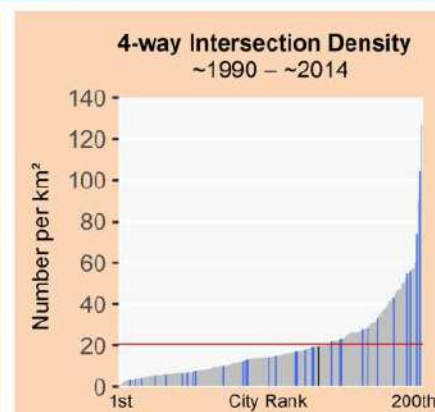
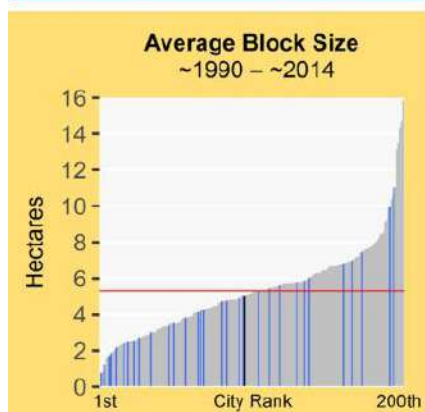
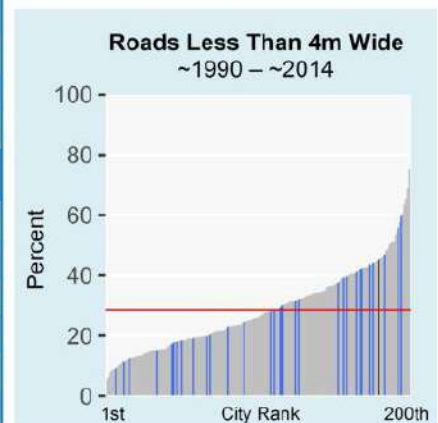
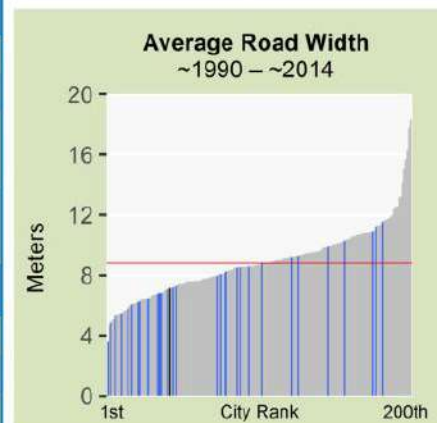
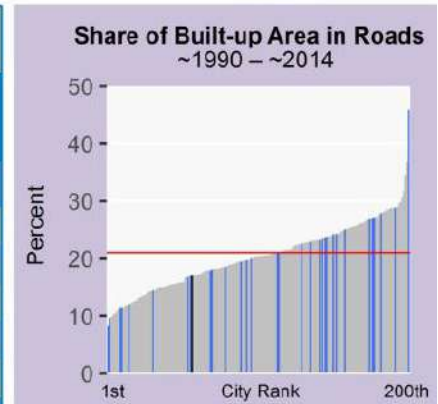
- Urban Extent in 1992
- Expansion, 1992 - 2000
- Expansion, 2000 - 2014

Arterial Roads

# Sialkot, Pakistan (South and Central Asia)



Legend for Charts			
	Sialkot	Other cities in region	All other cities
			Global average —
Metrics			
	Pre-1992	1992-2014	
Roads			
Share of Built-Up Area Occupied by Roads	16%	17%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%	
Average Road Width (m)	7.1	5.1	
Share of Roads less than 4m Wide	46%	45%	
Share of Roads more than 16m Wide	12%	4%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	1.8	1.0	
Average Beeline Distance to Arterial Roads (m)	181	379	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	99%	81%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	88%	70%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	8%	6%	
Average Block Size (ha)	2.4	5.1	
3-way Intersection Density (number per km <sup>2</sup> )	150	154	
4-way Intersection Density (number per km <sup>2</sup> )	16	19	
Walkability Ratio	1.6	1.8	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	332	234	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	75%	72%	
Share of Residential Area Not Laid Out Before Occupation	57%	69%	
Share of Residential Area Laid Out Before Occupation	42%	30%	
Share of Residential Area in Informal Land Subdivisions	18%	16%	
Share of Residential Area in Formal Land Subdivisions	23%	7%	
Share of Residential Area in Housing Projects	0%	7%	



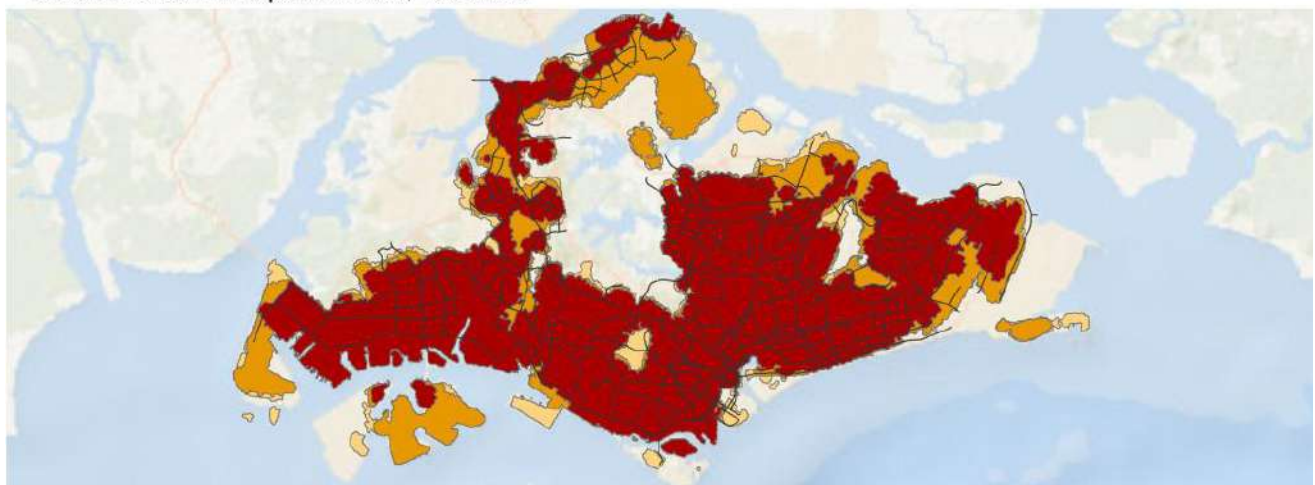
# Singapore, Singapore (Southeast Asia)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013



**Singapore, Singapore**  
1990-2013

0 5 10 15 km

N

- Urban Extent in 1990
- Expansion, 1990 - 2002
- Expansion, 2002 - 2013
- Arterial Roads



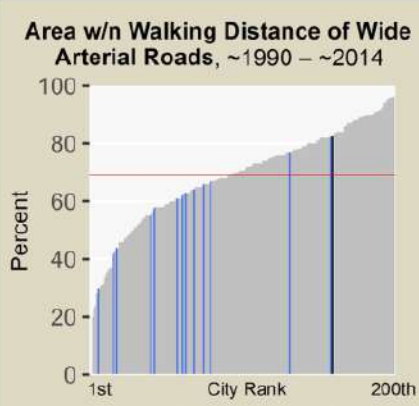
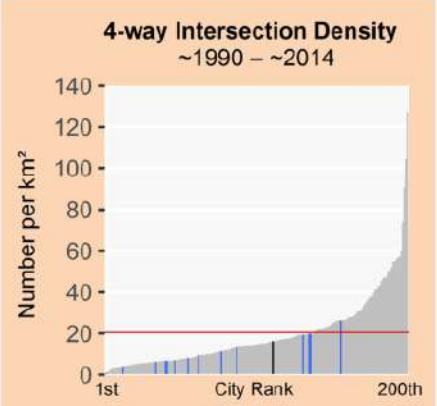
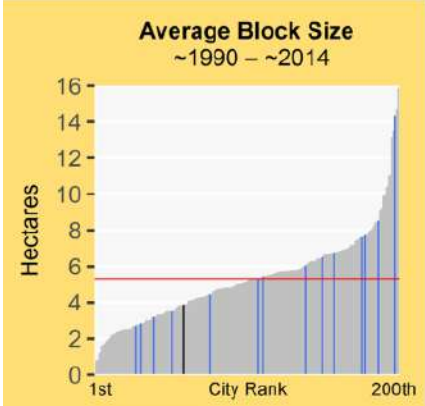
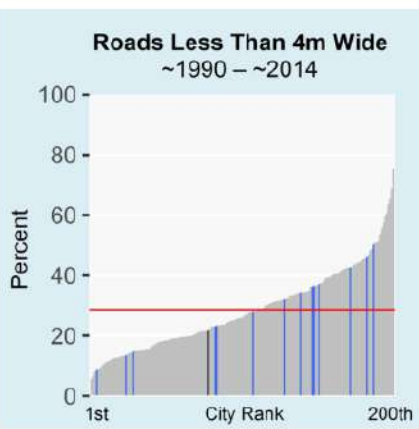
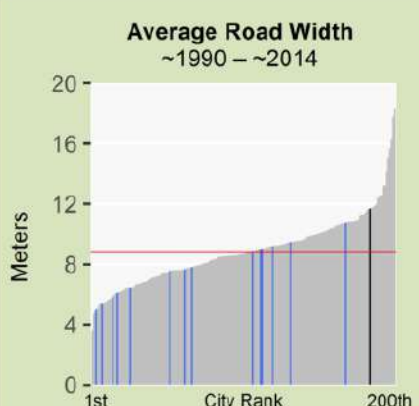
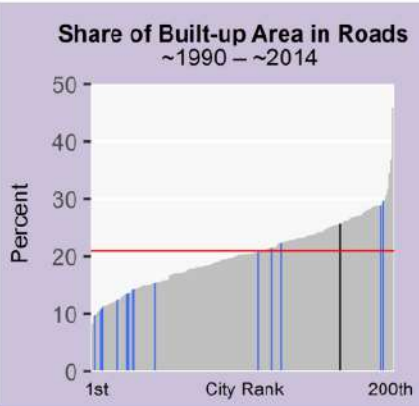
# Singapore, Singapore (Southeast Asia)



**Legend for Charts**

Singapore | Other cities in region | All other cities | Global average

Metrics	Pre-1990	1990-2013
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	23%	25%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	10%
Average Road Width (m)	11.7	9.1
Share of Roads less than 4m Wide	7%	21%
Share of Roads more than 16m Wide	23%	15%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.7	1.4
Average Beeline Distance to Arterial Roads (m)	243	513
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	92%	82%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	92%	82%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	4%	15%
Average Block Size (ha)	4.5	3.9
3-way Intersection Density (number per km <sup>2</sup> )	78	100
4-way Intersection Density (number per km <sup>2</sup> )	5	16
Walkability Ratio	2.2	2.0
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		520
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	54%	55%
Share of Residential Area Not Laid Out Before Occupation	3%	14%
Share of Residential Area Laid Out Before Occupation	96%	85%
Share of Residential Area in Informal Land Subdivisions	0%	0%
Share of Residential Area in Formal Land Subdivisions	38%	13%
Share of Residential Area in Housing Projects	58%	72%



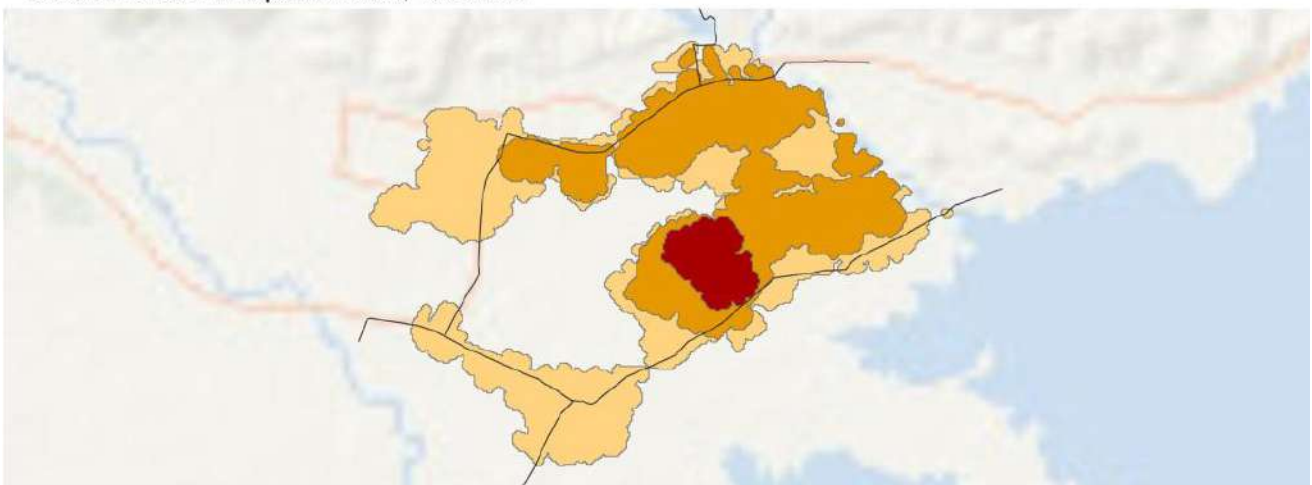
# Singrauli, India (South and Central Asia)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2010



## Singrauli, India 1990-2010



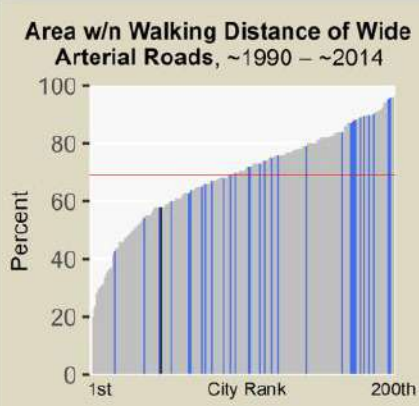
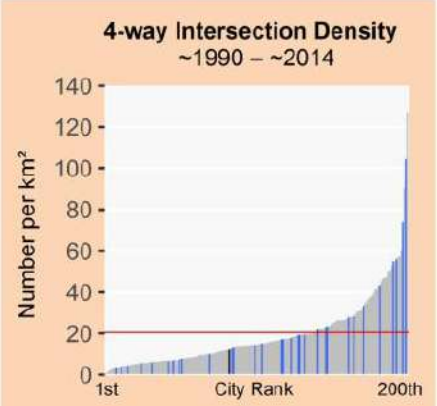
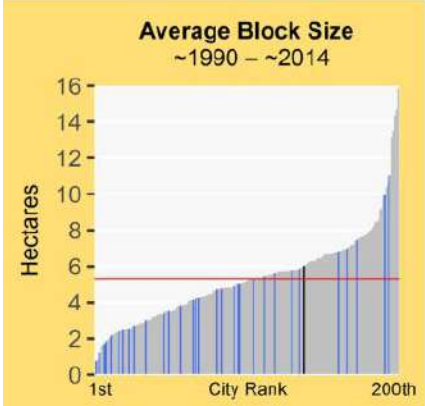
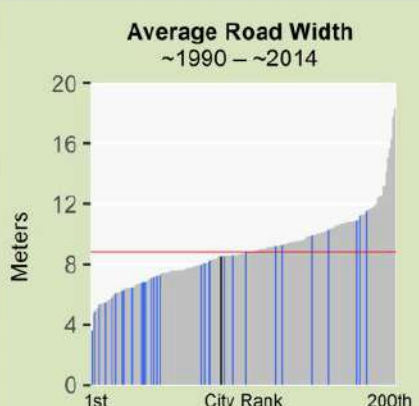
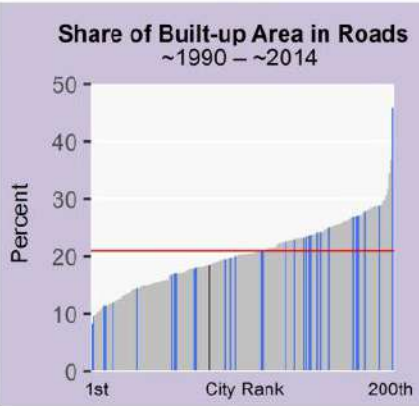
- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2010

Arterial Roads

# Singrauli, India (South and Central Asia)



Legend for Charts			
	Singrauli	Other cities in region	Global average
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	28%		18%
Share of Built-Up Area that is Gridded or Partially Gridded			0%
Average Road Width (m)	8.5		6.2
Share of Roads less than 4m Wide	7%		28%
Share of Roads more than 16m Wide	7%		4%
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	0.0		0.6
Average Beeline Distance to Arterial Roads (m)	1182		678
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	21%		54%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	21%		57%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	8%		5%
Average Block Size (ha)	3.4		6.0
3-way Intersection Density (number per km <sup>2</sup> )	180		137
4-way Intersection Density (number per km <sup>2</sup> )	20		12
Walkability Ratio	1.5		1.7
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			236
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	226		
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	60%		74%
Share of Residential Area Not Laid Out Before Occupation	1%		33%
Share of Residential Area Laid Out Before Occupation	98%		66%
Share of Residential Area in Informal Land Subdivisions	0%		33%
Share of Residential Area in Formal Land Subdivisions	21%		3%
Share of Residential Area in Housing Projects	76%		29%



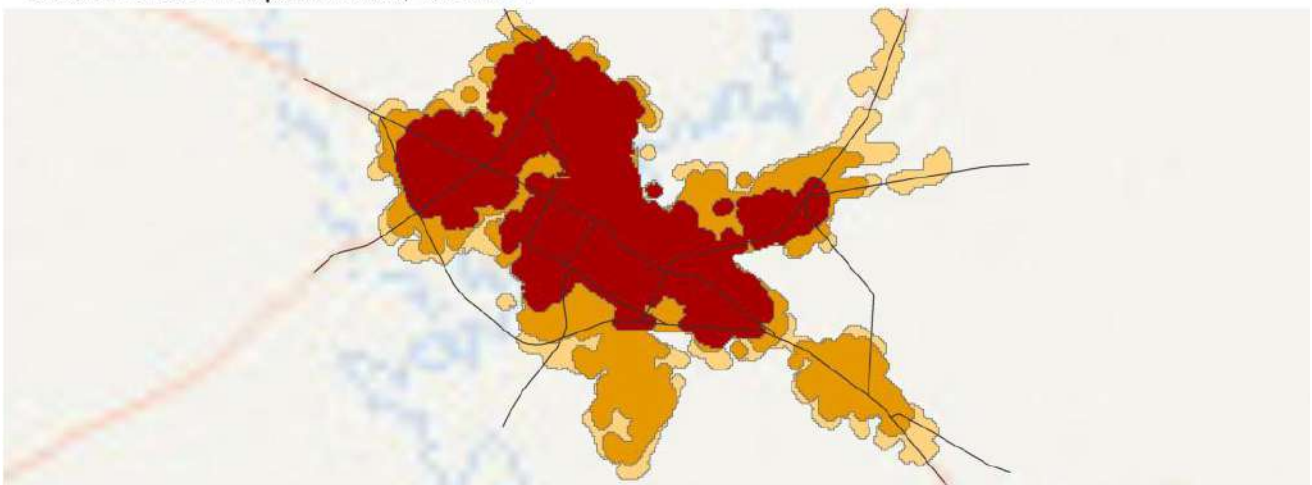
# Sitapur, India (South and Central Asia)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2014



**Sitapur, India**  
1989-2014

0 1 2 3 4 km

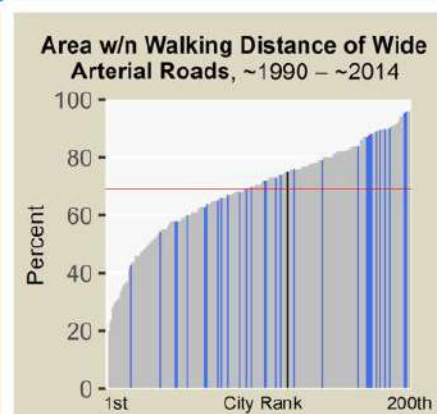
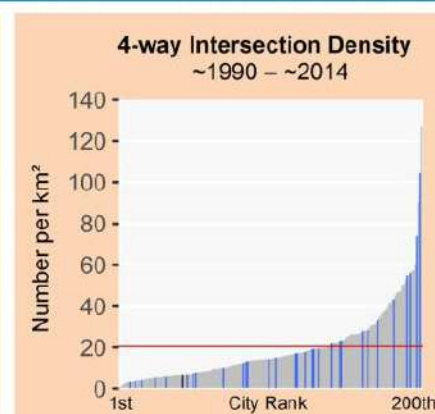
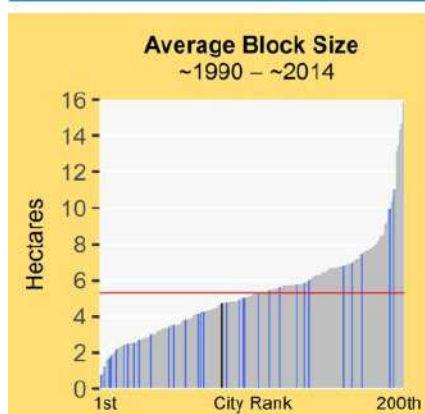
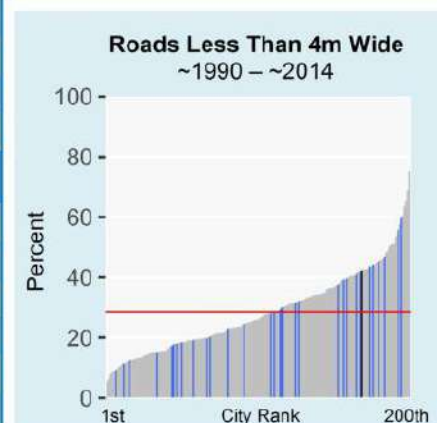
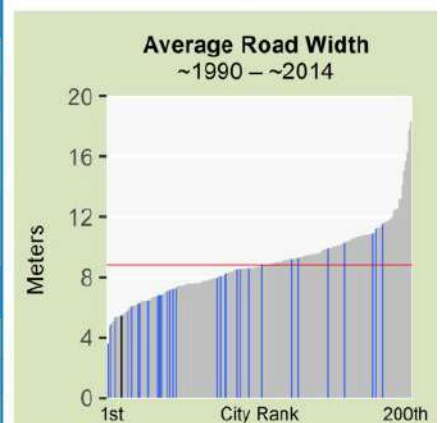
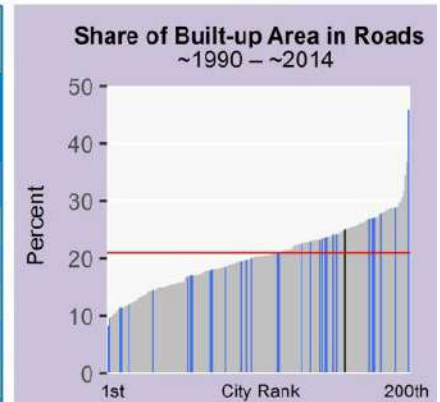
N

- Urban Extent in 1989
- Expansion, 1989 - 2000
- Expansion, 2000 - 2014
- Arterial Roads

# Sitapur, India (South and Central Asia)



Legend for Charts			
	Sitapur	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1989	1989-2014	
Roads			
Share of Built-Up Area Occupied by Roads	17%	25%	
Share of Built-Up Area that is Gridded or Partially Gridded	10%	0%	
Average Road Width (m)	5.5	5.0	
Share of Roads less than 4m Wide	45%	42%	
Share of Roads more than 16m Wide	4%	0%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	1.9	1.7	
Average Beeline Distance to Arterial Roads (m)	175	251	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	96%	90%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	78%	75%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	10%	5%	
Average Block Size (ha)	2.6	4.8	
3-way Intersection Density (number per km <sup>2</sup> )	203	132	
4-way Intersection Density (number per km <sup>2</sup> )	26	7	
Walkability Ratio	1.8	1.3	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	108	93	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	149		
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	69%	51%	
Share of Residential Area Not Laid Out Before Occupation	26%	1%	
Share of Residential Area Laid Out Before Occupation	73%	98%	
Share of Residential Area in Informal Land Subdivisions	70%	78%	
Share of Residential Area in Formal Land Subdivisions	3%	0%	
Share of Residential Area in Housing Projects	0%	20%	



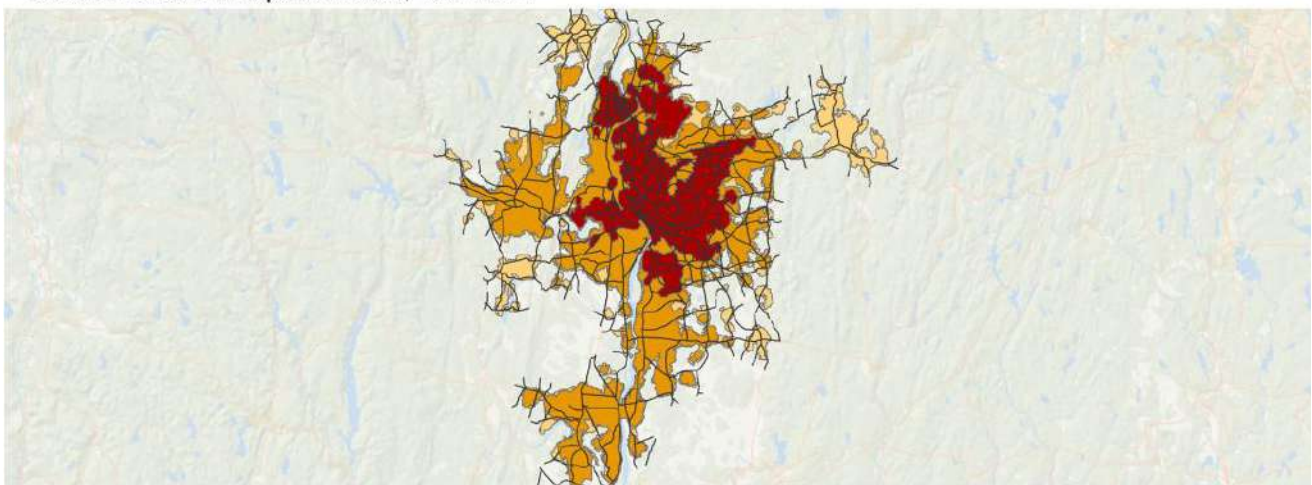
# Springfield, MA, United States (Land-Rich Developed Countries)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2014



Springfield, MA, United States  
1991-2014

0 5 10 15 20 25 30 km

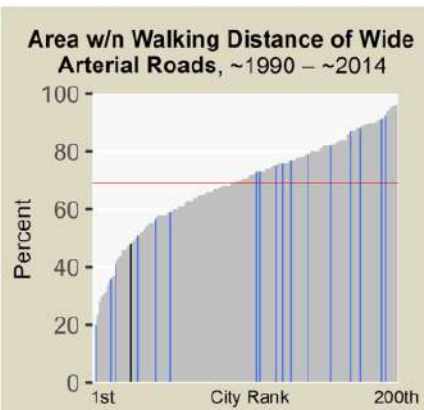
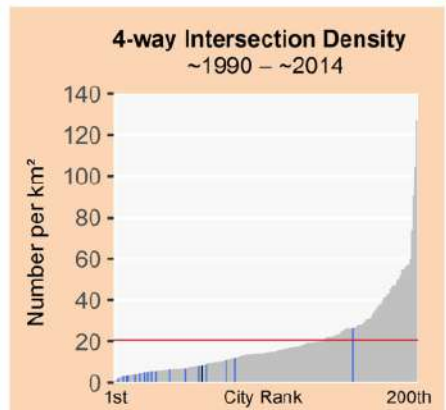
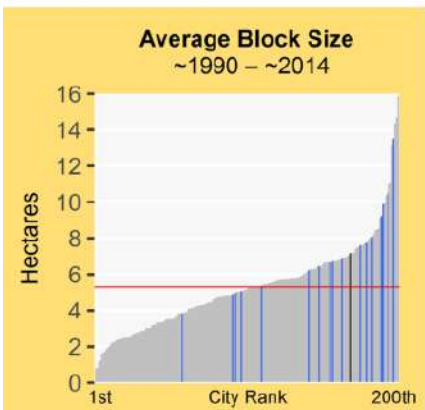
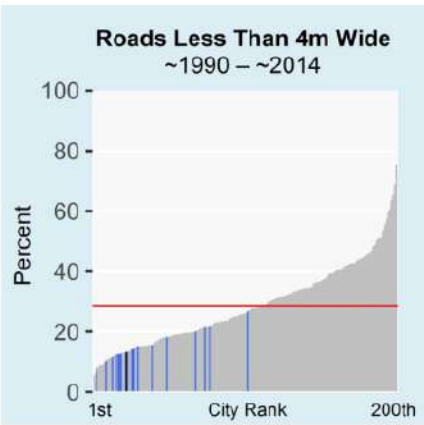
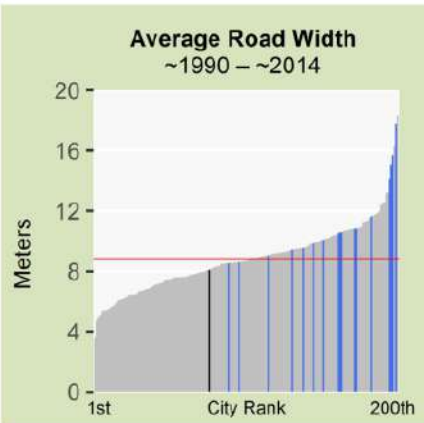
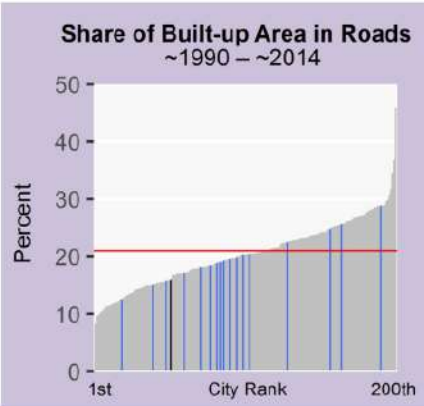
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- Urban Extent in 1991
- Expansion, 1991 - 2000
- Expansion, 2000 - 2014
- Arterial Roads

# Springfield, MA, United States (Land-Rich Developed Countries)



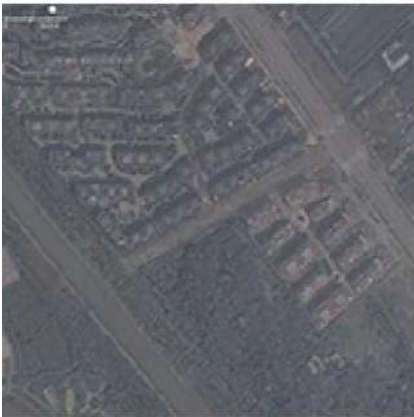
Legend for Charts			
	Springfield	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1991	1991-2014	
Roads			
Share of Built-Up Area Occupied by Roads	18%	15%	
Share of Built-Up Area that is Gridded or Partially Gridded	2%	0%	
Average Road Width (m)	8.1	7.9	
Share of Roads less than 4m Wide	18%	13%	
Share of Roads more than 16m Wide	8%	2%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	1.9	1.4	
Average Beeline Distance to Arterial Roads (m)	246	275	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	92%	89%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	75%	48%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	8%	5%	
Average Block Size (ha)	3.8	7.2	
3-way Intersection Density (number per km <sup>2</sup> )	97	45	
4-way Intersection Density (number per km <sup>2</sup> )	9	8	
Walkability Ratio	1.6	1.6	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	950	1508	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	73%	75%	
Share of Residential Area Not Laid Out Before Occupation	9%	32%	
Share of Residential Area Laid Out Before Occupation	90%	67%	
Share of Residential Area in Informal Land Subdivisions	0%	0%	
Share of Residential Area in Formal Land Subdivisions	85%	66%	
Share of Residential Area in Housing Projects	4%	1%	



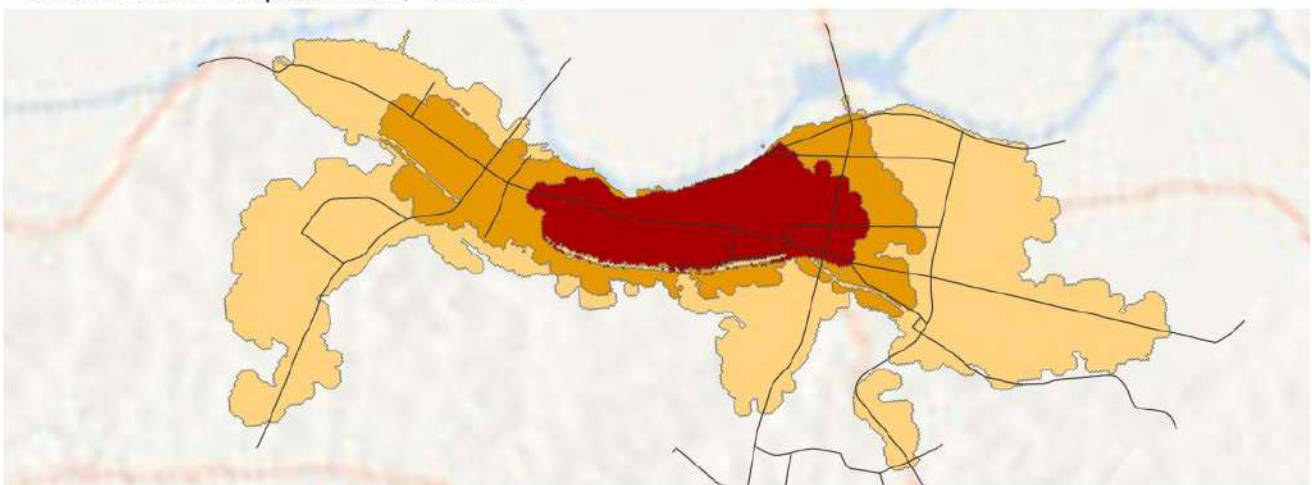
# Suining, Sichuan, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1988



Selected Locales in Expansion Area, 1988-2013



**Suining, Sichuan, China 1988-2013**

0 1 2 3 4 km

Urban Extent in 1988

Expansion, 1988 - 2000

Expansion, 2000 - 2013

Arterial Roads



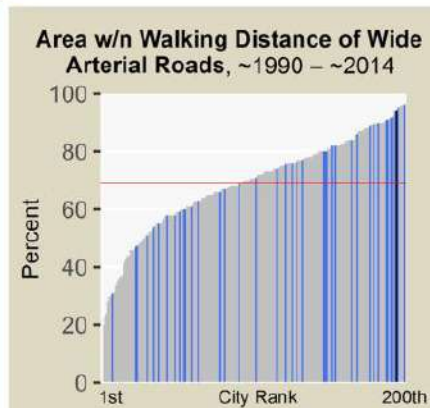
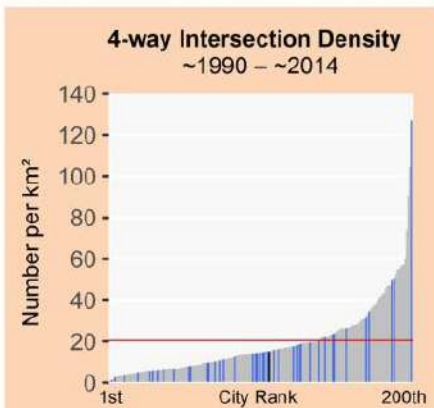
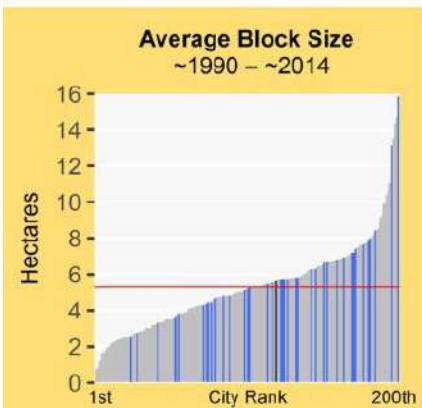
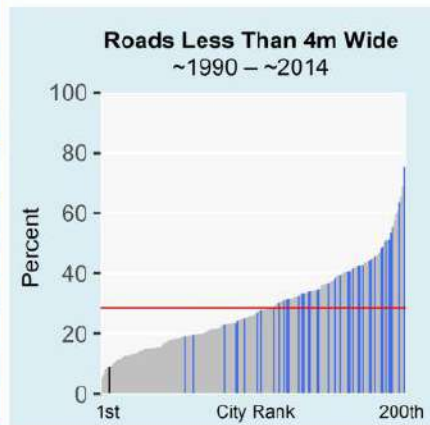
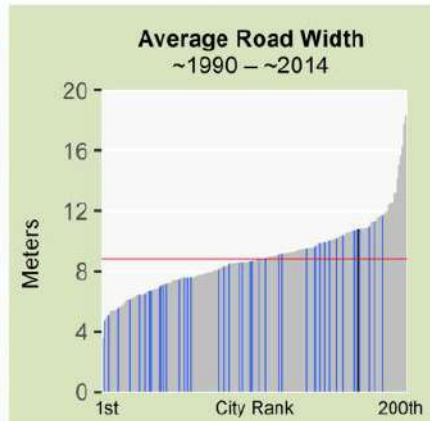
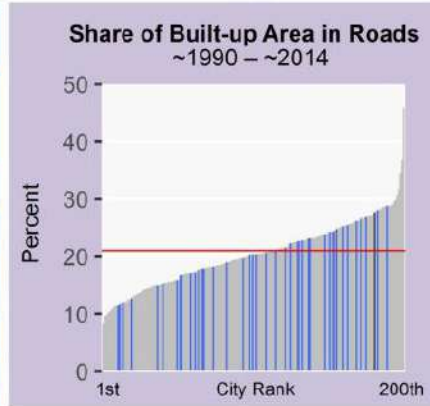
# Suining, Sichuan, China (East Asia and the Pacific)



**Legend for Charts**

Suining | Other cities in region | All other cities | Global average —

Metrics	Pre-1988	1988-2013
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	27%	27%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	10.8	11.0
Share of Roads less than 4m Wide	6%	9%
Share of Roads more than 16m Wide	19%	18%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.6	1.8
Average Beeline Distance to Arterial Roads (m)	117	190
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	100%	96%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	100%	94%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	7%	6%
Average Block Size (ha)	2.2	5.6
3-way Intersection Density (number per km <sup>2</sup> )	209	140
4-way Intersection Density (number per km <sup>2</sup> )	18	15
Walkability Ratio	1.4	1.9
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	69%	60%
Share of Residential Area Not Laid Out Before Occupation	2%	26%
Share of Residential Area Laid Out Before Occupation	97%	73%
Share of Residential Area in Informal Land Subdivisions	0%	13%
Share of Residential Area in Formal Land Subdivisions	97%	29%
Share of Residential Area in Housing Projects	0%	30%



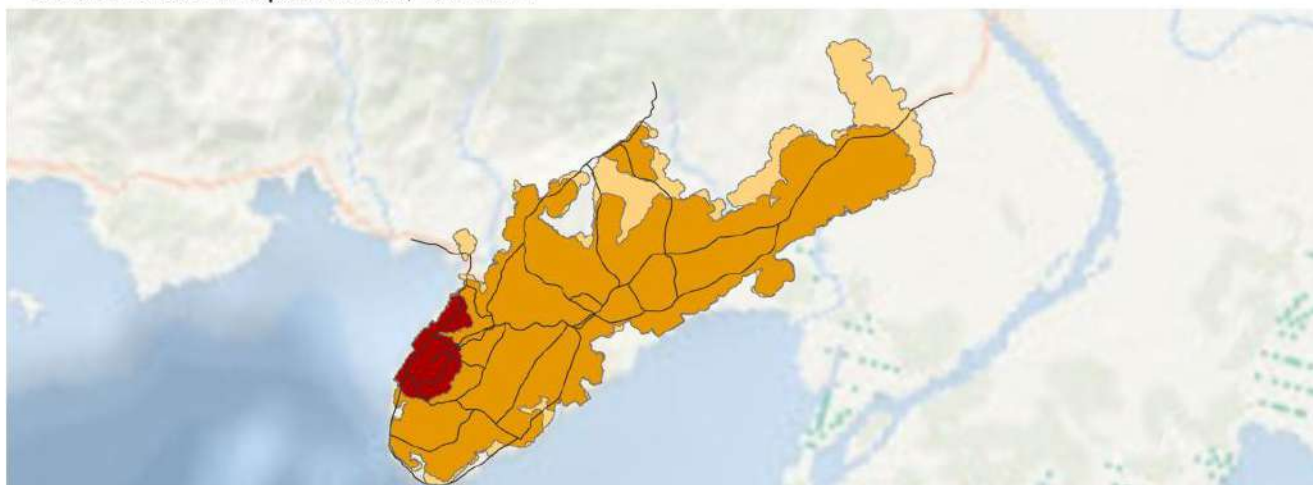
# Suva, Fiji (East Asia and the Pacific)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2014



**Suva, Fiji**  
1991-2014

0 5 km

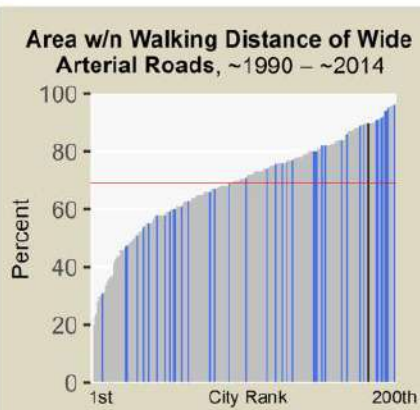
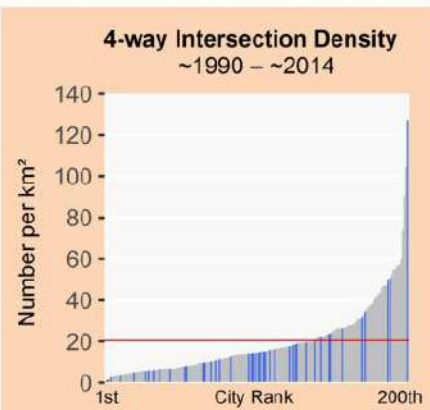
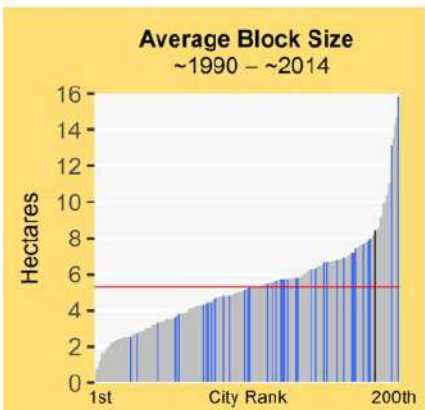
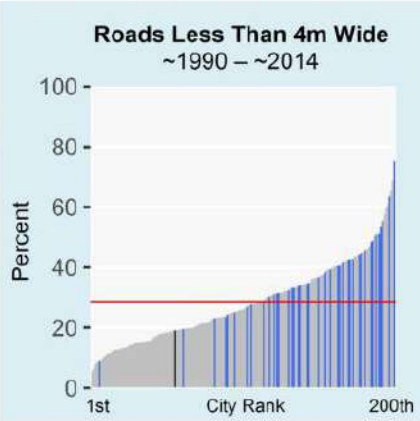
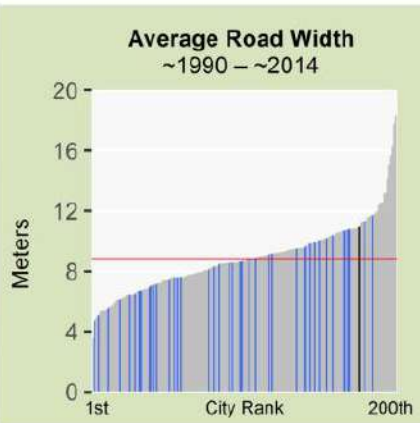
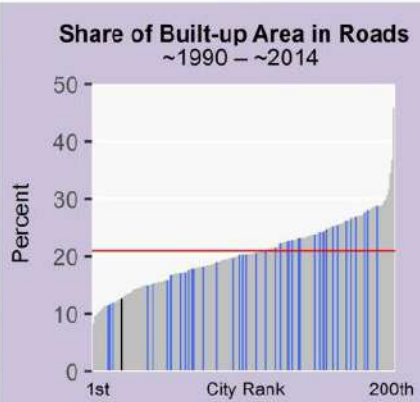
N

- Urban Extent in 1991
- Expansion, 1991 - 1999
- Expansion, 1999 - 2014
- Arterial Roads

# Suva, Fiji (East Asia and the Pacific)



Legend for Charts			
	Suva	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1991	1991-2014	
Roads			
Share of Built-Up Area Occupied by Roads	24%	12%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%	
Average Road Width (m)	10.9	8.4	
Share of Roads less than 4m Wide	7%	19%	
Share of Roads more than 16m Wide	16%	8%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	2.9	1.4	
Average Beeline Distance to Arterial Roads (m)	83	253	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	100%	90%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	100%	90%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	1%	2%	
Average Block Size (ha)	5.2	8.4	
3-way Intersection Density (number per km <sup>2</sup> )	142	32	
4-way Intersection Density (number per km <sup>2</sup> )	5	1	
Walkability Ratio	1.5	1.6	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )			
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	48%	84%	
Share of Residential Area Not Laid Out Before Occupation	29%	39%	
Share of Residential Area Laid Out Before Occupation	70%	60%	
Share of Residential Area in Informal Land Subdivisions	0%	14%	
Share of Residential Area in Formal Land Subdivisions	69%	41%	
Share of Residential Area in Housing Projects	1%	3%	



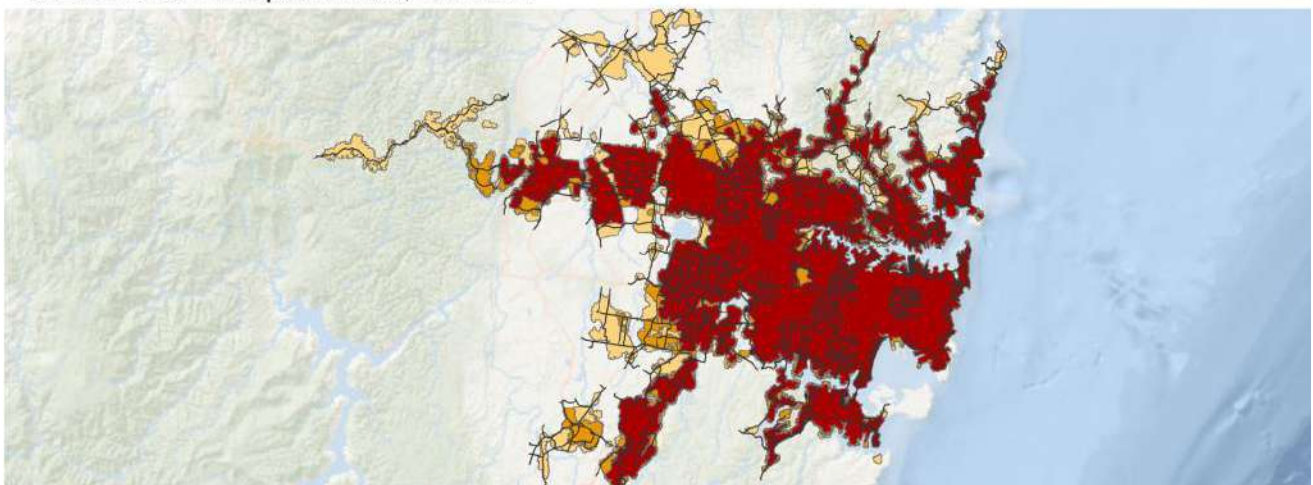
# Sydney, Australia (Land-Rich Developed Countries)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2014



## Sydney, Australia 1991-2014



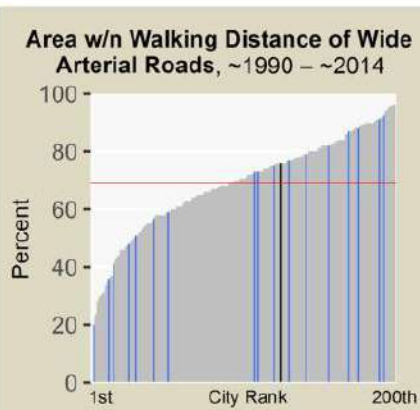
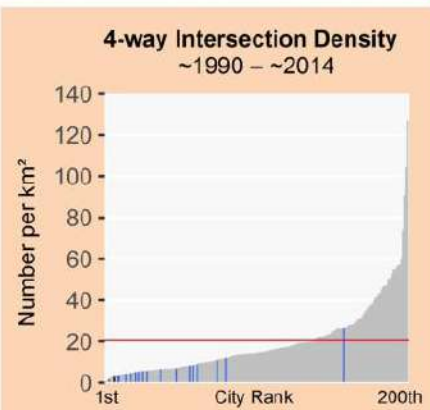
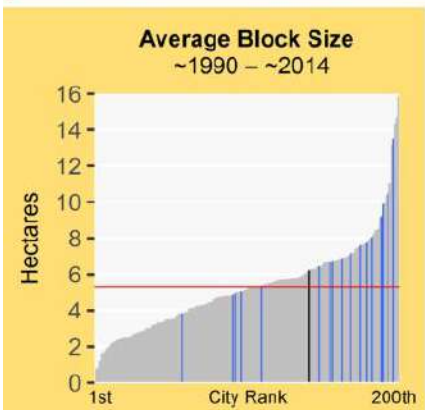
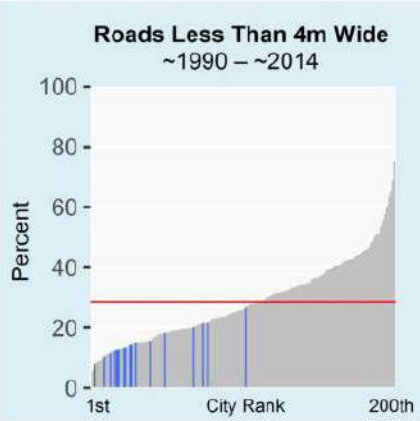
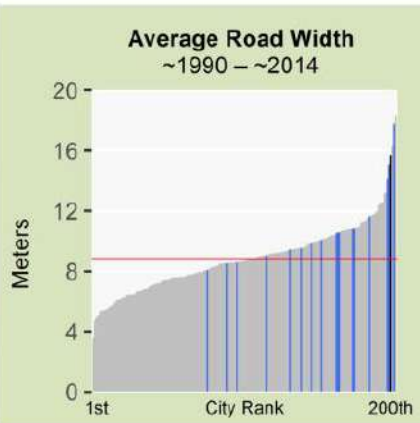
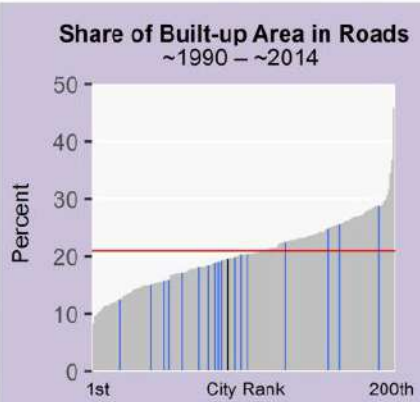
- Urban Extent in 1991
- Expansion, 1991 - 2000
- Expansion, 2000 - 2014

Arterial Roads

# Sydney, Australia (Land-Rich Developed Countries)



Legend for Charts			
	Sydney	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1991	1991-2014	
Roads			
Share of Built-Up Area Occupied by Roads	26%	19%	
Share of Built-Up Area that is Gridded or Partially Gridded	8%	2%	
Average Road Width (m)	15.7	9.9	
Share of Roads less than 4m Wide	5%	7%	
Share of Roads more than 16m Wide	50%	15%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	2.3	1.3	
Average Beeline Distance to Arterial Roads (m)	163	357	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	97%	82%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	97%	76%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	17%	4%	
Average Block Size (ha)	5.8	6.2	
3-way Intersection Density (number per km <sup>2</sup> )	61	36	
4-way Intersection Density (number per km <sup>2</sup> )	17	3	
Walkability Ratio	1.7	1.8	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	575	707	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	82%	78%	
Share of Residential Area Not Laid Out Before Occupation	0%	13%	
Share of Residential Area Laid Out Before Occupation	95%	86%	
Share of Residential Area in Informal Land Subdivisions	0%	0%	
Share of Residential Area in Formal Land Subdivisions	92%	80%	
Share of Residential Area in Housing Projects	7%	6%	



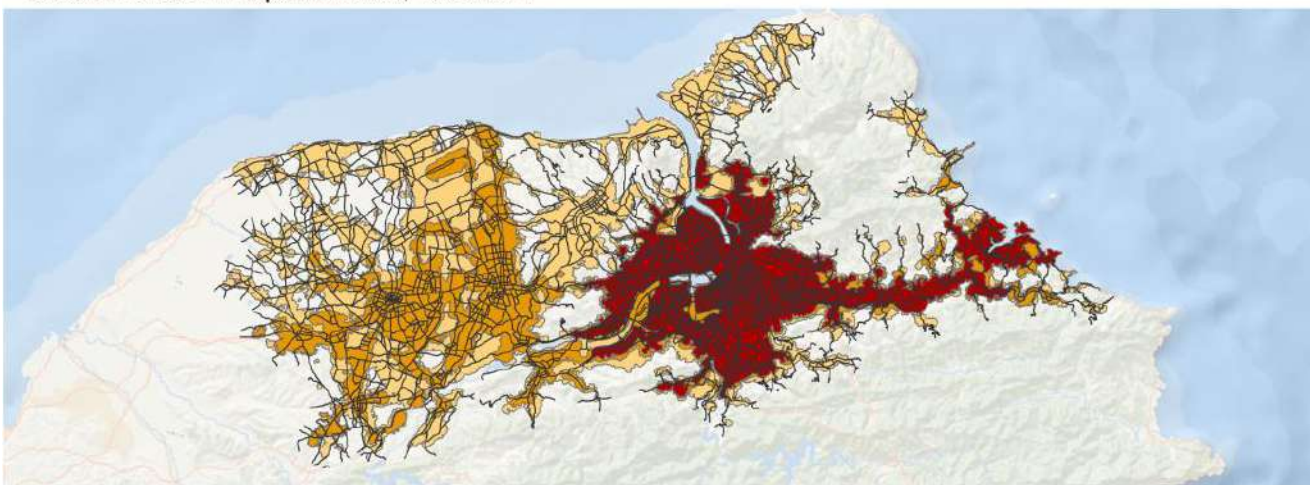
# Taipei, Taiwan, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



## Taipei, Taiwan, China 1990-2014



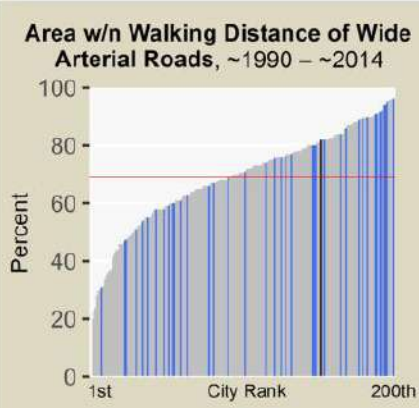
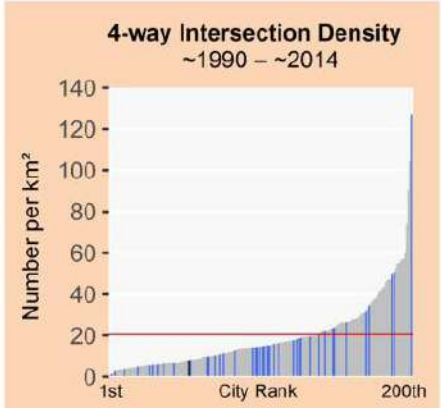
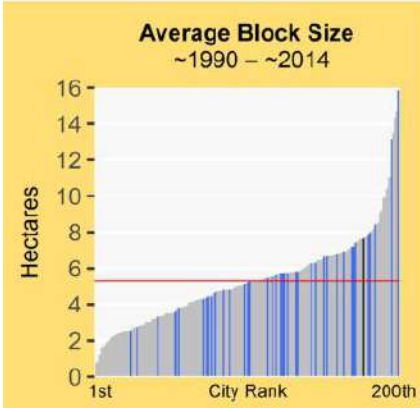
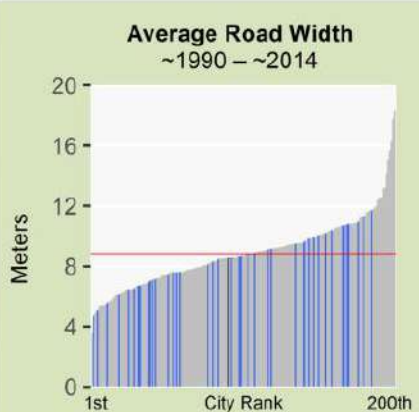
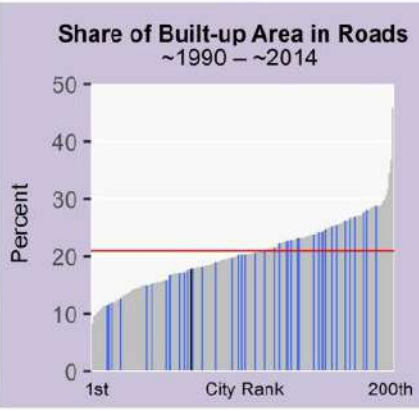
- Urban Extent in 1990
- Expansion, 1990 - 2001
- Expansion, 2001 - 2014

Arterial Roads

# Taipei, Taiwan, China (East Asia and the Pacific)



Legend for Charts			
	Taipei	Other cities in region	Global average
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	21%		17%
Share of Built-Up Area that is Gridded or Partially Gridded	0%		0%
Average Road Width (m)	8.5		5.3
Share of Roads less than 4m Wide	22%		44%
Share of Roads more than 16m Wide	11%		3%
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	4.6		3.1
Average Beeline Distance to Arterial Roads (m)	83		134
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	99%		97%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	95%		81%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	13%		3%
Average Block Size (ha)	2.9		7.7
3-way Intersection Density (number per km <sup>2</sup> )	135		96
4-way Intersection Density (number per km <sup>2</sup> )	24		8
Walkability Ratio	1.6		1.9
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	209		
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	47%		40%
Share of Residential Area Not Laid Out Before Occupation	22%		55%
Share of Residential Area Laid Out Before Occupation	77%		44%
Share of Residential Area in Informal Land Subdivisions	0%		0%
Share of Residential Area in Formal Land Subdivisions	70%		35%
Share of Residential Area in Housing Projects	6%		8%



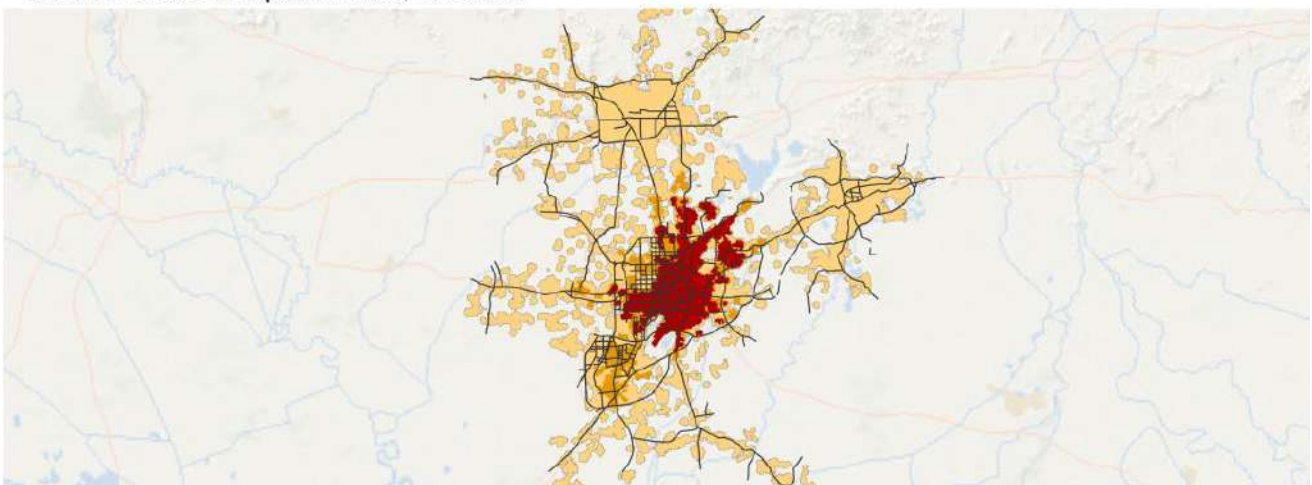
# Tangshan, Hebei, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013



## Tangshan, Hebei, China 1990-2013



- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2013

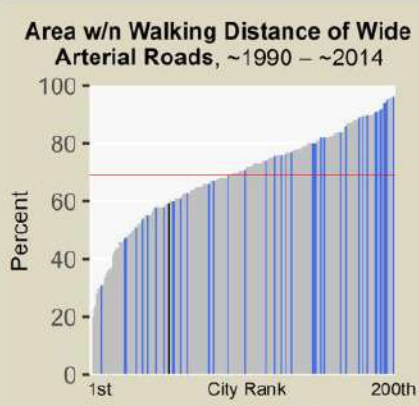
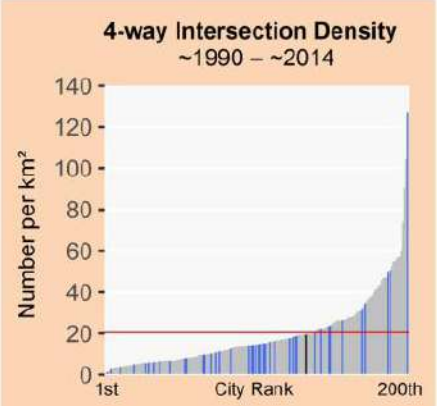
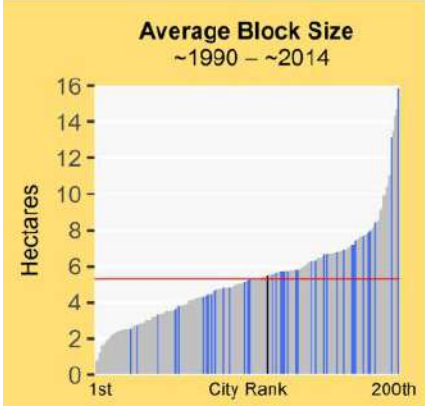
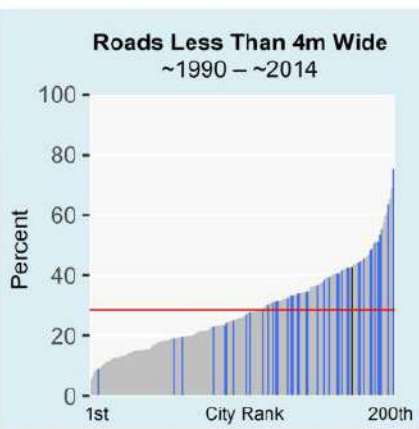
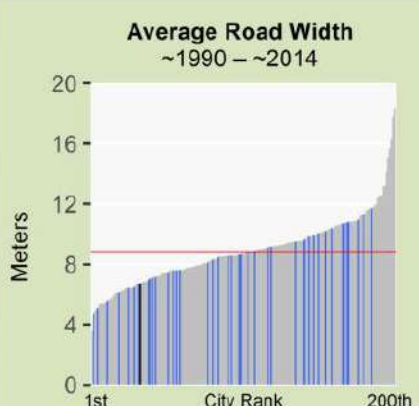
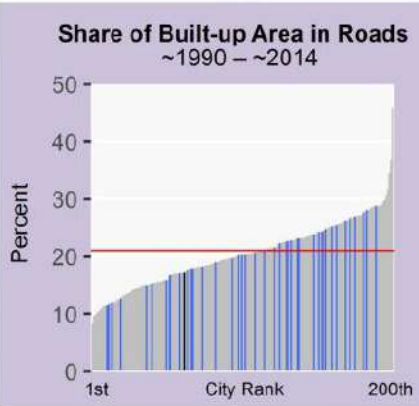
Arterial Roads



# Tangshan, Hebei, China (East Asia and the Pacific)



Legend for Charts			
	Tangshan	Other cities in region	Global average
<b>Metrics</b>			
	Pre-1990	1990-2013	
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	19%	17%	
Share of Built-Up Area that is Gridded or Partially Gridded	2%	0%	
Average Road Width (m)	6.7	5.7	
Share of Roads less than 4m Wide	33%	42%	
Share of Roads more than 16m Wide	6%	4%	
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	1.4	0.8	
Average Beeline Distance to Arterial Roads (m)	318	840	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	86%	62%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	84%	59%	
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	9%	8%	
Average Block Size (ha)	3.0	5.5	
3-way Intersection Density (number per km <sup>2</sup> )	204	151	
4-way Intersection Density (number per km <sup>2</sup> )	31	20	
Walkability Ratio	1.6	1.6	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		308	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		374	
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	51%	57%	
Share of Residential Area Not Laid Out Before Occupation	0%	11%	
Share of Residential Area Laid Out Before Occupation	99%	88%	
Share of Residential Area in Informal Land Subdivisions	42%	67%	
Share of Residential Area in Formal Land Subdivisions	44%	13%	
Share of Residential Area in Housing Projects	12%	7%	





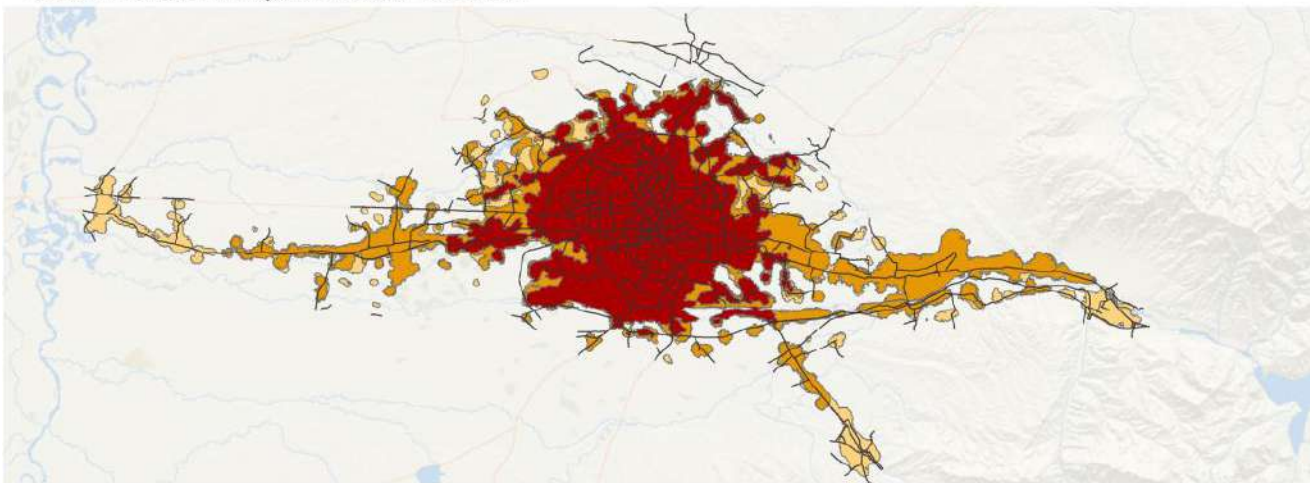
# Tashkent, Uzbekistan (South and Central Asia)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013



**Tashkent, Uzbekistan**  
1990-2013

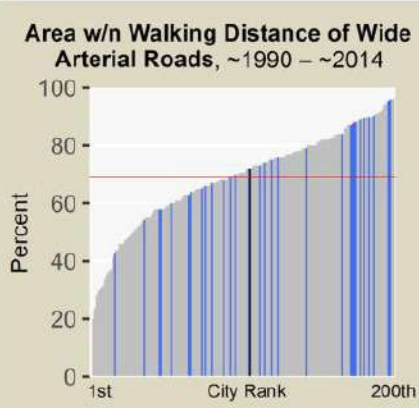
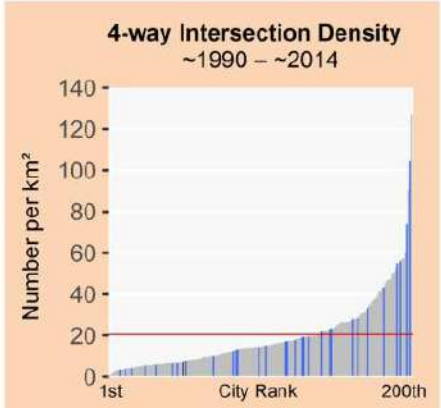
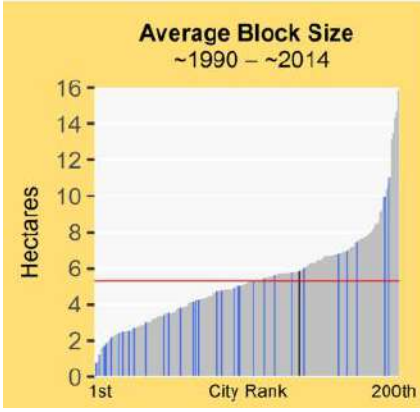
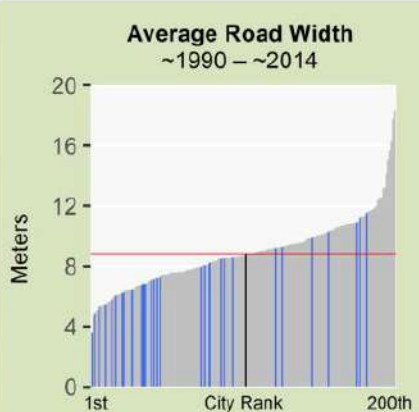
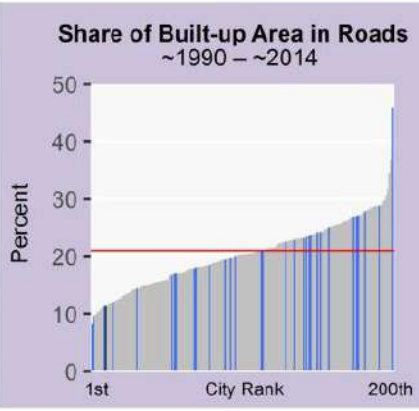
0 8 16 24 32 km

Urban Extent in 1990  
Expansion, 1990 - 1999  
Expansion, 1999 - 2013

Arterial Roads

# Tashkent, Uzbekistan (South and Central Asia)

Legend for Charts			
	Tashkent	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1990	1990-2013	
Roads			
Share of Built-Up Area Occupied by Roads	16%	11%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%	
Average Road Width (m)	8.8	5.6	
Share of Roads less than 4m Wide	12%	30%	
Share of Roads more than 16m Wide	10%	1%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	1.0	0.9	
Average Beeline Distance to Arterial Roads (m)	412	445	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	79%	76%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	77%	72%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	7%	11%	
Average Block Size (ha)	5.7	5.9	
3-way Intersection Density (number per km <sup>2</sup> )	61	46	
4-way Intersection Density (number per km <sup>2</sup> )	8	7	
Walkability Ratio	1.8	1.7	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	962	1104	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )			
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	72%	80%	
Share of Residential Area Not Laid Out Before Occupation	16%	8%	
Share of Residential Area Laid Out Before Occupation	83%	91%	
Share of Residential Area in Informal Land Subdivisions	37%	88%	
Share of Residential Area in Formal Land Subdivisions	37%	0%	
Share of Residential Area in Housing Projects	9%	3%	



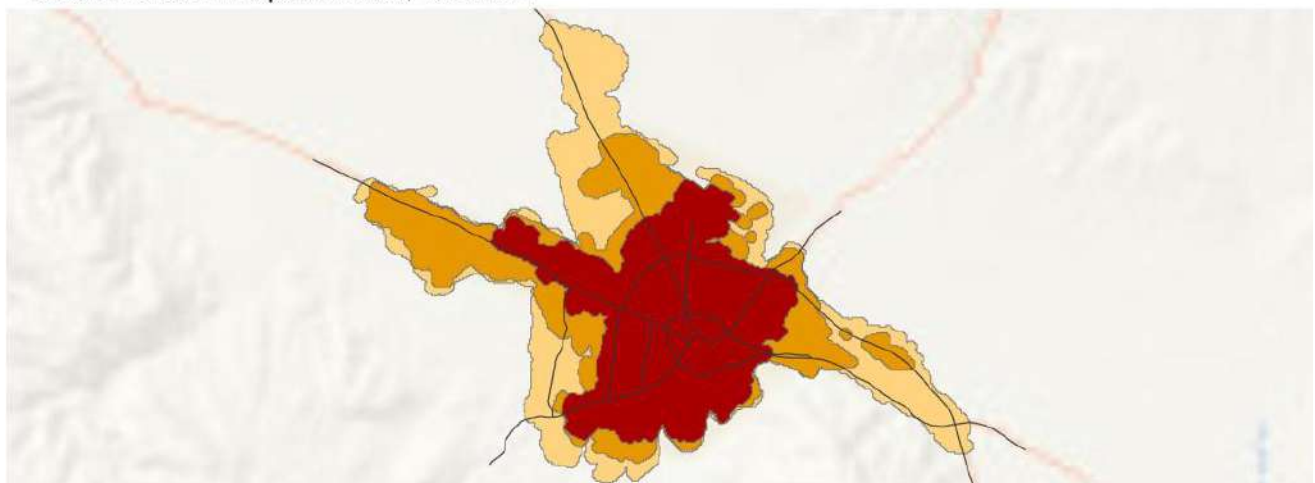
# Tebessa, Algeria (Western Asia and North Africa)



Selected Locales in Area Developed Before 1988



Selected Locales in Expansion Area, 1988-2014



## Tebessa, Algeria 1988-2014



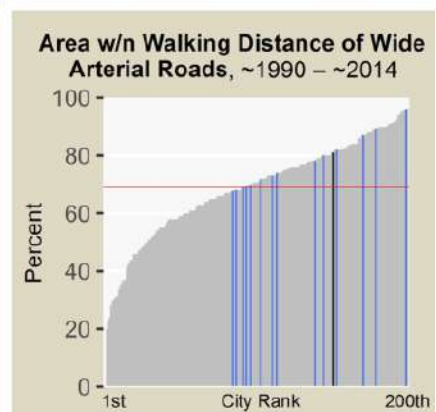
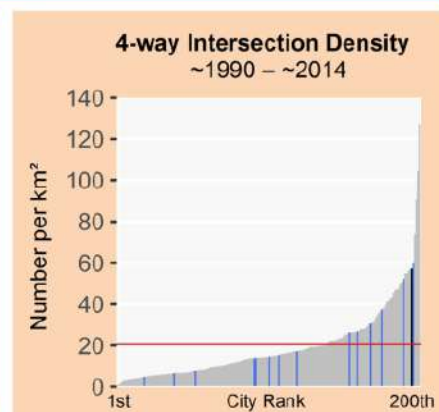
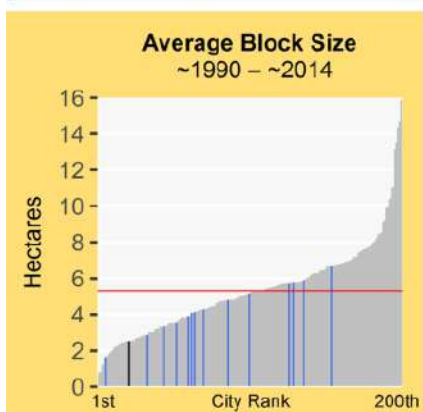
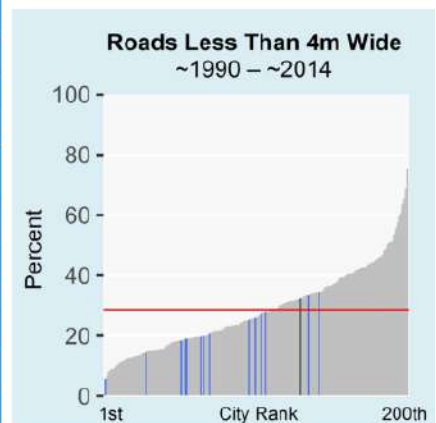
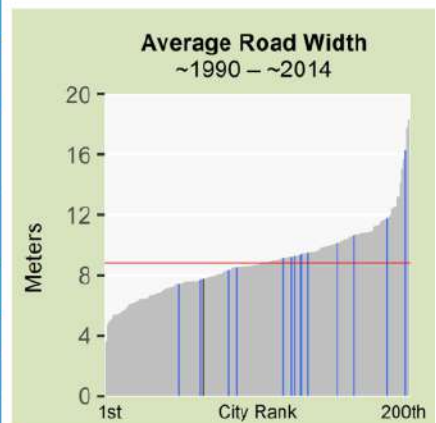
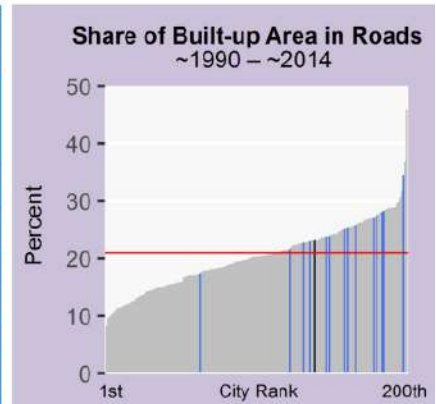
- Urban Extent in 1988
- Expansion, 1988 - 2001
- Expansion, 2001 - 2014

Arterial Roads

# Tebessa, Algeria (Western Asia and North Africa)



Legend for Charts		
	Tebessa	Other cities in region   All other cities   Global average
Metrics		
	Pre-1988	1988-2014
Roads		
Share of Built-Up Area Occupied by Roads	23%	23%
Share of Built-Up Area that is Gridded or Partially Gridded	2%	0%
Average Road Width (m)	7.8	6.2
Share of Roads less than 4m Wide	28%	32%
Share of Roads more than 16m Wide	10%	7%
Arterial Roads		
Density of Arterial Roads (km/km <sup>2</sup> )	1.7	1.2
Average Beeline Distance to Arterial Roads (m)	205	305
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	95%	85%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	86%	81%
Block Size, Plot Size, Intersection Density, and Walkability		
Share of Intersections that are 4-way	12%	13%
Average Block Size (ha)	1.4	2.5
3-way Intersection Density (number per km <sup>2</sup> )	250	283
4-way Intersection Density (number per km <sup>2</sup> )	44	57
Walkability Ratio	1.7	1.6
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	251	178
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	330	240
Stages in the Evolution of Residential Layouts		
Share of Built-Up Area in Residential Use	61%	61%
Share of Residential Area Not Laid Out Before Occupation	7%	19%
Share of Residential Area Laid Out Before Occupation	92%	80%
Share of Residential Area in Informal Land Subdivisions	44%	52%
Share of Residential Area in Formal Land Subdivisions	32%	1%
Share of Residential Area in Housing Projects	15%	26%



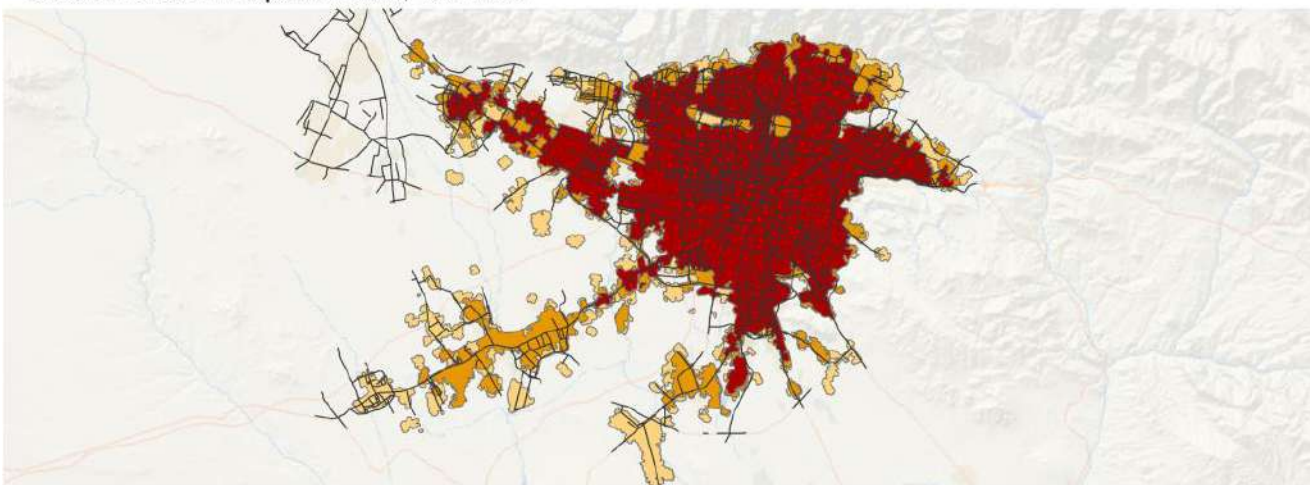
# Tehran, Iran (South and Central Asia)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2010



Tehran, Iran  
1991-2010

0 5 10 15 20 km

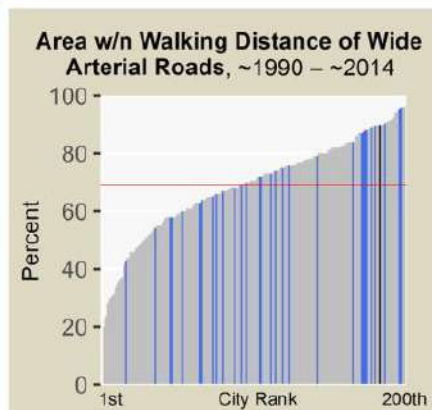
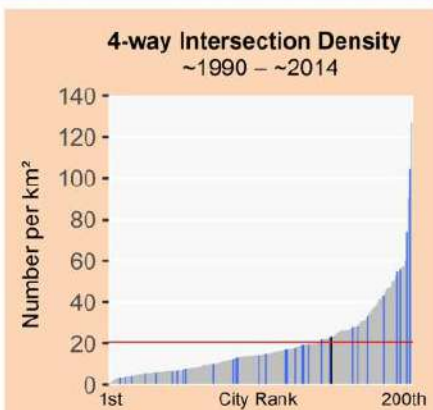
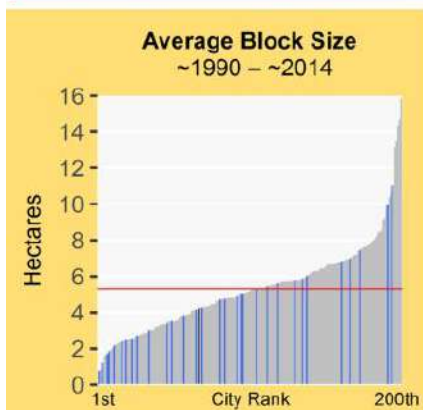
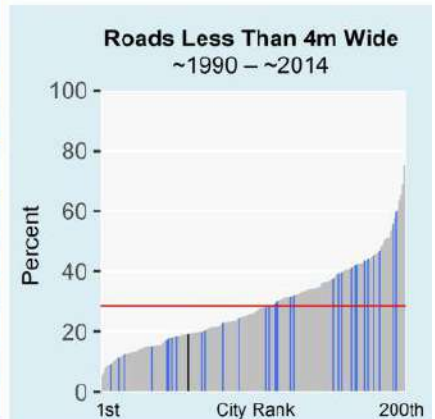
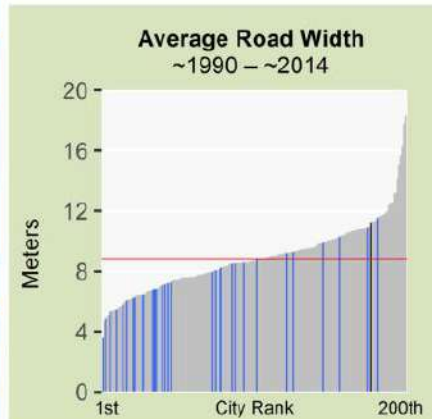
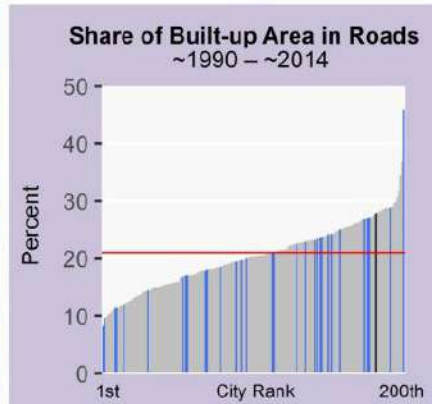
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- Urban Extent in 1991
- Expansion, 1991 - 2000
- Expansion, 2000 - 2010
- Arterial Roads

# Tehran, Iran (South and Central Asia)



Legend for Charts		
	Tehran	Other cities in region
	All other cities	Global average
Metrics		
	Pre-1991	1991-2010
Roads		
Share of Built-Up Area Occupied by Roads	22%	27%
Share of Built-Up Area that is Gridded or Partially Gridded	12%	0%
Average Road Width (m)	11.2	9.5
Share of Roads less than 4m Wide	15%	19%
Share of Roads more than 16m Wide	19%	14%
Arterial Roads		
Density of Arterial Roads (km/km <sup>2</sup> )	2.4	1.9
Average Beeline Distance to Arterial Roads (m)	176	255
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	96%	91%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	96%	90%
Block Size, Plot Size, Intersection Density, and Walkability		
Share of Intersections that are 4-way	16%	13%
Average Block Size (ha)	4.1	4.2
3-way Intersection Density (number per km <sup>2</sup> )	81	162
4-way Intersection Density (number per km <sup>2</sup> )	28	24
Walkability Ratio	1.5	2.1
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	258	
Stages in the Evolution of Residential Layouts		
Share of Built-Up Area in Residential Use	70%	63%
Share of Residential Area Not Laid Out Before Occupation	19%	24%
Share of Residential Area Laid Out Before Occupation	65%	75%
Share of Residential Area in Informal Land Subdivisions	0%	18%
Share of Residential Area in Formal Land Subdivisions	73%	40%
Share of Residential Area in Housing Projects	6%	16%



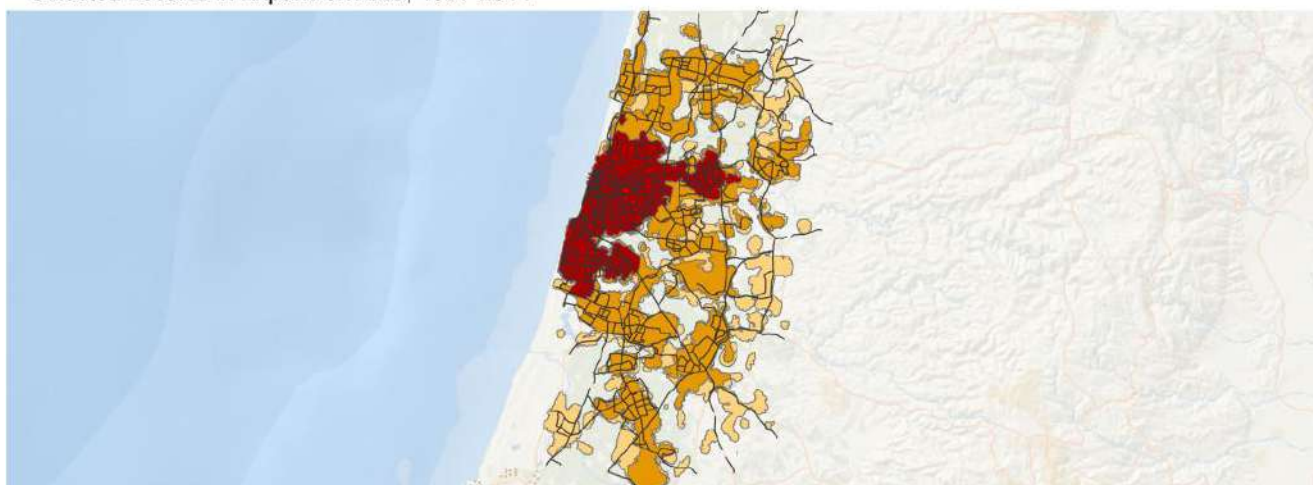
# Tel Aviv, Israel (Western Asia and North Africa)



Selected Locales in Area Developed Before 1987



Selected Locales in Expansion Area, 1987-2014



## Tel Aviv, Israel 1987-2014



- Urban Extent in 1987
- Expansion, 1987 - 2000
- Expansion, 2000 - 2014

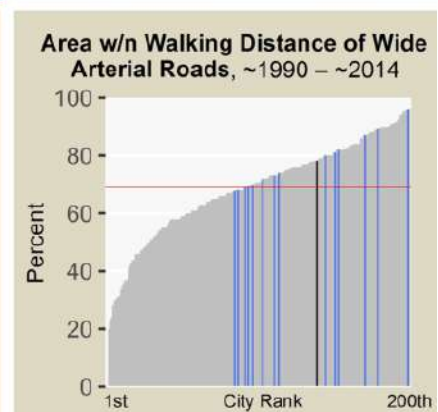
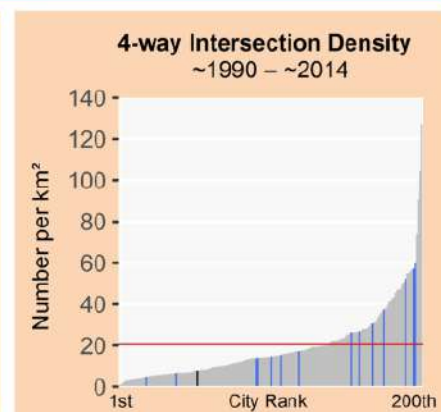
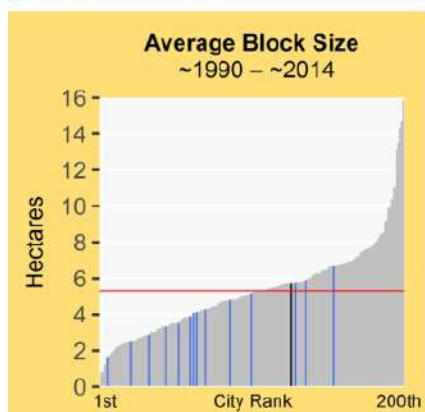
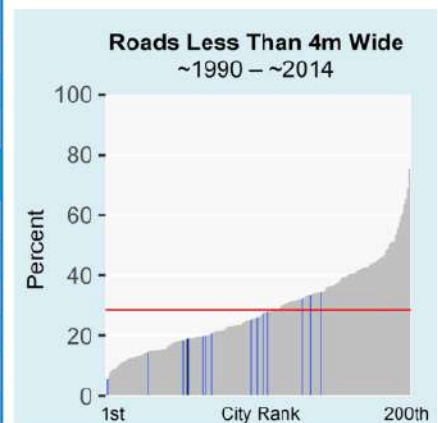
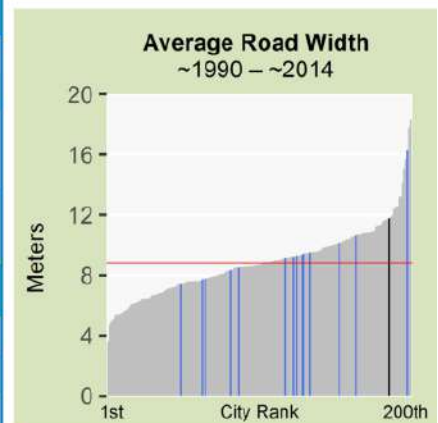
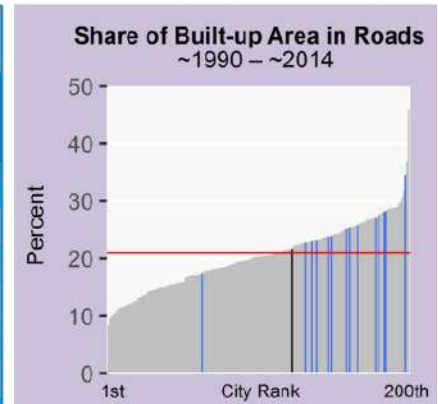
Arterial Roads



# Tel Aviv, Israel (Western Asia and North Africa)



Legend for Charts			
	Tel Aviv	Other cities in region	All other cities
<b>Legend for Charts</b>			
	Tel Aviv	Other cities in region	All other cities
			Global average
Metrics	Pre-1987	1987-2014	
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	23%	21%	
Share of Built-Up Area that is Gridded or Partially Gridded	1%	0%	
Average Road Width (m)	11.8	9.4	
Share of Roads less than 4m Wide	6%	19%	
Share of Roads more than 16m Wide	18%	13%	
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	2.0	1.1	
Average Beeline Distance to Arterial Roads (m)	178	376	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	96%	80%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	96%	78%	
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	21%	9%	
Average Block Size (ha)	4.0	5.7	
3-way Intersection Density (number per km <sup>2</sup> )	76	65	
4-way Intersection Density (number per km <sup>2</sup> )	110	8	
Walkability Ratio	1.6	2.1	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		554	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	487	772	
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	70%	71%	
Share of Residential Area Not Laid Out Before Occupation	14%	17%	
Share of Residential Area Laid Out Before Occupation	71%	82%	
Share of Residential Area in Informal Land Subdivisions	1%	16%	
Share of Residential Area in Formal Land Subdivisions	72%	59%	
Share of Residential Area in Housing Projects	11%	6%	



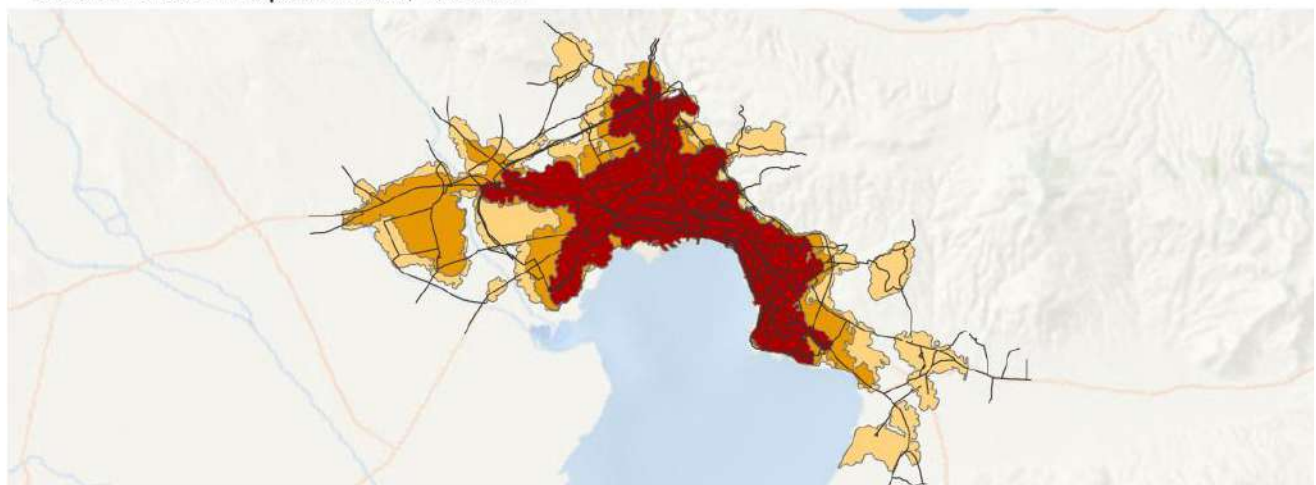
# Thessaloniki, Greece (Europe and Japan)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2011



## Thessaloniki, Greece 1990-2011



- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2011

Arterial Roads

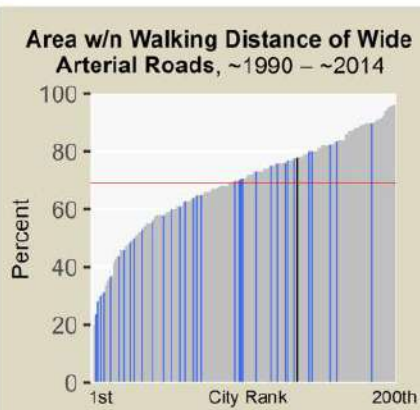
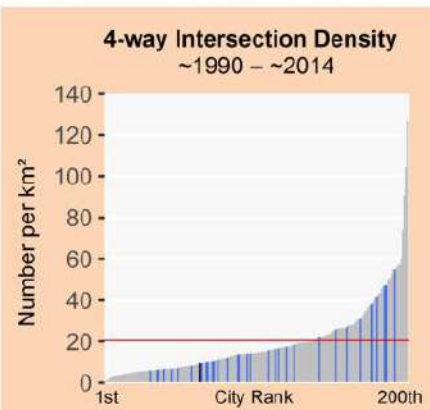
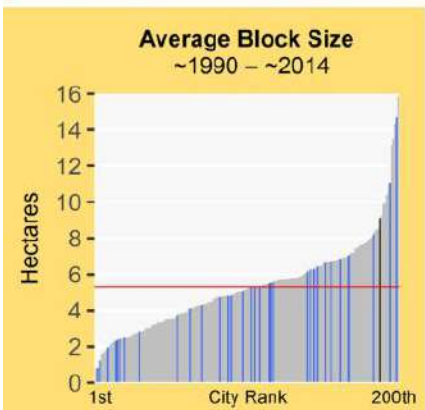
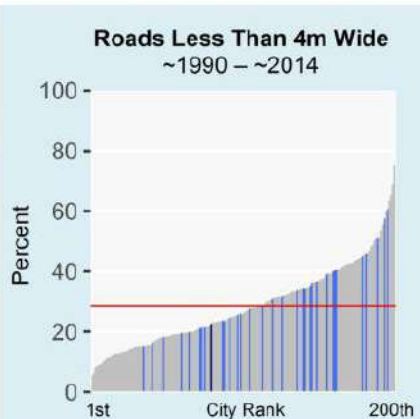
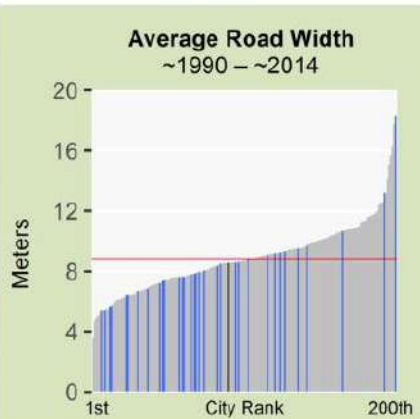
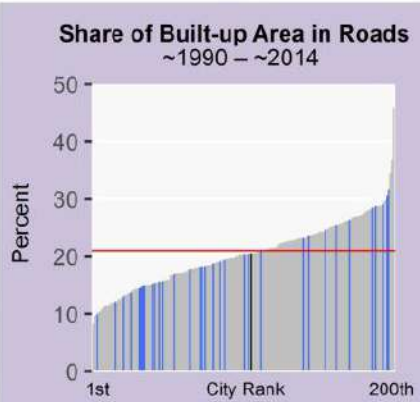
# Thessaloniki, Greece (Europe and Japan)



**Legend for Charts**

Thessaloniki | Other cities in region | All other cities | Global average —

Metrics	Pre-1990	1990-2011
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	22%	20%
Share of Built-Up Area that is Gridded or Partially Gridded	7%	0%
Average Road Width (m)	8.5	7.0
Share of Roads less than 4m Wide	21%	22%
Share of Roads more than 16m Wide	9%	8%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.9	2.1
Average Beeline Distance to Arterial Roads (m)	138	198
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	98%	94%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	89%	78%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	22%	9%
Average Block Size (ha)	5.1	9.1
3-way Intersection Density (number per km <sup>2</sup> )	159	84
4-way Intersection Density (number per km <sup>2</sup> )	46	9
Walkability Ratio	1.7	2.3
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	60%	57%
Share of Residential Area Not Laid Out Before Occupation	5%	9%
Share of Residential Area Laid Out Before Occupation	94%	90%
Share of Residential Area in Informal Land Subdivisions	1%	30%
Share of Residential Area in Formal Land Subdivisions	91%	53%
Share of Residential Area in Housing Projects	2%	6%



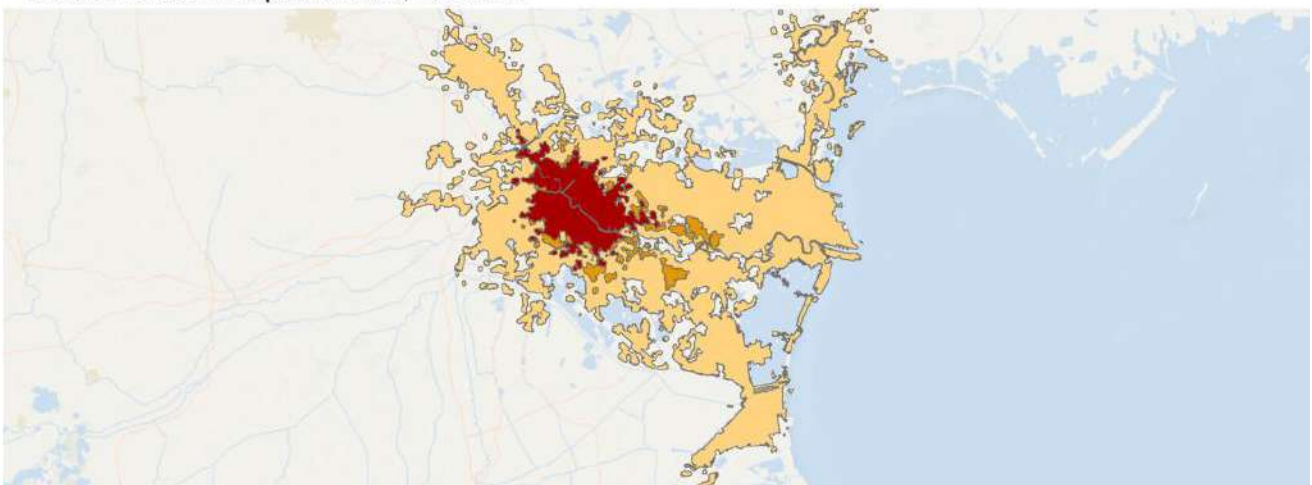
# Tianjin, Tianjin, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013



## Tianjin, Tianjin, China 1990-2013



- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2013

Arterial Roads

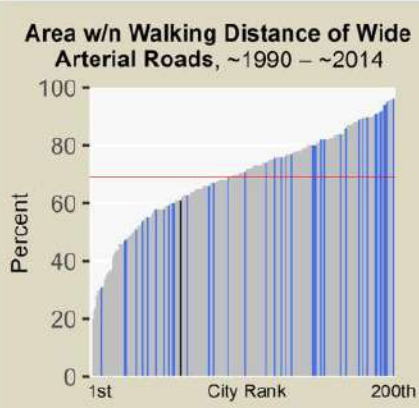
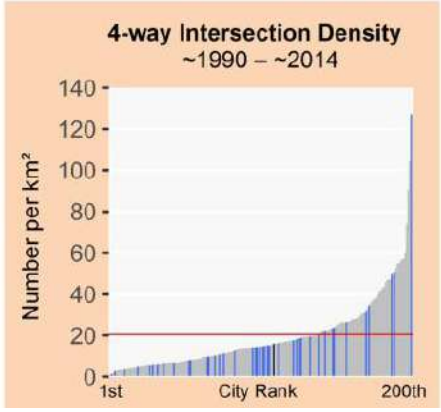
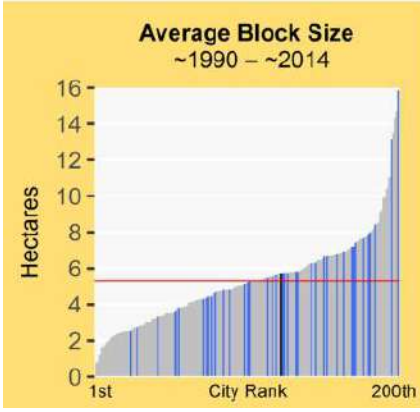
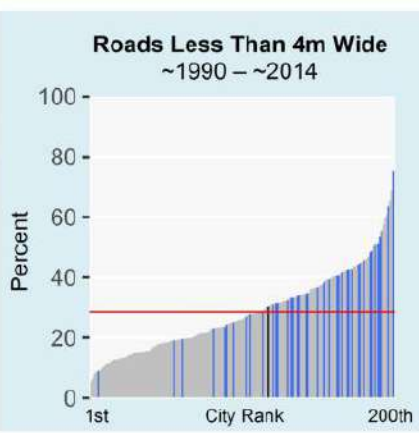
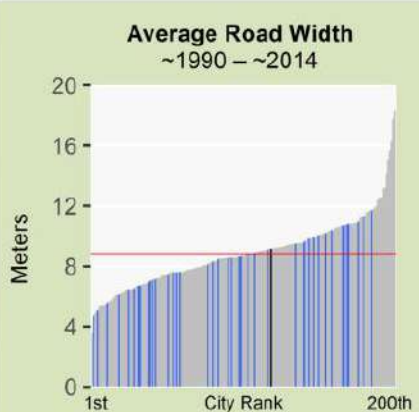
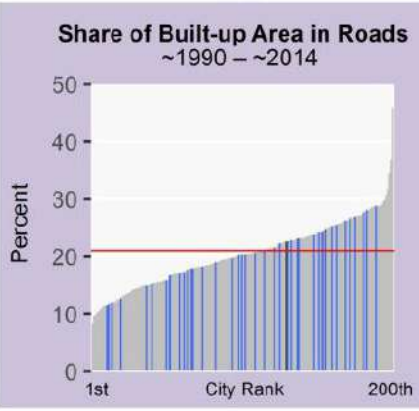
# Tianjin, Tianjin, China (East Asia and the Pacific)



**Legend for Charts**

Tianjin | Other cities in region | All other cities | Global average

Metrics	Pre-1990	1990-2013
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	21%	22%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	9.2	8.4
Share of Roads less than 4m Wide	24%	30%
Share of Roads more than 16m Wide	11%	13%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.3	0.8
Average Beeline Distance to Arterial Roads (m)	173	522
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	97%	69%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	96%	61%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	12%	13%
Average Block Size (ha)	3.0	5.7
3-way Intersection Density (number per km <sup>2</sup> )	119	100
4-way Intersection Density (number per km <sup>2</sup> )	18	16
Walkability Ratio	1.9	1.9
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	42%	45%
Share of Residential Area Not Laid Out Before Occupation	3%	4%
Share of Residential Area Laid Out Before Occupation	96%	95%
Share of Residential Area in Informal Land Subdivisions	8%	25%
Share of Residential Area in Formal Land Subdivisions	16%	19%
Share of Residential Area in Housing Projects	71%	50%



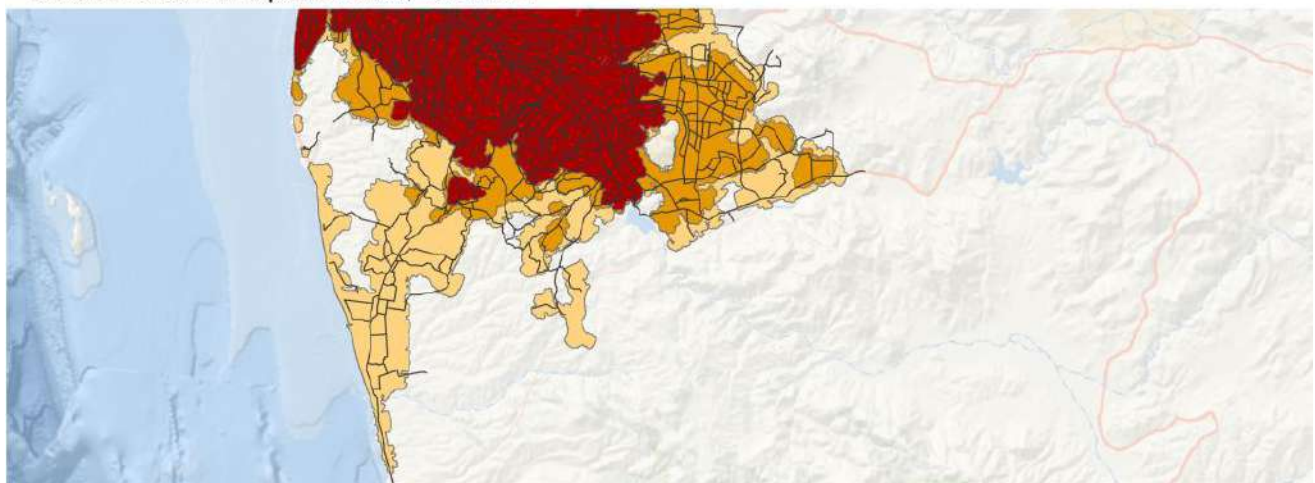
# Tijuana, Mexico (Latin America and the Caribbean)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2014



## Tijuana, Mexico 1989-2014



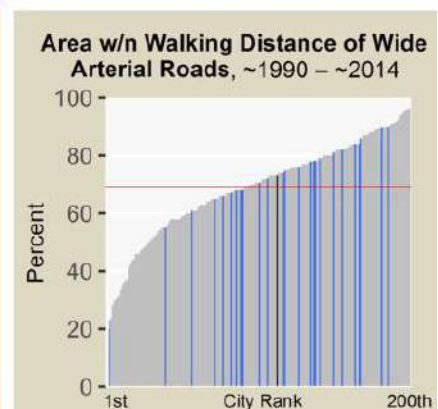
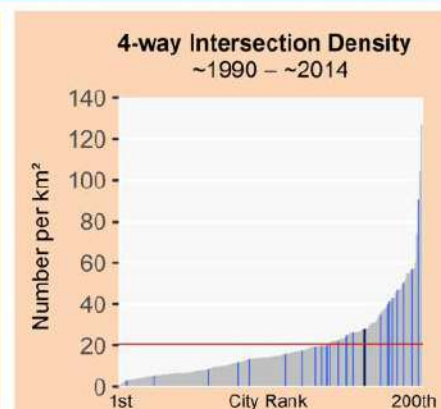
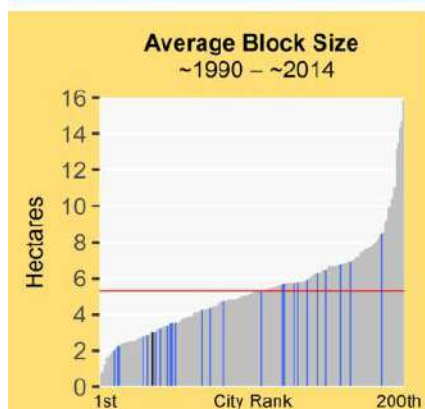
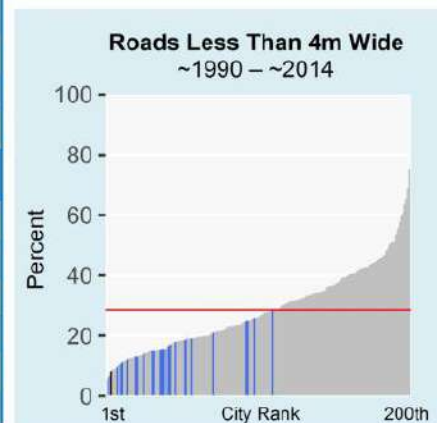
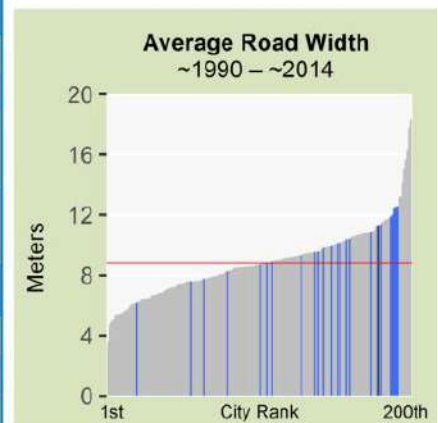
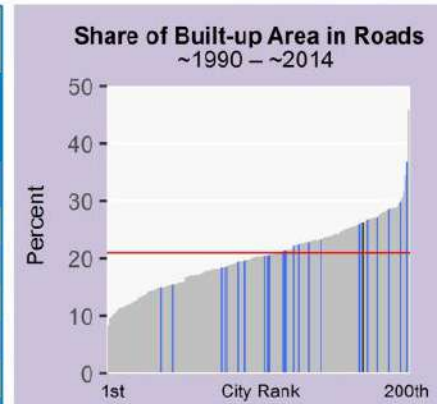
- Urban Extent in 1989
- Expansion, 1989 - 2000
- Expansion, 2000 - 2014

Arterial Roads

# Tijuana, Mexico (Latin America and the Caribbean)



Legend for Charts		
	Tijuana	Other cities in region   All other cities   Global average
Metrics	Pre-1989	1989-2014
Roads		
Share of Built-Up Area Occupied by Roads	23%	26%
Share of Built-Up Area that is Gridded or Partially Gridded	15%	12%
Average Road Width (m)	11.3	9.3
Share of Roads less than 4m Wide	7%	8%
Share of Roads more than 16m Wide	17%	7%
Arterial Roads		
Density of Arterial Roads (km/km <sup>2</sup> )	1.9	1.6
Average Beeline Distance to Arterial Roads (m)	172	233
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	98%	93%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	81%	73%
Block Size, Plot Size, Intersection Density, and Walkability		
Share of Intersections that are 4-way	17%	21%
Average Block Size (ha)	3.5	3.0
3-way Intersection Density (number per km <sup>2</sup> )	83	111
4-way Intersection Density (number per km <sup>2</sup> )	17	28
Walkability Ratio	1.7	1.8
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	315	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	259	155
Stages in the Evolution of Residential Layouts		
Share of Built-Up Area in Residential Use	70%	77%
Share of Residential Area Not Laid Out Before Occupation	5%	6%
Share of Residential Area Laid Out Before Occupation	94%	93%
Share of Residential Area in Informal Land Subdivisions	9%	49%
Share of Residential Area in Formal Land Subdivisions	84%	27%
Share of Residential Area in Housing Projects	0%	15%



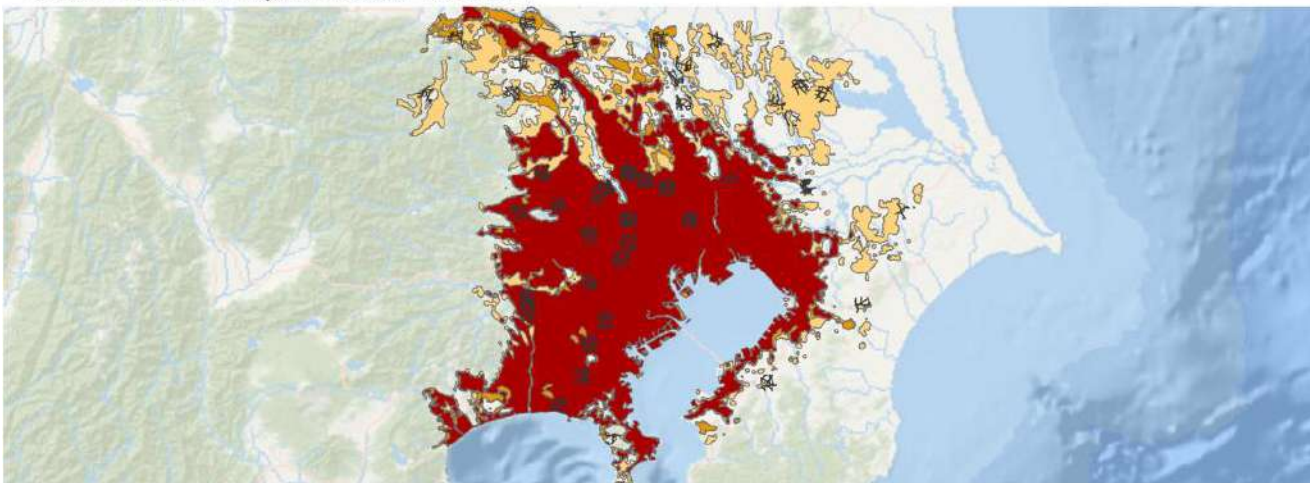
# Tokyo, Japan (Europe and Japan)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



**Tokyo, Japan**  
1990-2014

0 20 40 60 80 km

N

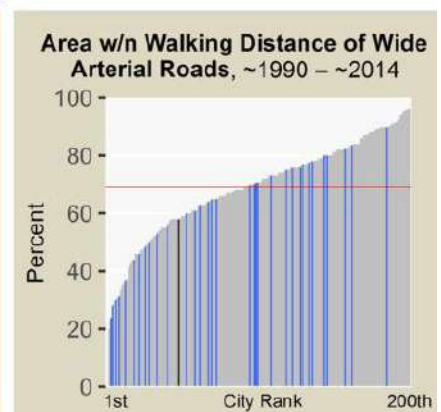
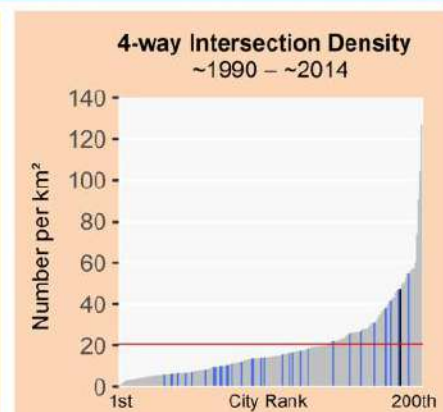
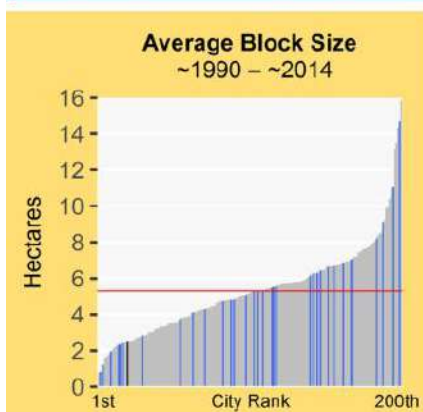
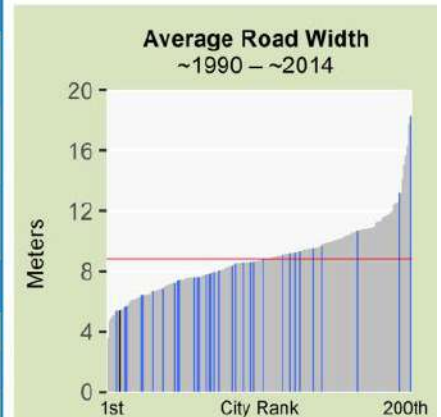
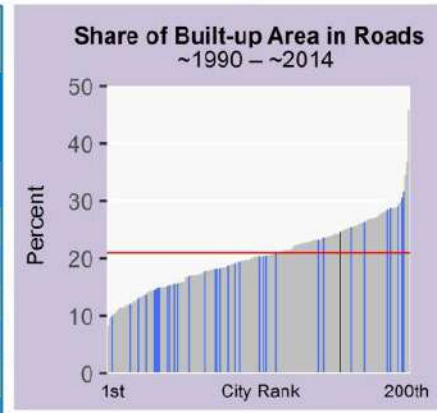
- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2014
- Arterial Roads



# Tokyo, Japan (Europe and Japan)



Legend for Charts		
	Tokyo	Other cities in region   All other cities   Global average
Metrics	Pre-1990	1990-2014
Roads		
Share of Built-Up Area Occupied by Roads	37%	24%
Share of Built-Up Area that is Gridded or Partially Gridded	15%	2%
Average Road Width (m)	5.4	5.0
Share of Roads less than 4m Wide	45%	51%
Share of Roads more than 16m Wide	2%	2%
Arterial Roads		
Density of Arterial Roads (km/km <sup>2</sup> )	2.8	1.7
Average Beeline Distance to Arterial Roads (m)	129	198
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	99%	93%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	84%	57%
Block Size, Plot Size, Intersection Density, and Walkability		
Share of Intersections that are 4-way	18%	15%
Average Block Size (ha)	1.6	2.5
3-way Intersection Density (number per km <sup>2</sup> )	169	194
4-way Intersection Density (number per km <sup>2</sup> )	41	47
Walkability Ratio	1.5	1.4
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	350	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	200	230
Stages in the Evolution of Residential Layouts		
Share of Built-Up Area in Residential Use	62%	55%
Share of Residential Area Not Laid Out Before Occupation	47%	46%
Share of Residential Area Laid Out Before Occupation	48%	53%
Share of Residential Area in Informal Land Subdivisions	0%	1%
Share of Residential Area in Formal Land Subdivisions	49%	49%
Share of Residential Area in Housing Projects	3%	2%



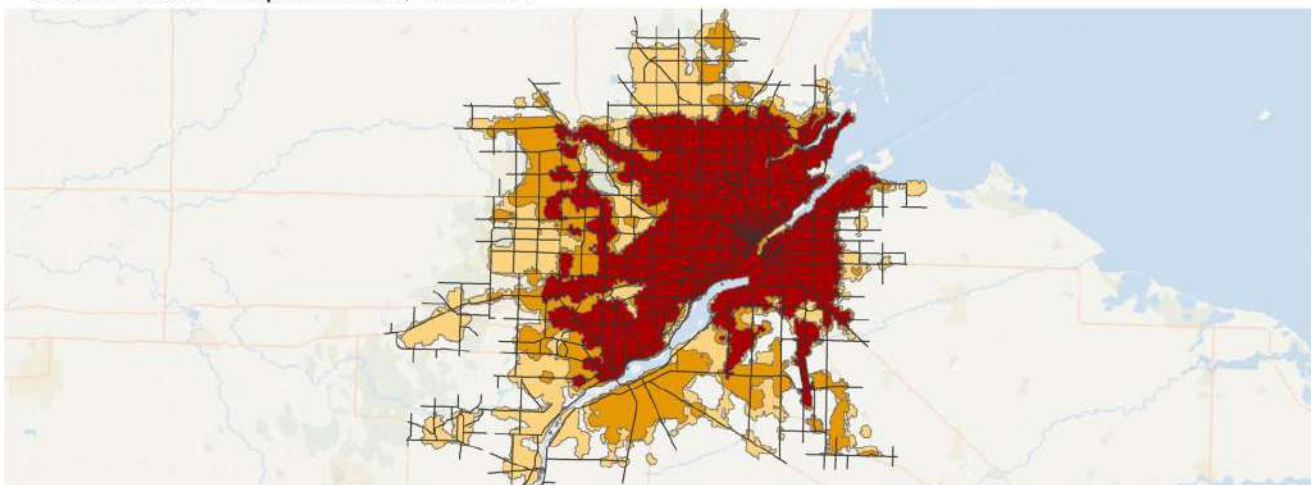
# Toledo, United States (Land-Rich Developed Countries)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



**Toledo, United States**  
1990-2014

0 5 10 15 20 km

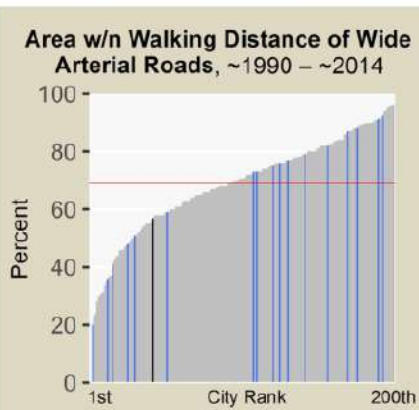
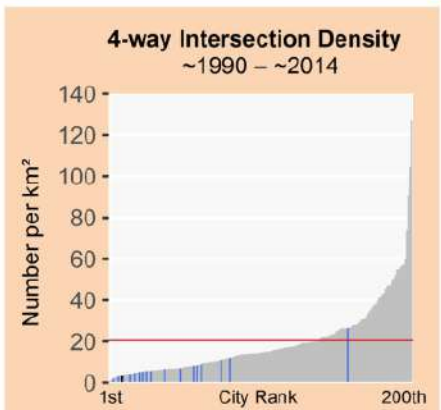
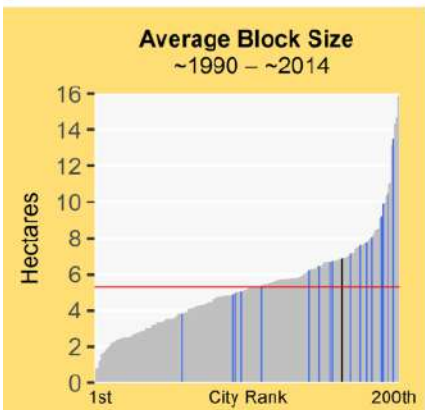
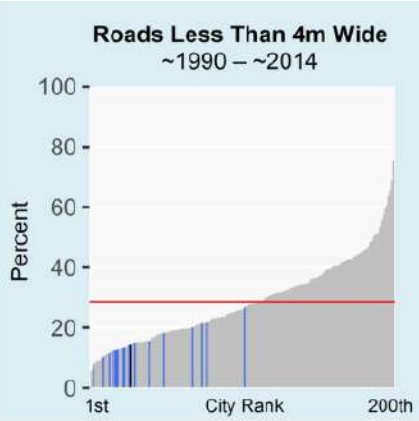
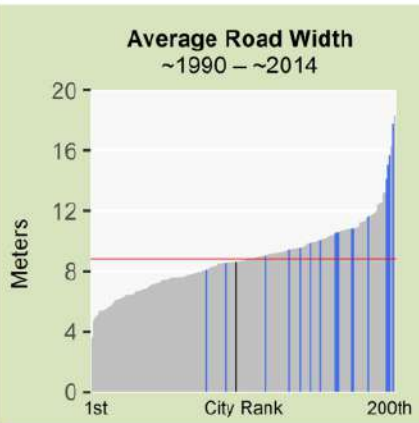
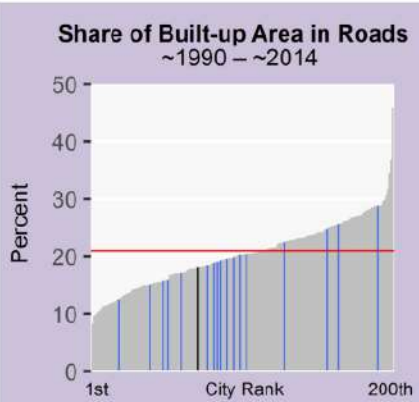
N

- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2014
- Arterial Roads

# Toledo, United States (Land-Rich Developed Countries)



Legend for Charts			
	Toledo	Other cities in region	All other cities
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	20%		18%
Share of Built-Up Area that is Gridded or Partially Gridded	2%		0%
Average Road Width (m)	8.6		9.3
Share of Roads less than 4m Wide	24%		14%
Share of Roads more than 16m Wide	17%		21%
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	1.4		1.2
Average Beeline Distance to Arterial Roads (m)	258		340
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	91%		84%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	74%		56%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	17%		4%
Average Block Size (ha)	2.4		6.9
3-way Intersection Density (number per km <sup>2</sup> )	126		75
4-way Intersection Density (number per km <sup>2</sup> )	25		3
Walkability Ratio	1.7		1.6
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	625		1238
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	71%		79%
Share of Residential Area Not Laid Out Before Occupation	1%		33%
Share of Residential Area Laid Out Before Occupation	98%		66%
Share of Residential Area in Informal Land Subdivisions	0%		0%
Share of Residential Area in Formal Land Subdivisions	88%		58%
Share of Residential Area in Housing Projects	9%		8%



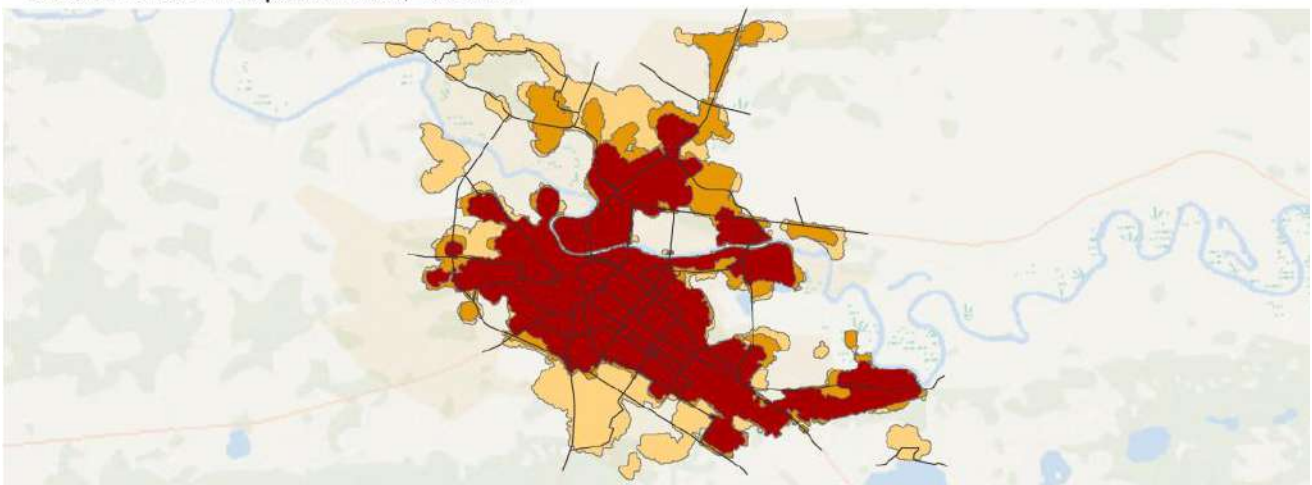
# Tyumen, Russia (Europe and Japan)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2011



**Tyumen, Russia**  
1990-2011

0 5 10 15 km

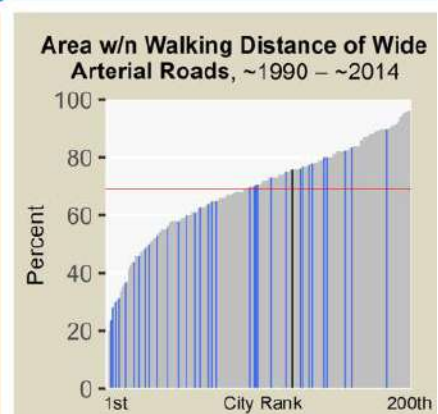
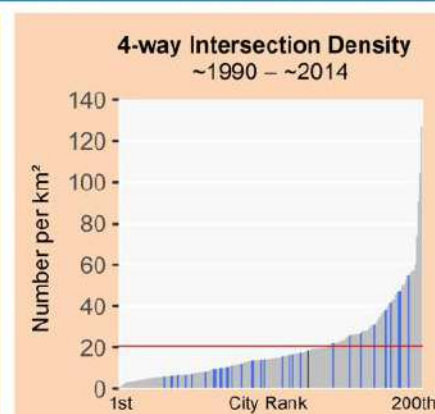
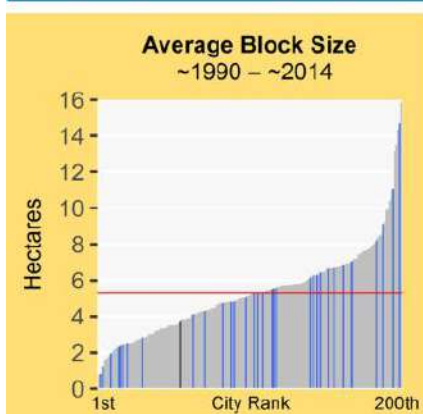
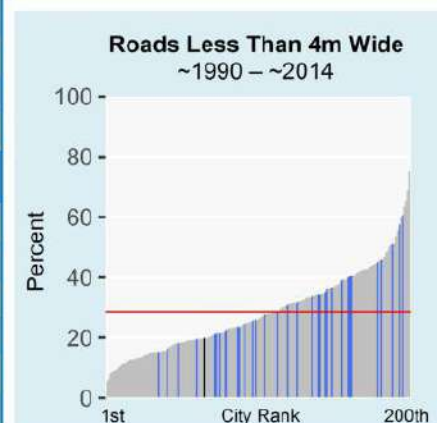
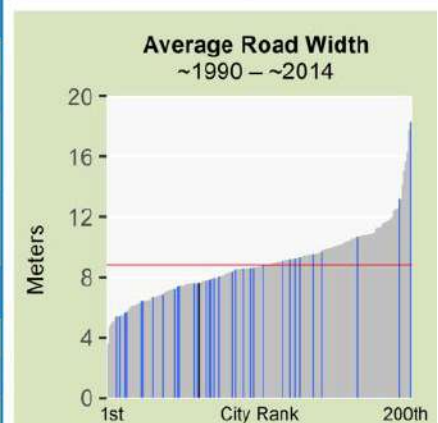
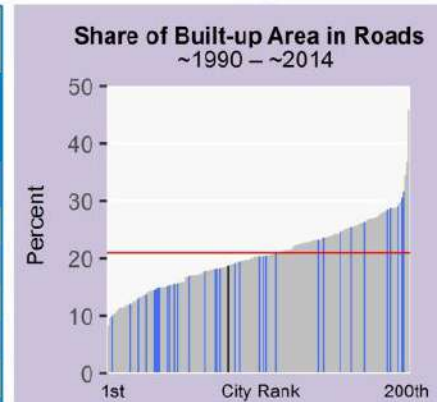
N

- Urban Extent in 1990
- Expansion, 1990 - 1999
- Expansion, 1999 - 2011
- Arterial Roads

# Tyumen, Russia (Europe and Japan)



Legend for Charts			
	Tyumen	Other cities in region	All other cities
			Global average —
Metrics	Pre-1990	1990-2011	
Roads			
Share of Built-Up Area Occupied by Roads	20%	18%	
Share of Built-Up Area that is Gridded or Partially Gridded	10%	2%	
Average Road Width (m)	7.7	6.7	
Share of Roads less than 4m Wide	17%	19%	
Share of Roads more than 16m Wide	7%	5%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	1.3	1.1	
Average Beeline Distance to Arterial Roads (m)	312	392	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	85%	79%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	84%	75%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	9%	16%	
Average Block Size (ha)	5.2	3.8	
3-way Intersection Density (number per km <sup>2</sup> )	109	126	
4-way Intersection Density (number per km <sup>2</sup> )	13	18	
Walkability Ratio	1.8	1.7	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	471	900	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	1104	1185	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	47%	84%	
Share of Residential Area Not Laid Out Before Occupation	14%	0%	
Share of Residential Area Laid Out Before Occupation	85%	99%	
Share of Residential Area in Informal Land Subdivisions	38%	85%	
Share of Residential Area in Formal Land Subdivisions	19%	10%	
Share of Residential Area in Housing Projects	26%	2%	



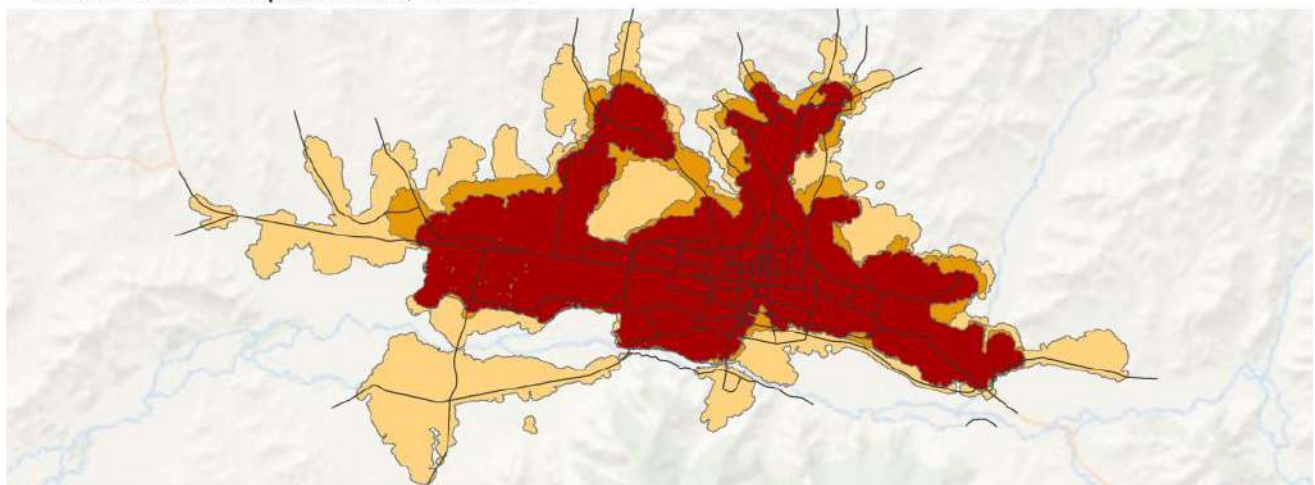
# Ulaanbaatar, Mongolia (East Asia and the Pacific)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



## Ulaanbaatar, Mongolia 1990-2014



- Urban Extent in 1990
- Expansion, 1990 - 2001
- Expansion, 2001 - 2014

Arterial Roads

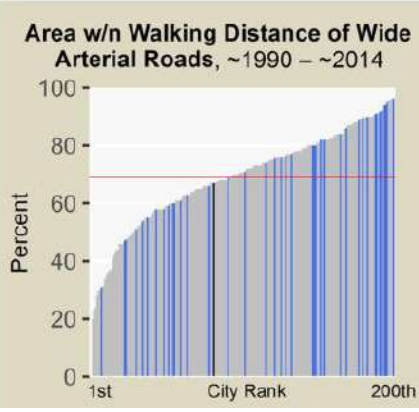
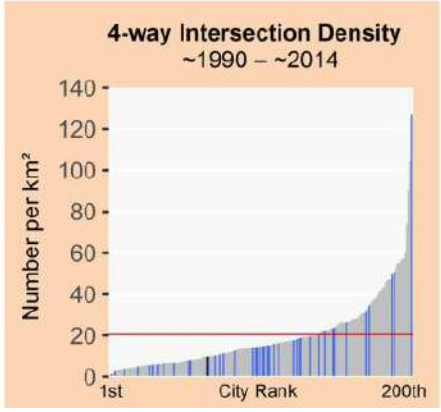
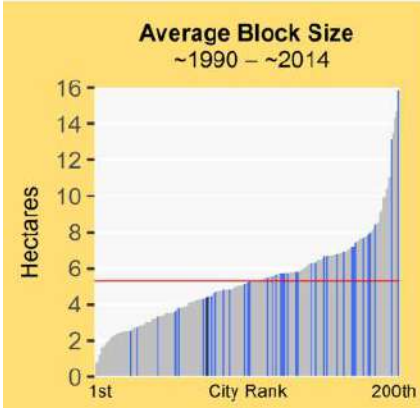
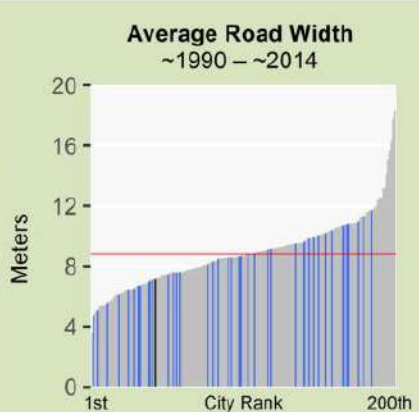
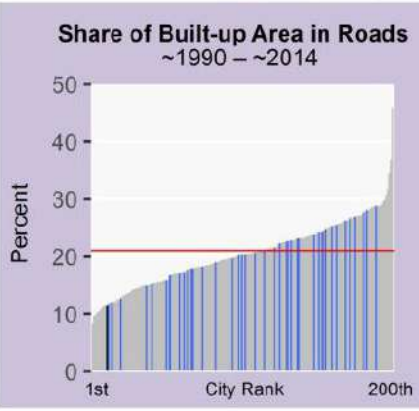
# Ulaanbaatar, Mongolia (East Asia and the Pacific)



**Legend for Charts**

Ulaanbaatar | Other cities in region | All other cities | Global average —

Metrics	Pre-1990	1990-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	15%	11%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	7.1	4.2
Share of Roads less than 4m Wide	24%	51%
Share of Roads more than 16m Wide	7%	0%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.6	1.2
Average Beeline Distance to Arterial Roads (m)	272	394
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	89%	78%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	81%	67%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	2%	7%
Average Block Size (ha)	5.6	4.4
3-way Intersection Density (number per km <sup>2</sup> )	85	91
4-way Intersection Density (number per km <sup>2</sup> )	4	10
Walkability Ratio	1.8	1.7
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	643	629
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	66%	85%
Share of Residential Area Not Laid Out Before Occupation	23%	25%
Share of Residential Area Laid Out Before Occupation	76%	74%
Share of Residential Area in Informal Land Subdivisions	64%	71%
Share of Residential Area in Formal Land Subdivisions	5%	0%
Share of Residential Area in Housing Projects	6%	3%



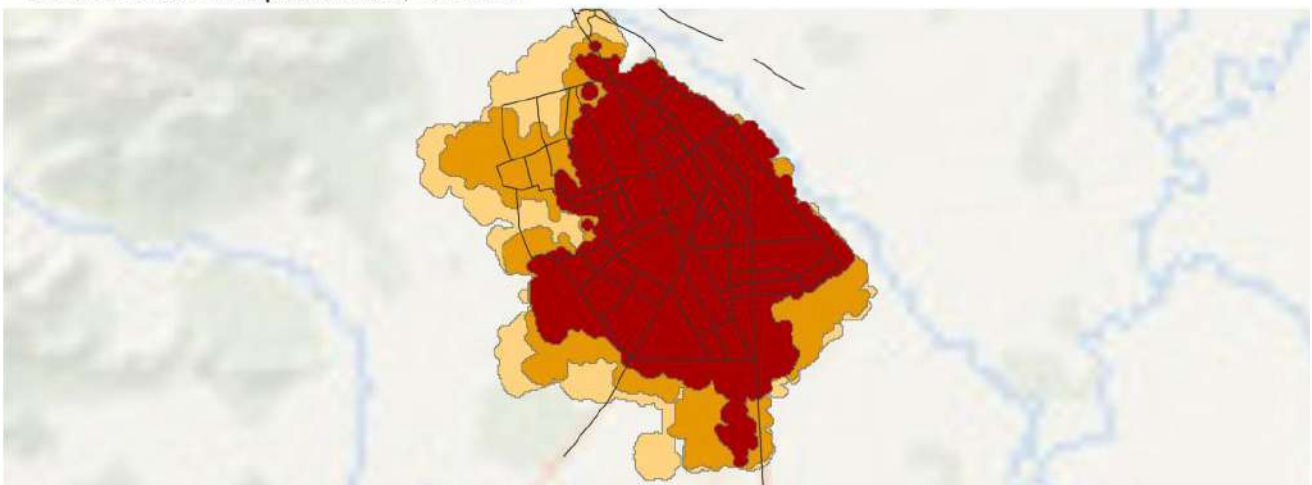
# Valledupar, Colombia (Latin America and the Caribbean)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2011



**Valledupar, Colombia**  
1989-2011

0 2 4 6 km

N

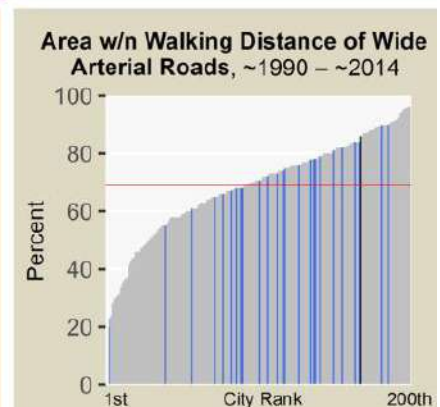
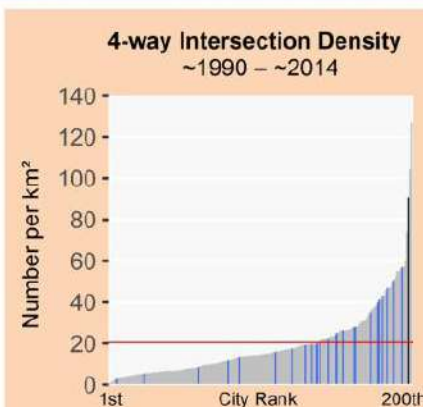
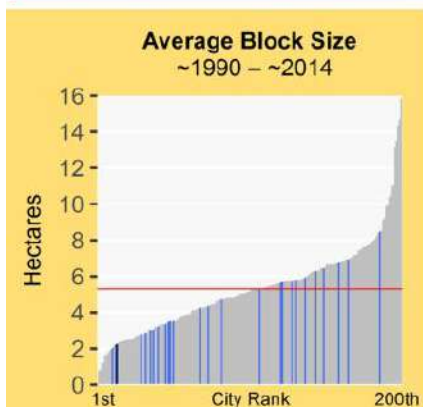
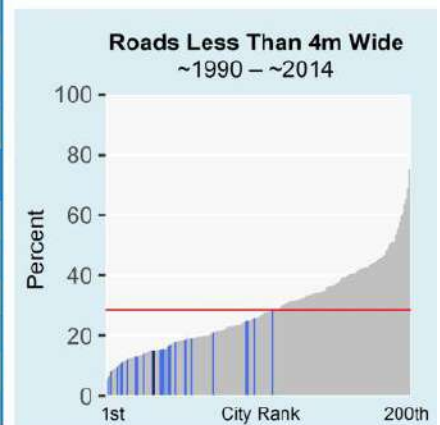
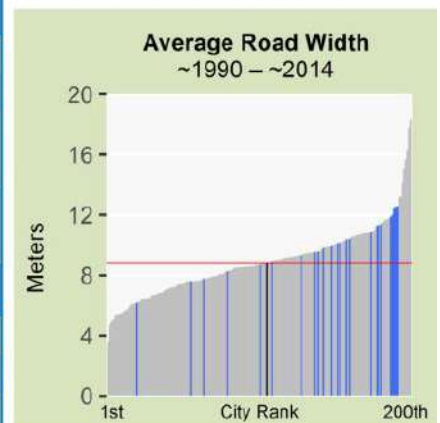
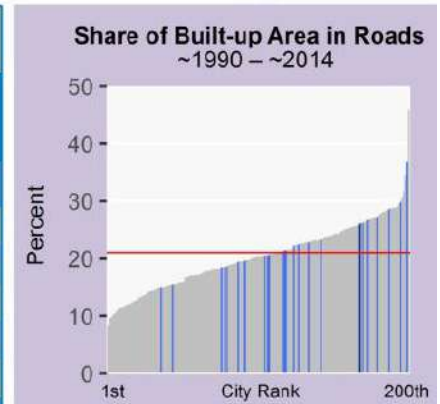
- Urban Extent in 1989
- Expansion, 1989 - 2001
- Expansion, 2001 - 2011
- Arterial Roads



# Valledupar, Colombia (Latin America and the Caribbean)



Legend for Charts			
	Valledupar	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1989	1989-2011	
Roads			
Share of Built-Up Area Occupied by Roads	21%	26%	
Share of Built-Up Area that is Gridded or Partially Gridded	67%	30%	
Average Road Width (m)	8.9	6.9	
Share of Roads less than 4m Wide	7%	14%	
Share of Roads more than 16m Wide	9%	1%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	3.3	2.4	
Average Beeline Distance to Arterial Roads (m)	107	209	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	99%	90%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	97%	86%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	38%	33%	
Average Block Size (ha)	1.3	2.2	
3-way Intersection Density (number per km <sup>2</sup> )	119	183	
4-way Intersection Density (number per km <sup>2</sup> )	68	91	
Walkability Ratio	1.4	1.7	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		90	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )			
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	73%	89%	
Share of Residential Area Not Laid Out Before Occupation	0%	4%	
Share of Residential Area Laid Out Before Occupation	99%	95%	
Share of Residential Area in Informal Land Subdivisions	23%	55%	
Share of Residential Area in Formal Land Subdivisions	76%	1%	
Share of Residential Area in Housing Projects	0%	38%	



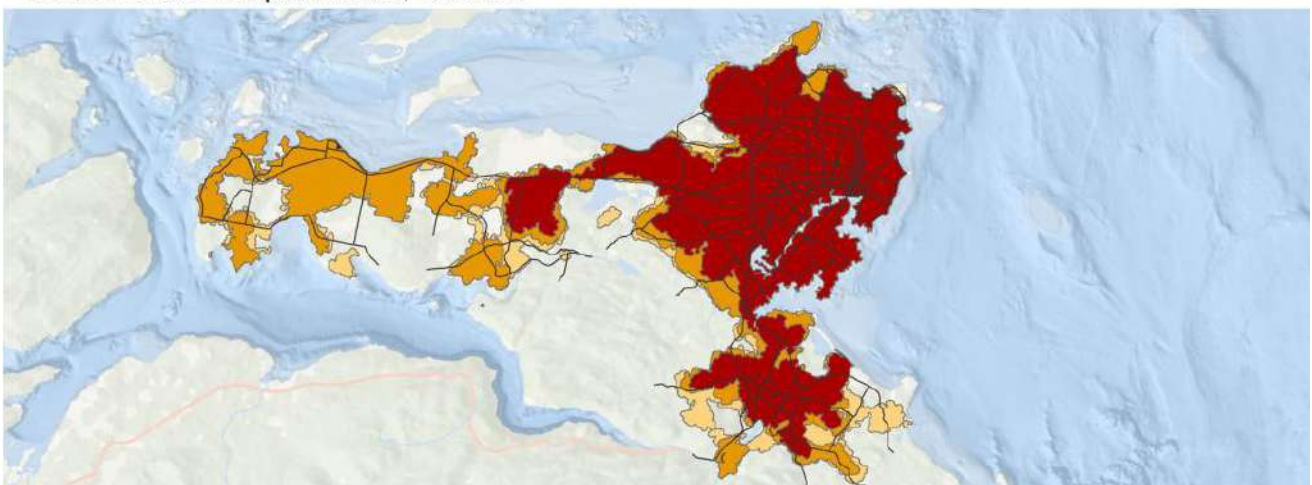
# Victoria, Canada (Land-Rich Developed Countries)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013



## Victoria, Canada 1990-2013



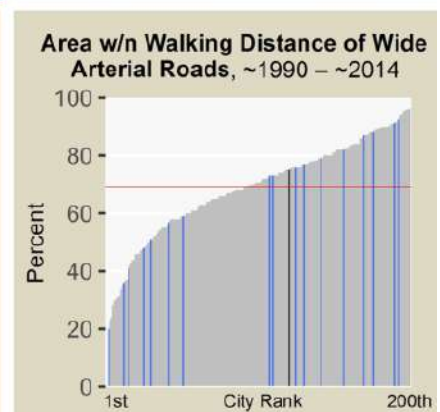
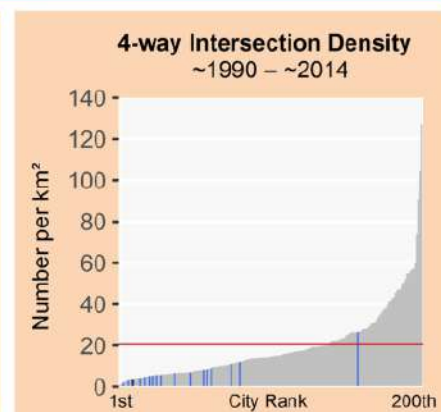
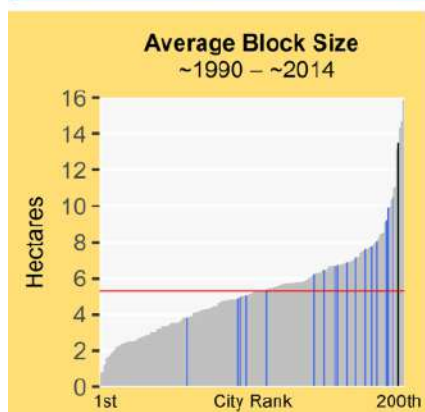
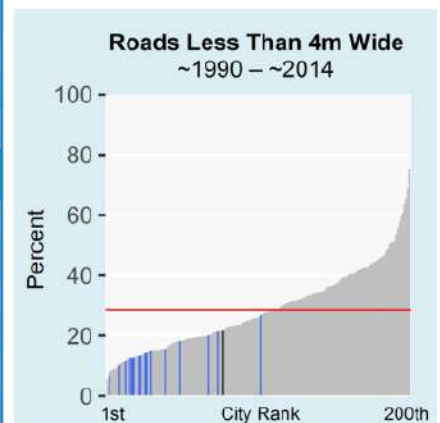
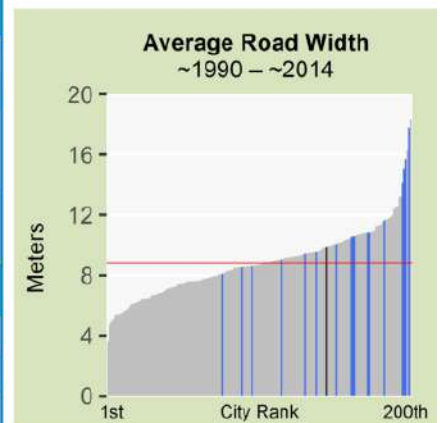
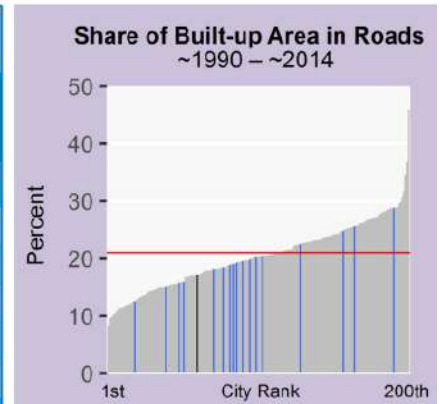
- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2013

Arterial Roads

# Victoria, Canada (Land-Rich Developed Countries)



Legend for Charts			
	Victoria	Other cities in region	All other cities
			Global average
Metrics			
	Pre-1990	1990-2013	
Roads			
Share of Built-Up Area Occupied by Roads	18%	17%	
Share of Built-Up Area that is Gridded or Partially Gridded	2%	0%	
Average Road Width (m)	9.8	7.3	
Share of Roads less than 4m Wide	8%	21%	
Share of Roads more than 16m Wide	12%	3%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	2.0	1.6	
Average Beeline Distance to Arterial Roads (m)	185	260	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	96%	89%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	88%	75%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	18%	2%	
Average Block Size (ha)	7.5	13.5	
3-way Intersection Density (number per km <sup>2</sup> )	68	22	
4-way Intersection Density (number per km <sup>2</sup> )	11	3	
Walkability Ratio	1.8	1.3	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	778	725	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	83%	75%	
Share of Residential Area Not Laid Out Before Occupation	8%	34%	
Share of Residential Area Laid Out Before Occupation	91%	65%	
Share of Residential Area in Informal Land Subdivisions	0%	6%	
Share of Residential Area in Formal Land Subdivisions	83%	56%	
Share of Residential Area in Housing Projects	7%	2%	



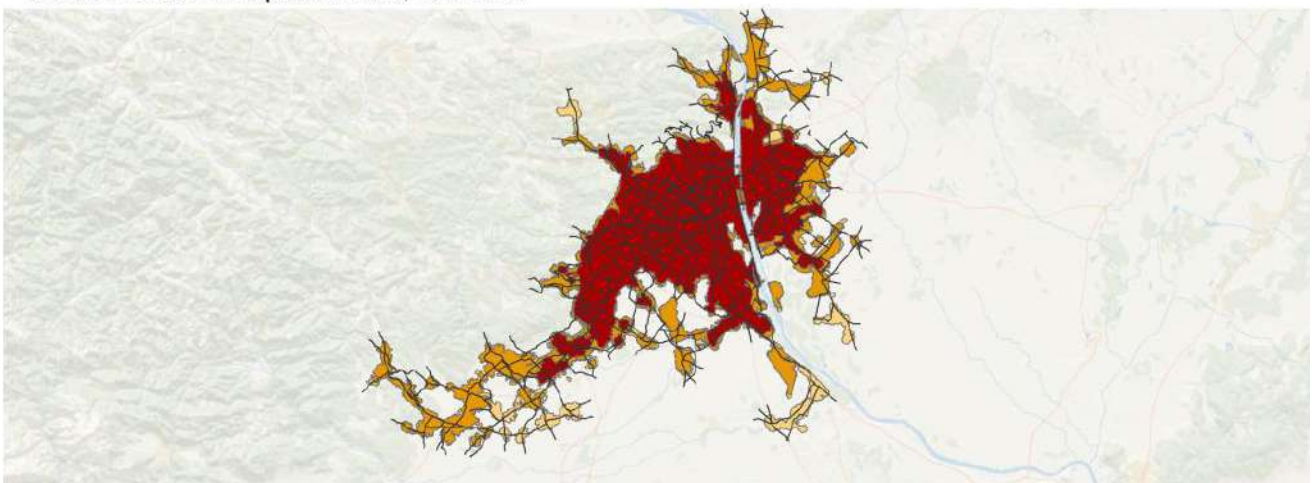
# Vienna, Austria (Europe and Japan)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2013



## Vienna, Austria 1991-2013



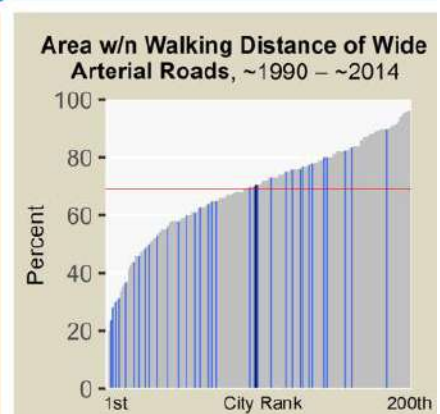
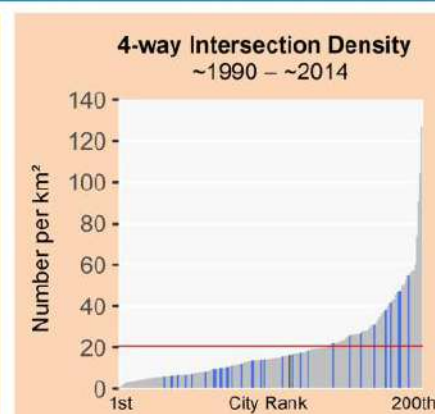
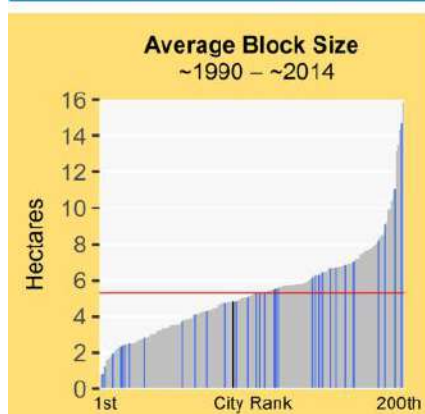
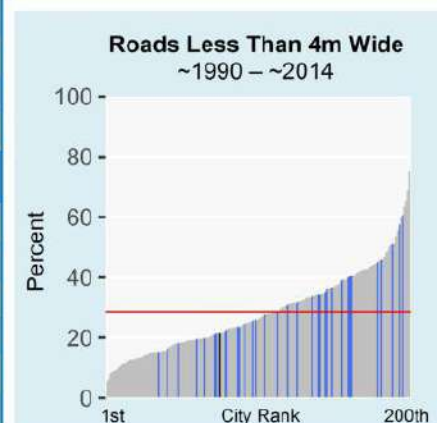
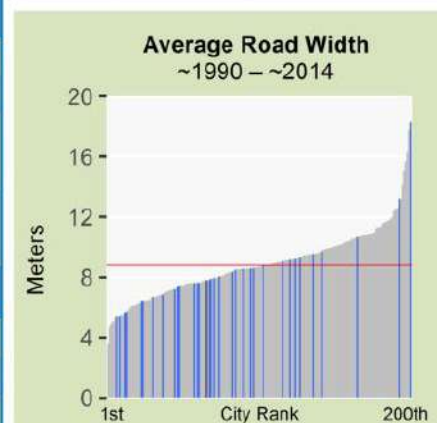
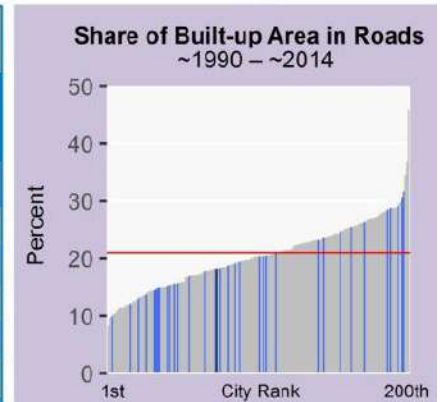
- Urban Extent in 1991
- Expansion, 1991 - 2000
- Expansion, 2000 - 2013

Arterial Roads

# Vienna, Austria (Europe and Japan)



Legend for Charts			
	Vienna	Other cities in region	Global average
<b>Metrics</b>			
	Pre-1991	1991-2013	
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	22%	18%	
Share of Built-Up Area that is Gridded or Partially Gridded	5%	0%	
Average Road Width (m)	7.8	6.6	
Share of Roads less than 4m Wide	23%	21%	
Share of Roads more than 16m Wide	8%	0%	
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	2.0	1.8	
Average Beeline Distance to Arterial Roads (m)	169	207	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	97%	95%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	84%	70%	
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	18%	9%	
Average Block Size (ha)	2.8	4.9	
3-way Intersection Density (number per km <sup>2</sup> )	198	103	
4-way Intersection Density (number per km <sup>2</sup> )	40	17	
Walkability Ratio	1.7	2.1	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	575	587	
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	68%	78%	
Share of Residential Area Not Laid Out Before Occupation	0%	12%	
Share of Residential Area Laid Out Before Occupation	99%	87%	
Share of Residential Area in Informal Land Subdivisions	1%	0%	
Share of Residential Area in Formal Land Subdivisions	82%	80%	
Share of Residential Area in Housing Projects	15%	6%	



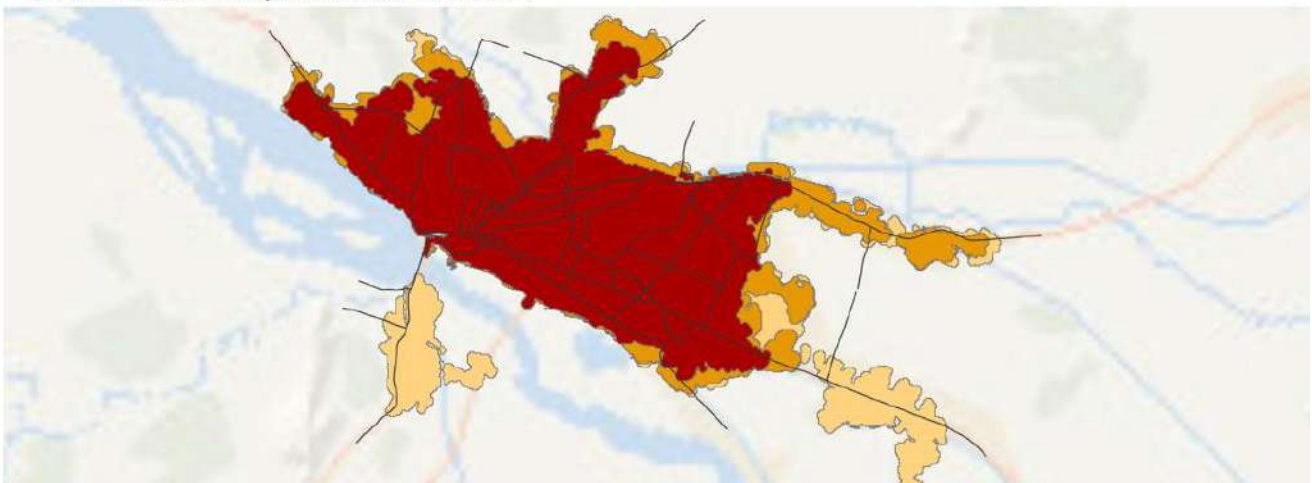
# Vijayawada, India (South and Central Asia)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2014



## Vijayawada, India 1991-2014



- Urban Extent in 1991
- Expansion, 1991 - 2000
- Expansion, 2000 - 2014

Arterial Roads

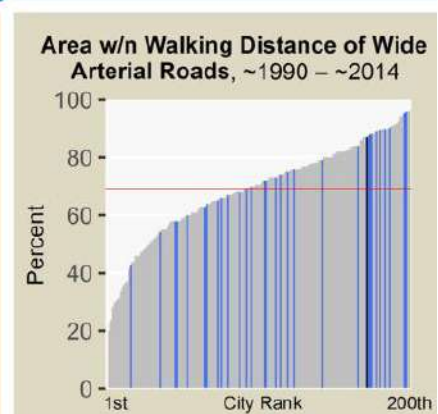
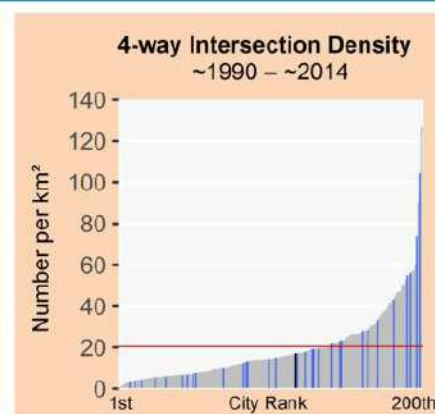
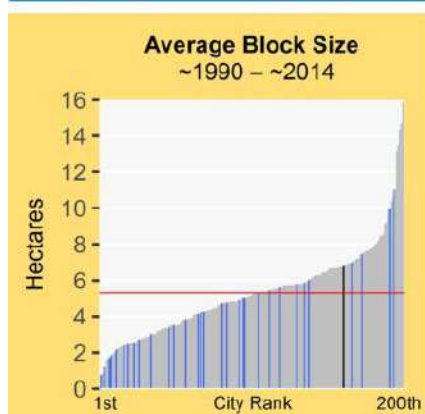
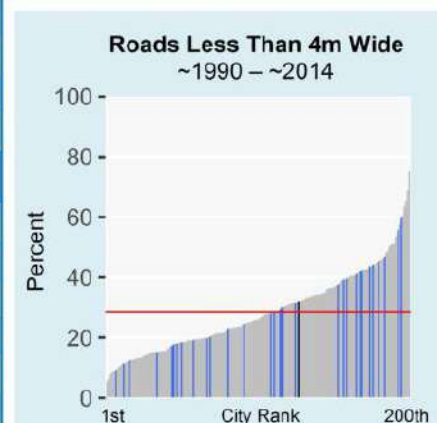
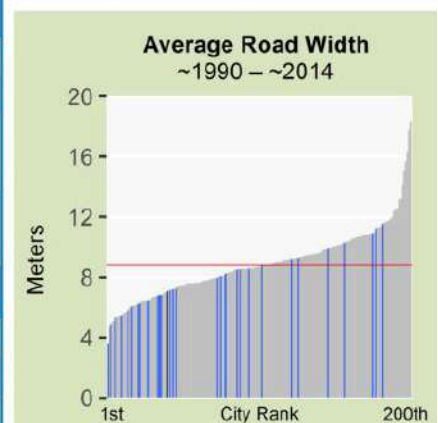
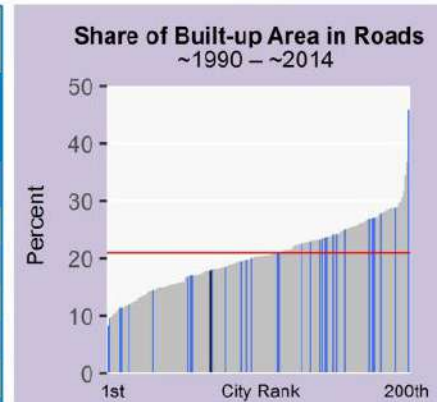
# Vijayawada, India (South and Central Asia)



**Legend for Charts**

Vijayawada | Other cities in region | All other cities | Global average

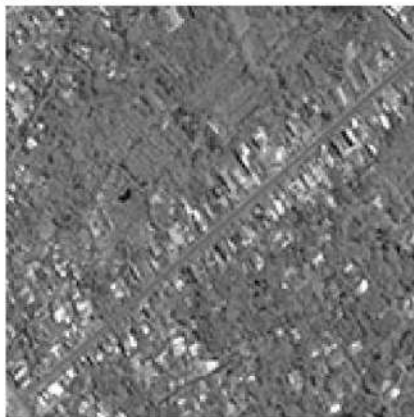
Metrics	Pre-1991	1991-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	19%	18%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	7.0	5.8
Share of Roads less than 4m Wide	20%	31%
Share of Roads more than 16m Wide	7%	3%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.0	1.6
Average Beeline Distance to Arterial Roads (m)	161	221
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	99%	94%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	92%	87%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	15%	5%
Average Block Size (ha)	1.8	6.8
3-way Intersection Density (number per km <sup>2</sup> )	158	130
4-way Intersection Density (number per km <sup>2</sup> )	34	17
Walkability Ratio	1.7	1.8
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	281	195
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	233	69
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	73%	70%
Share of Residential Area Not Laid Out Before Occupation	20%	35%
Share of Residential Area Laid Out Before Occupation	79%	64%
Share of Residential Area in Informal Land Subdivisions	26%	59%
Share of Residential Area in Formal Land Subdivisions	52%	4%
Share of Residential Area in Housing Projects	1%	0%



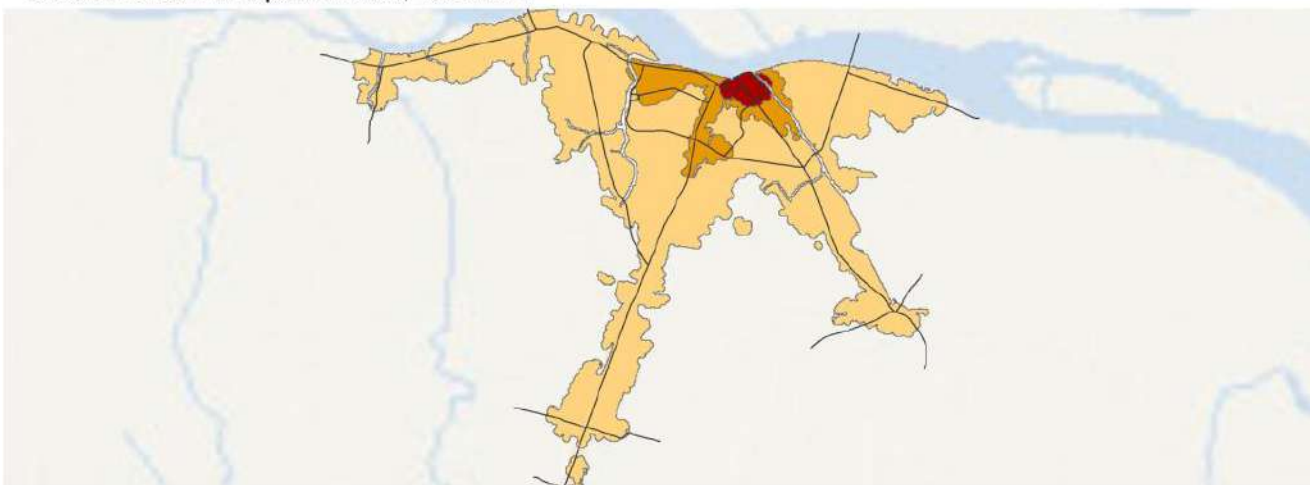
# Vinh Long, Vietnam (Southeast Asia)



Selected Locales in Area Developed Before 1989



Selected Locales in Expansion Area, 1989-2014



## Vinh Long, Vietnam 1989-2014



- Urban Extent in 1989
- Expansion, 1989 - 2000
- Expansion, 2000 - 2014

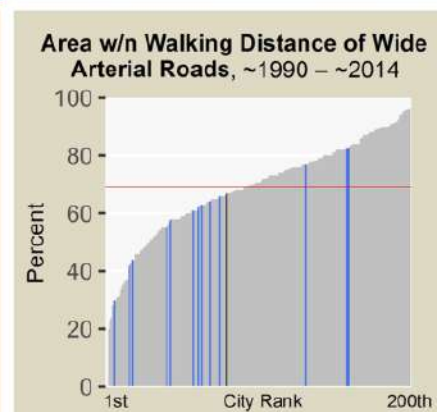
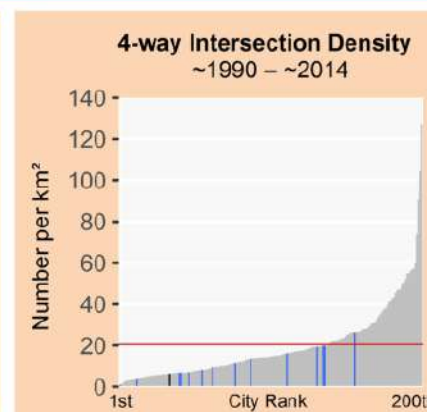
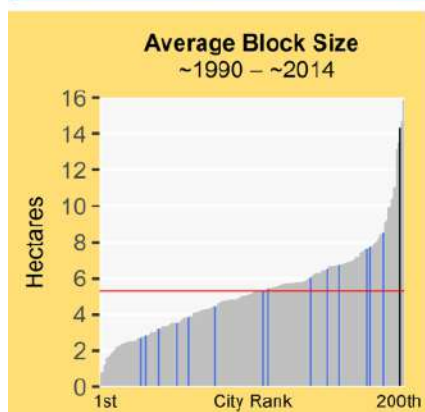
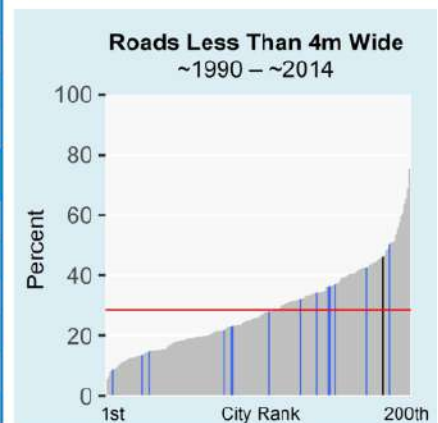
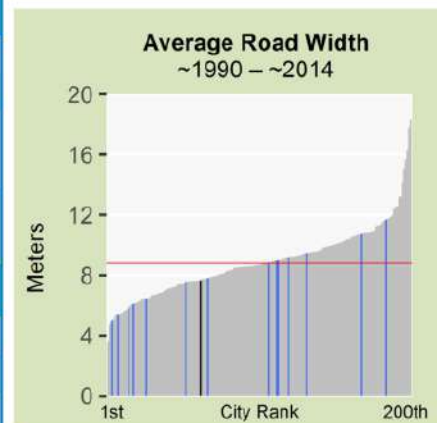
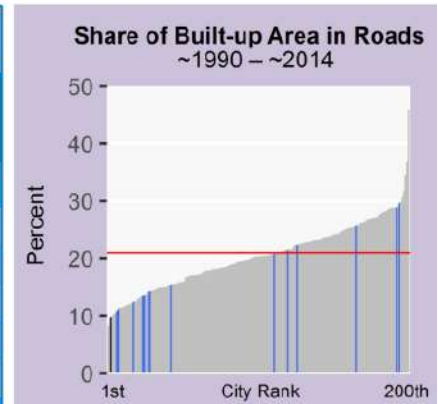
Arterial Roads



# Vinh Long, Vietnam (Southeast Asia)



Legend for Charts			
	Vinh Long	Other cities in region	All other cities
<b>Global average</b> —			
Metrics	Pre-1989	1989-2014	
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	16%	9%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%	
Average Road Width (m)	7.7	6.1	
Share of Roads less than 4m Wide	18%	46%	
Share of Roads more than 16m Wide	3%	8%	
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	3.6	1.0	
Average Beeline Distance to Arterial Roads (m)	74	321	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	100%	83%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	89%	66%	
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	22%	2%	
Average Block Size (ha)	1.9	14.4	
3-way Intersection Density (number per km <sup>2</sup> )	92	33	
4-way Intersection Density (number per km <sup>2</sup> )	23	6	
Walkability Ratio	1.4	1.3	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )			
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	66%	66%	
Share of Residential Area Not Laid Out Before Occupation	46%	98%	
Share of Residential Area Laid Out Before Occupation	53%	1%	
Share of Residential Area in Informal Land Subdivisions	0%	1%	
Share of Residential Area in Formal Land Subdivisions	53%	0%	
Share of Residential Area in Housing Projects	0%	0%	



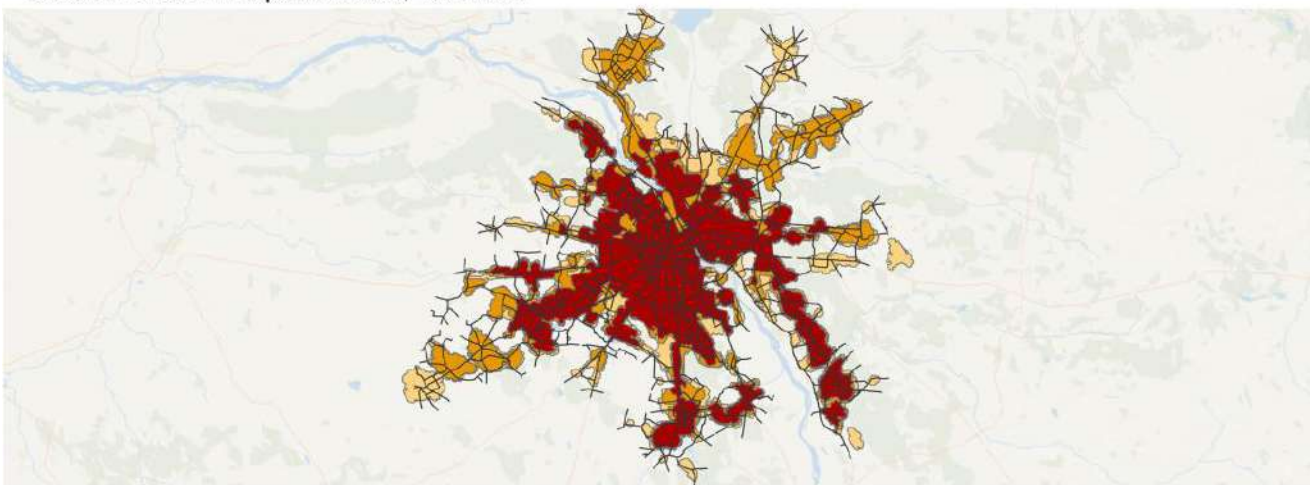
# Warsaw, Poland (Europe and Japan)



Selected Locales in Area Developed Before 1992



Selected Locales in Expansion Area, 1992-2013



## Warsaw, Poland 1992-2013



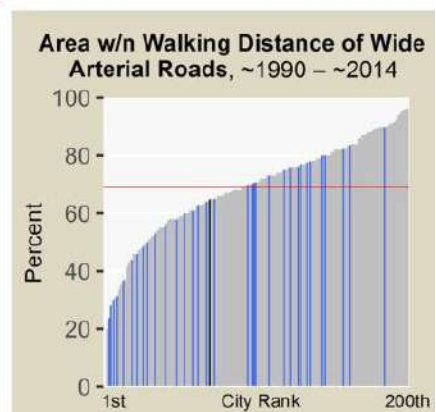
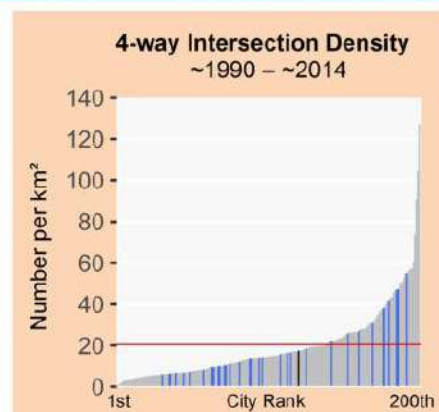
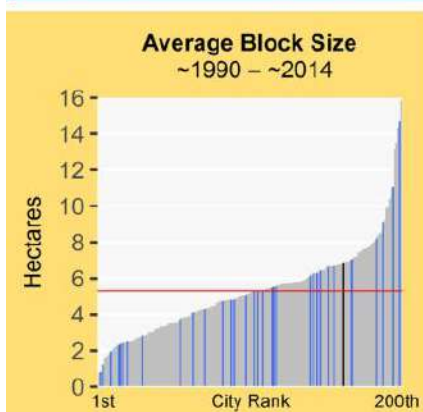
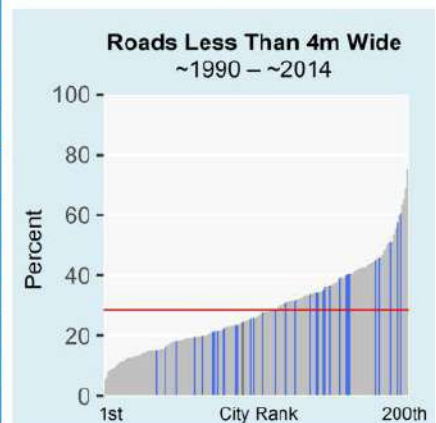
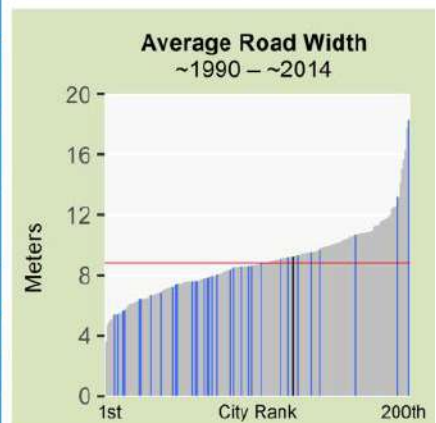
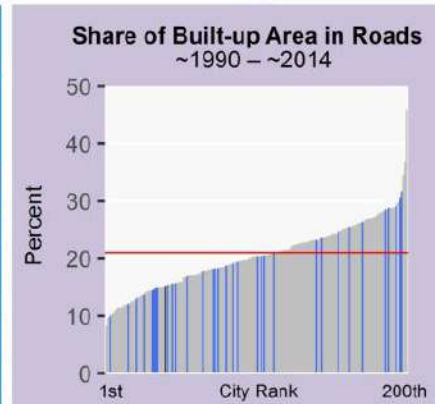
- Urban Extent in 1992
- Expansion, 1992 - 2000
- Expansion, 2000 - 2013

Arterial Roads

# Warsaw, Poland (Europe and Japan)



Legend for Charts			
	Warsaw	Other cities in region	Global average
<b>Legend for Charts</b>			
	Warsaw	Other cities in region	Global average
Metrics	Pre-1992	1992-2013	
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	21%	15%	
Share of Built-Up Area that is Gridded or Partially Gridded	4%	5%	
Average Road Width (m)	9.3	6.3	
Share of Roads less than 4m Wide	7%	24%	
Share of Roads more than 16m Wide	12%	1%	
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	1.9	1.6	
Average Beeline Distance to Arterial Roads (m)	185	214	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	96%	94%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	78%	64%	
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	20%	13%	
Average Block Size (ha)	6.0	6.9	
3-way Intersection Density (number per km <sup>2</sup> )	29	79	
4-way Intersection Density (number per km <sup>2</sup> )	19	17	
Walkability Ratio	1.6	1.6	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	22	1401	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	772	751	
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	68%	76%	
Share of Residential Area Not Laid Out Before Occupation	5%	14%	
Share of Residential Area Laid Out Before Occupation	89%	85%	
Share of Residential Area in Informal Land Subdivisions	7%	36%	
Share of Residential Area in Formal Land Subdivisions	66%	41%	
Share of Residential Area in Housing Projects	20%	7%	



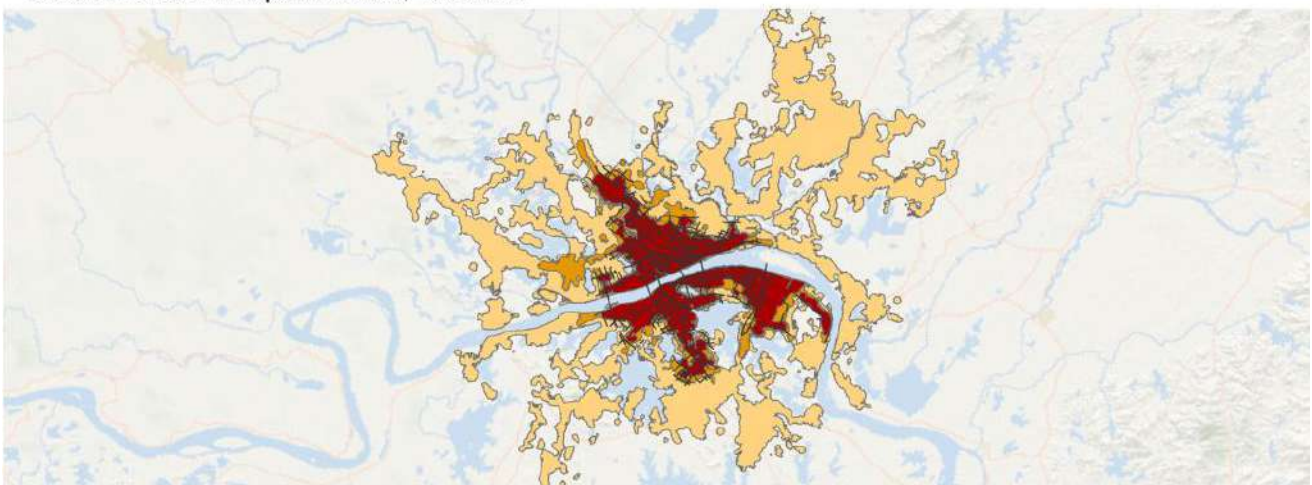
# Wuhan, Hubei, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013



## Wuhan, Hubei, China 1990-2013



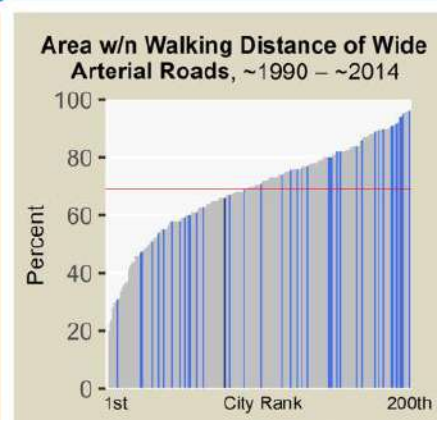
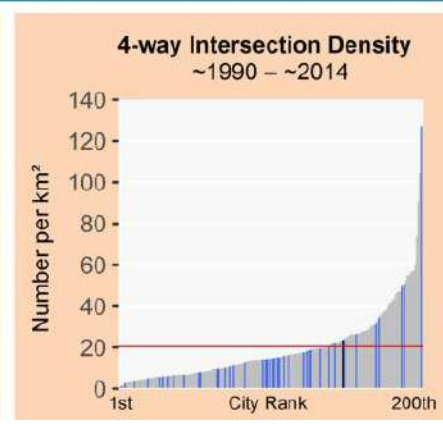
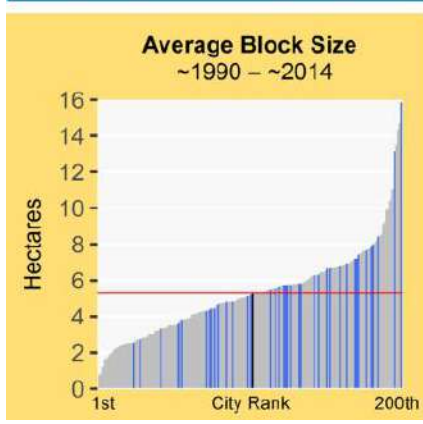
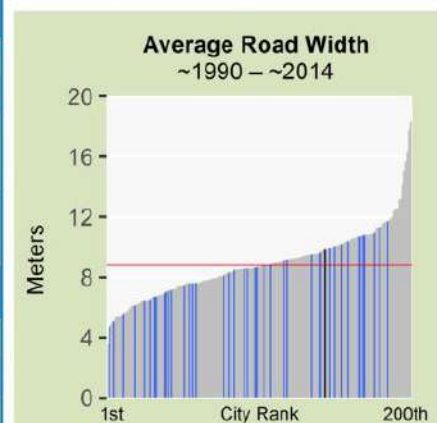
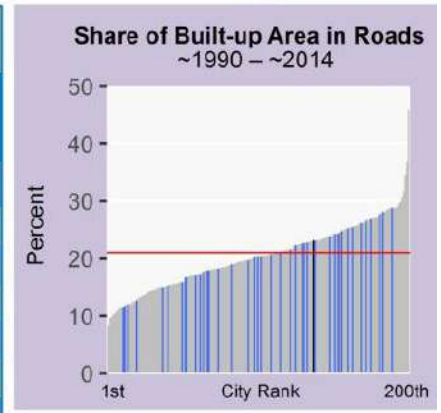
- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2013

Arterial Roads

# Wuhan, Hubei, China (East Asia and the Pacific)



Legend for Charts		
	Wuhan	Other cities in region   All other cities   Global average
Metrics	Pre-1990	1990-2013
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	16%	16%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	9.8	7.4
Share of Roads less than 4m Wide	18%	28%
Share of Roads more than 16m Wide	19%	8%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.6	0.8
Average Beeline Distance to Arterial Roads (m)	193	453
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	98%	75%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	98%	76%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	12%	16%
Average Block Size (ha)	5.5	6.9
3-way Intersection Density (number per km <sup>2</sup> )	63	80
4-way Intersection Density (number per km <sup>2</sup> )	7	15
Walkability Ratio	1.5	1.7
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	53%	64%
Share of Residential Area Not Laid Out Before Occupation	7%	6%
Share of Residential Area Laid Out Before Occupation	92%	93%
Share of Residential Area in Informal Land Subdivisions	8%	75%
Share of Residential Area in Formal Land Subdivisions	83%	2%
Share of Residential Area in Housing Projects	0%	15%



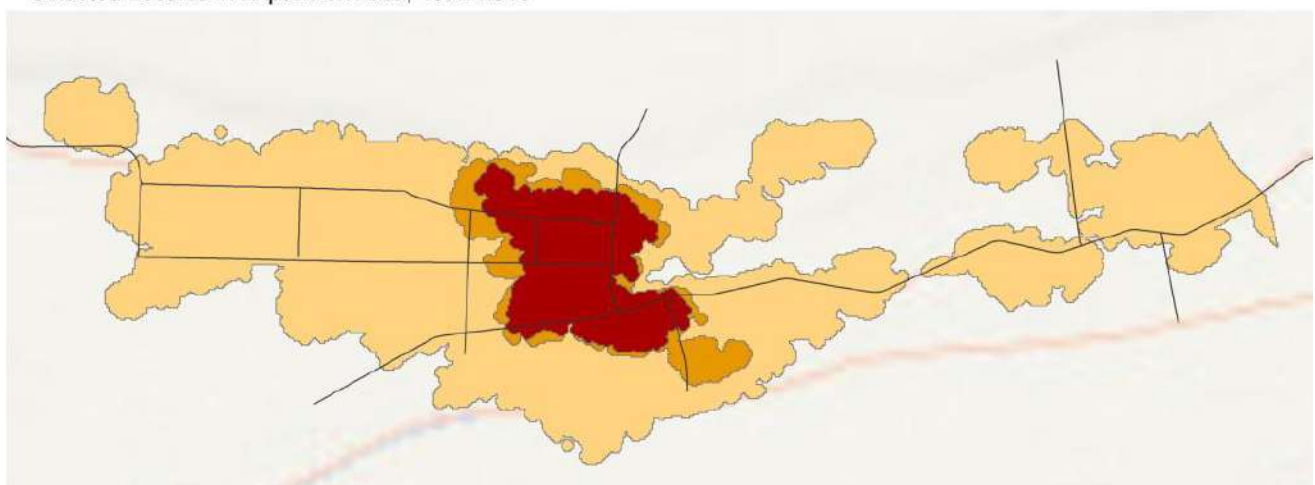
# Xingping, Shaanxi, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1992



Selected Locales in Expansion Area, 1992-2013



**Xingping, Shaanxi, China**  
1992-2013

0 1 2 3 km

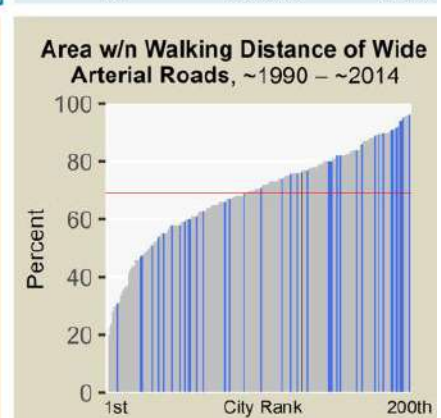
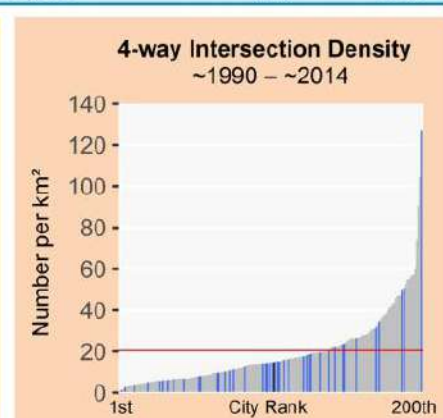
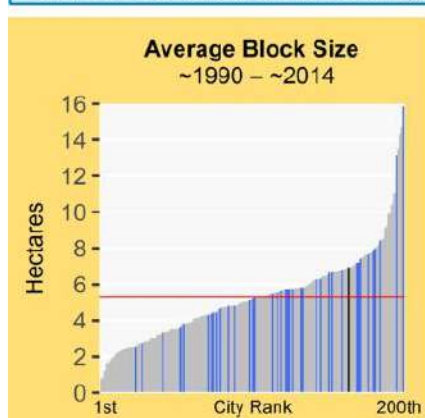
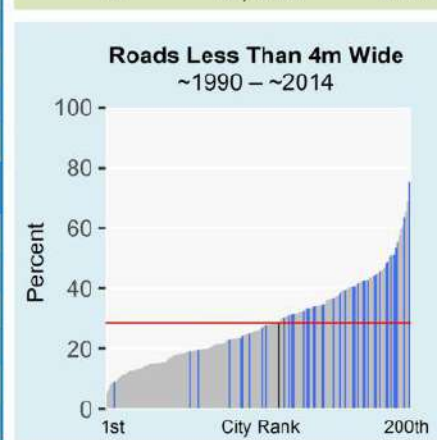
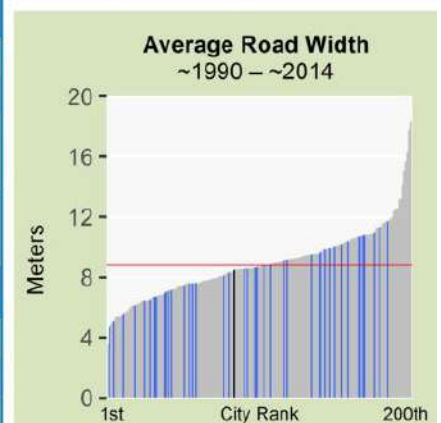
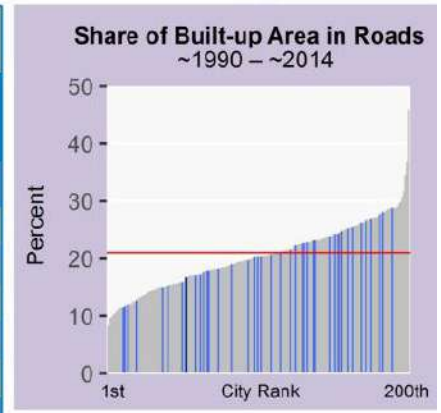
N

- Urban Extent in 1992
- Expansion, 1992 - 2000
- Expansion, 2000 - 2013
- Arterial Roads

# Xingping, Shaanxi, China (East Asia and the Pacific)



Legend for Charts			
	Xingping	Other cities in region	All other cities
			Global average —
Metrics			
	Pre-1992	1992-2013	
Roads			
Share of Built-Up Area Occupied by Roads	20%	24%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%	
Average Road Width (m)	8.5	9.2	
Share of Roads less than 4m Wide	21%	34%	
Share of Roads more than 16m Wide	22%	18%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	1.8	1.3	
Average Beeline Distance to Arterial Roads (m)	136	259	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	100%	92%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	100%	91%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	10%	8%	
Average Block Size (ha)	3.7	7.4	
3-way Intersection Density (number per km <sup>2</sup> )	53	106	
4-way Intersection Density (number per km <sup>2</sup> )	10	13	
Walkability Ratio	1.4	1.6	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )			
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	67%	56%	
Share of Residential Area Not Laid Out Before Occupation	89%	44%	
Share of Residential Area Laid Out Before Occupation	10%	55%	
Share of Residential Area in Informal Land Subdivisions	0%	38%	
Share of Residential Area in Formal Land Subdivisions	0%	1%	
Share of Residential Area in Housing Projects	10%	15%	



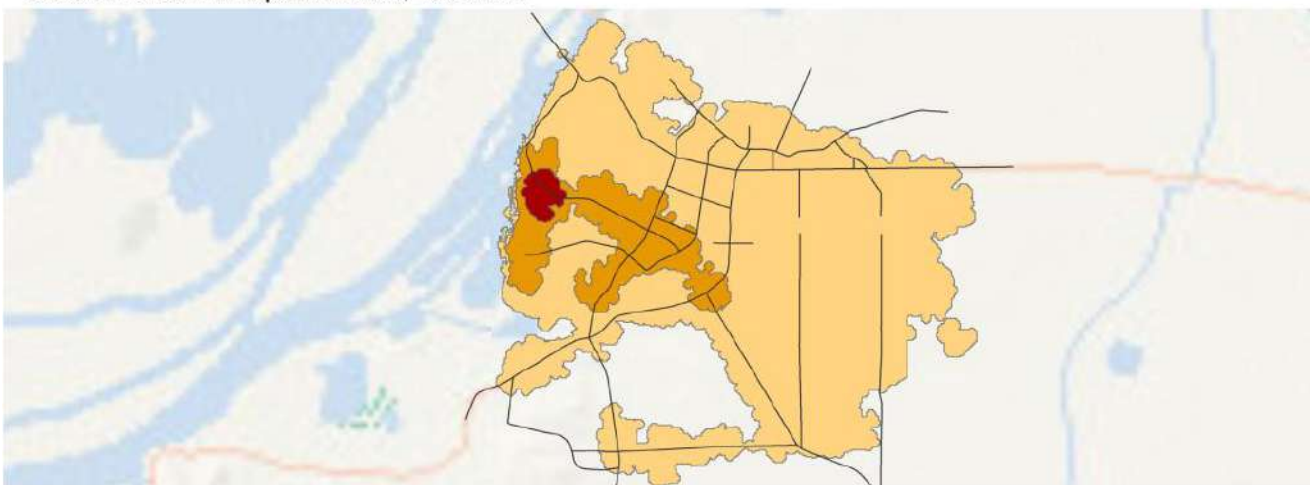
# Xucheng, Jiangsu, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013



## Xucheng, Jiangsu, China 1990-2013



- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2013

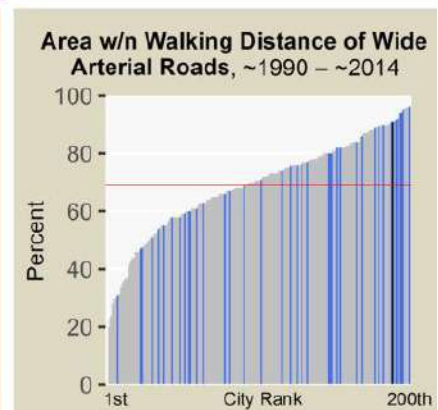
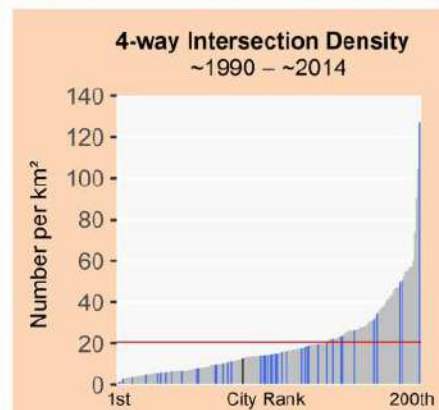
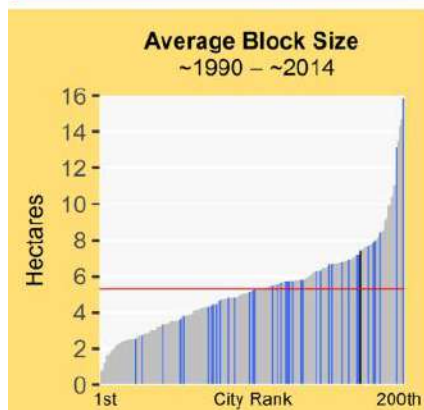
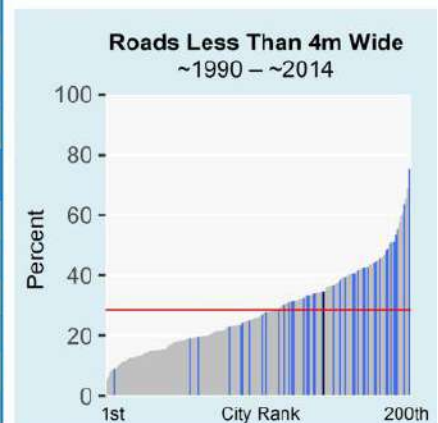
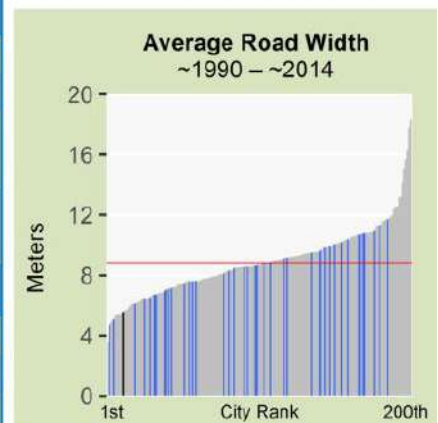
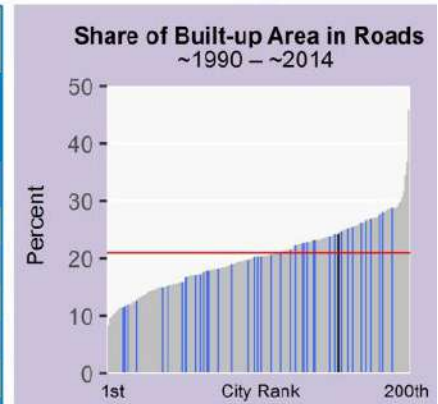
Arterial Roads



# Xucheng, Jiangsu, China (East Asia and the Pacific)



Legend for Charts		
	Xucheng	Other cities in region   All other cities   Global average
Metrics	Pre-1990	1990-2013
Roads		
Share of Built-Up Area Occupied by Roads	27%	28%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	5.5	5.8
Share of Roads less than 4m Wide	47%	45%
Share of Roads more than 16m Wide	3%	4%
Arterial Roads		
Density of Arterial Roads (km/km <sup>2</sup> )	1.6	1.5
Average Beeline Distance to Arterial Roads (m)	243	241
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	90%	91%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	79%	70%
Block Size, Plot Size, Intersection Density, and Walkability		
Share of Intersections that are 4-way	10%	12%
Average Block Size (ha)	2.8	2.4
3-way Intersection Density (number per km <sup>2</sup> )	204	282
4-way Intersection Density (number per km <sup>2</sup> )	31	42
Walkability Ratio	1.6	1.5
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	293	292
Stages in the Evolution of Residential Layouts		
Share of Built-Up Area in Residential Use	56%	61%
Share of Residential Area Not Laid Out Before Occupation	69%	45%
Share of Residential Area Laid Out Before Occupation	30%	54%
Share of Residential Area in Informal Land Subdivisions	0%	24%
Share of Residential Area in Formal Land Subdivisions	30%	29%
Share of Residential Area in Housing Projects	0%	0%



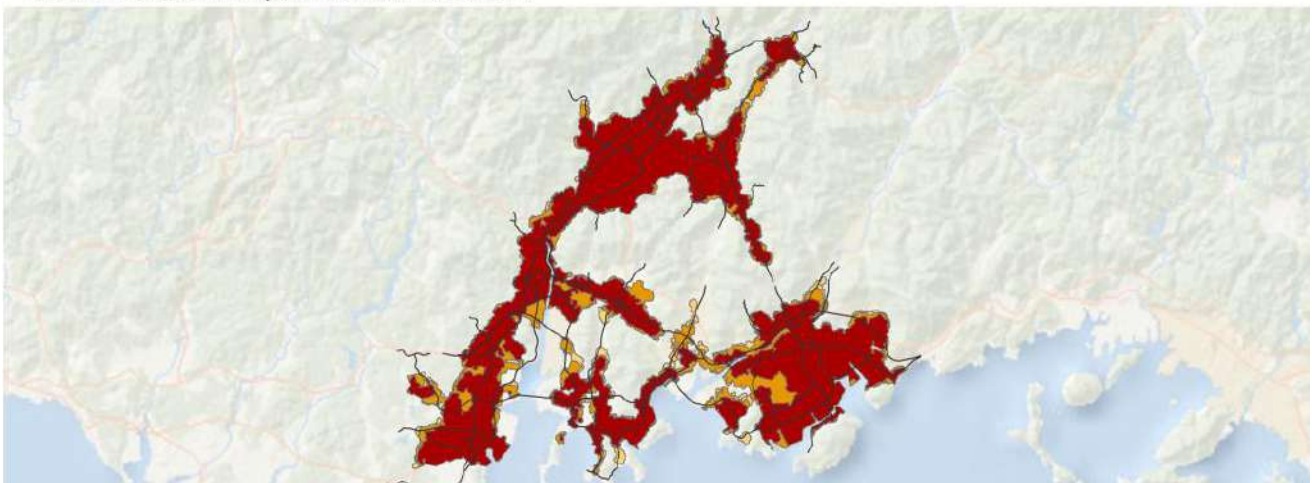
# Yamaguchi, Japan (Europe and Japan)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



**Yamaguchi, Japan**  
1990-2014

0 5 10 15 20 km

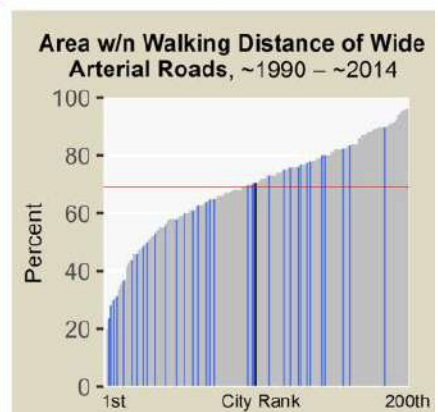
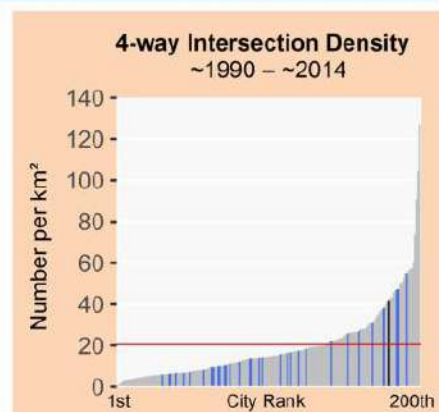
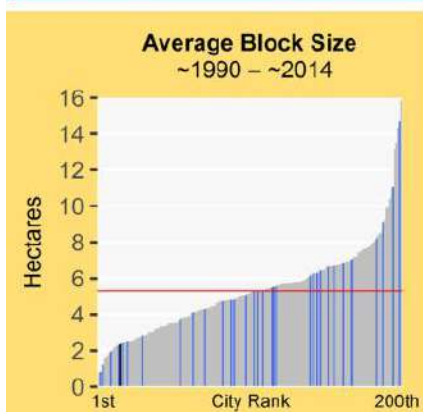
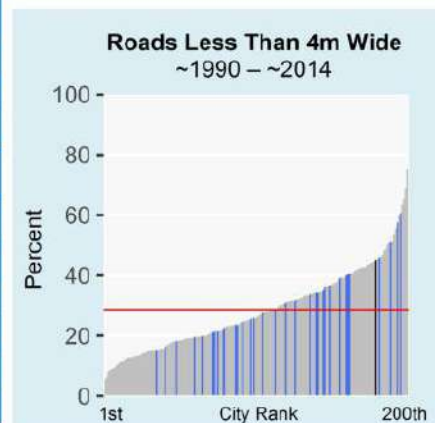
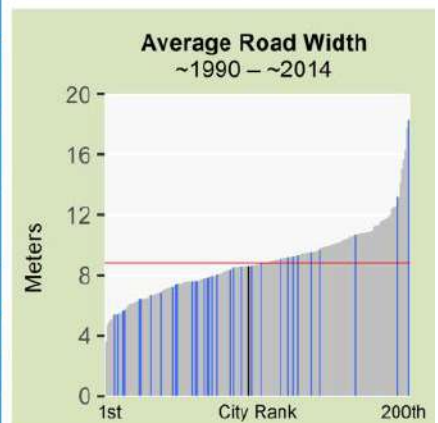
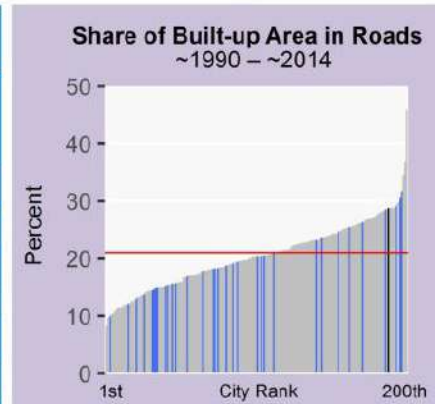
N

- Urban Extent in 1990
- Expansion, 1990 - 1999
- Expansion, 1999 - 2014
- Arterial Roads

# Yamaguchi, Japan (Europe and Japan)



Legend for Charts			
	Yamaguchi	Other cities in region	All other cities
<b>Global average</b> —			
Metrics	Pre-1990	1990-2014	
<b>Roads</b>			
Share of Built-Up Area Occupied by Roads	23%	15%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%	
Average Road Width (m)	8.6	3.3	
Share of Roads less than 4m Wide	31%	75%	
Share of Roads more than 16m Wide	16%	2%	
<b>Arterial Roads</b>			
Density of Arterial Roads (km/km <sup>2</sup> )	0.9	0.6	
Average Beeline Distance to Arterial Roads (m)	451	836	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	69%	59%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	69%	57%	
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>			
Share of Intersections that are 4-way	10%	16%	
Average Block Size (ha)	3.0	3.8	
3-way Intersection Density (number per km <sup>2</sup> )	147	178	
4-way Intersection Density (number per km <sup>2</sup> )	21	32	
Walkability Ratio	1.7	1.5	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	440	474	
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	331		
<b>Stages in the Evolution of Residential Layouts</b>			
Share of Built-Up Area in Residential Use	70%	71%	
Share of Residential Area Not Laid Out Before Occupation	0%	0%	
Share of Residential Area Laid Out Before Occupation	99%	99%	
Share of Residential Area in Informal Land Subdivisions	51%	97%	
Share of Residential Area in Formal Land Subdivisions	25%	0%	
Share of Residential Area in Housing Projects	23%	1%	



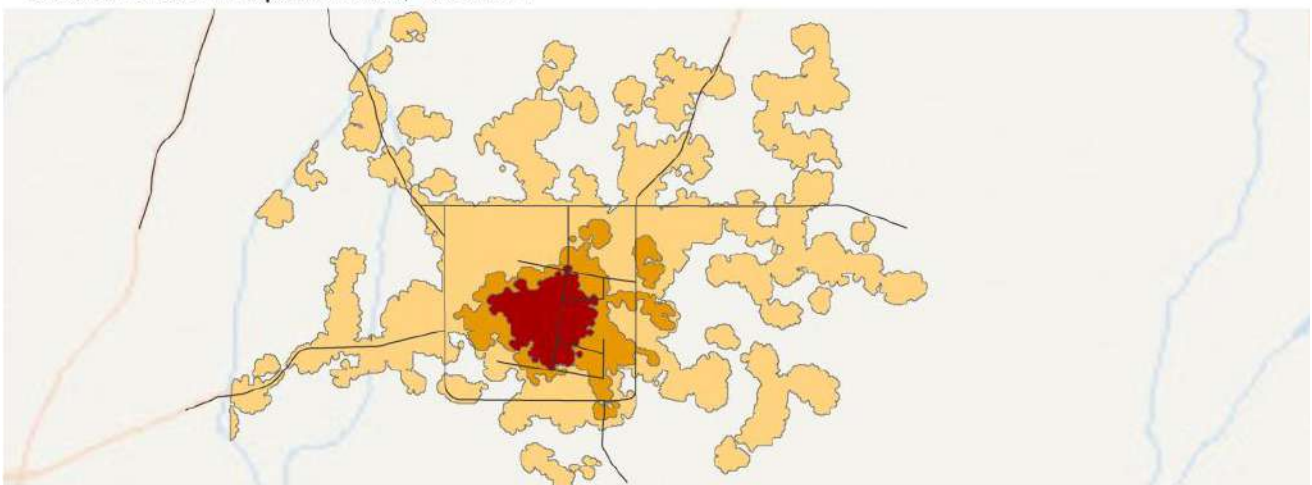
# Yanggu, Shandong, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



Yanggu, Shandong, China  
1990-2014

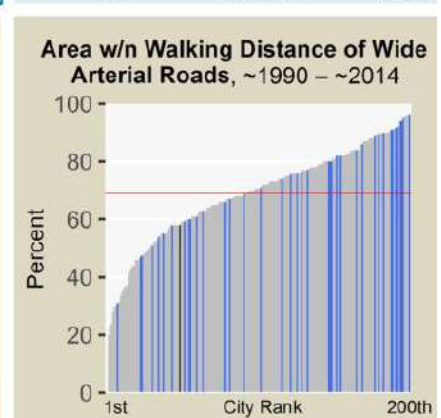
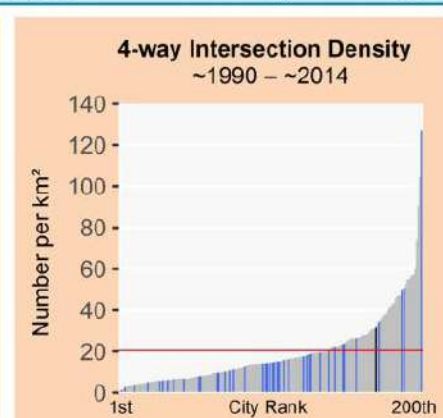
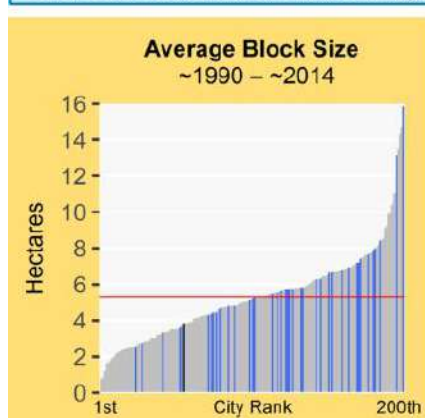
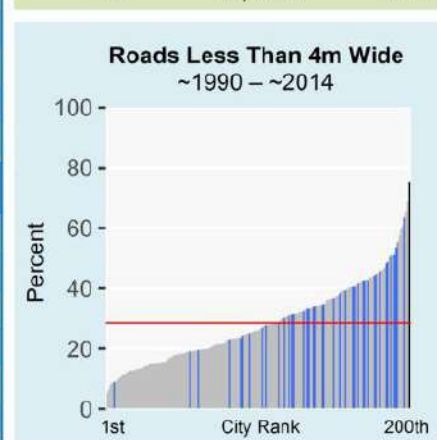
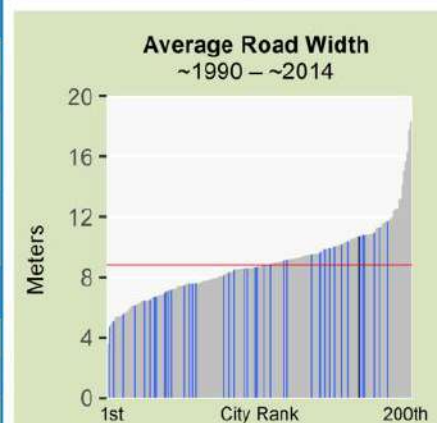
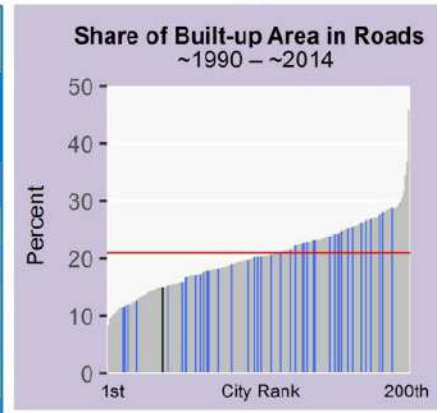
0 2 4 6 8 km

Urban Extent in 1990  
Expansion, 1990 - 2000  
Expansion, 2000 - 2014  
Arterial Roads

# Yanggu, Shandong, China (East Asia and the Pacific)



Legend for Charts			
	Yanggu	Other cities in region	All other cities
			Global average —
Metrics			
	Pre-1990	1990-2014	
Roads			
Share of Built-Up Area Occupied by Roads	16%	15%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%	
Average Road Width (m)	10.7	6.8	
Share of Roads less than 4m Wide	17%	48%	
Share of Roads more than 16m Wide	18%	10%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	1.6	0.8	
Average Beeline Distance to Arterial Roads (m)	263	481	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	91%	77%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	91%	71%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	10%	5%	
Average Block Size (ha)	10.4	13.1	
3-way Intersection Density (number per km <sup>2</sup> )	40	63	
4-way Intersection Density (number per km <sup>2</sup> )	5	5	
Walkability Ratio	1.7	1.3	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )			
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )			
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	63%	78%	
Share of Residential Area Not Laid Out Before Occupation	62%	70%	
Share of Residential Area Laid Out Before Occupation	37%	29%	
Share of Residential Area in Informal Land Subdivisions	6%	24%	
Share of Residential Area in Formal Land Subdivisions	24%	3%	
Share of Residential Area in Housing Projects	6%	1%	



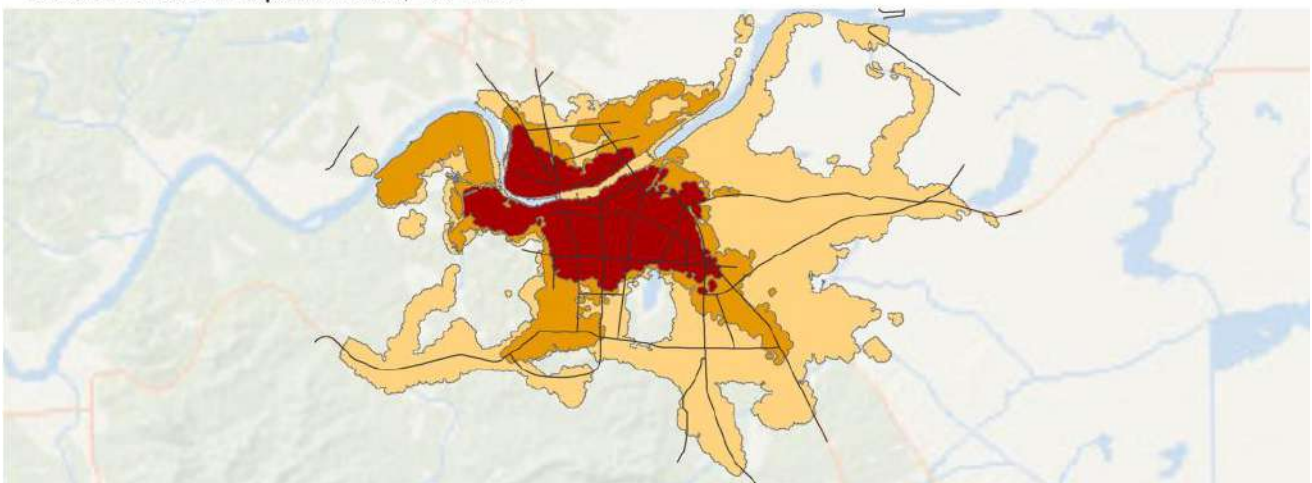
# Yiyang, Hunan, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1994



Selected Locales in Expansion Area, 1994-2013



Yiyang, Hunan, China  
1994-2013

0 2 4 6 8 km

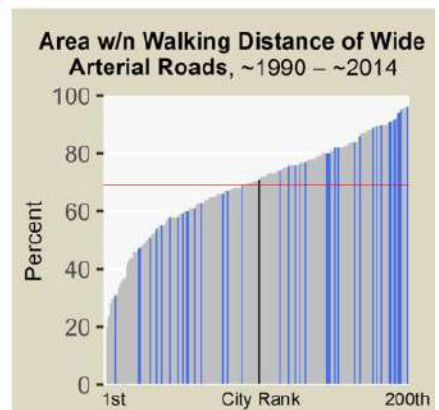
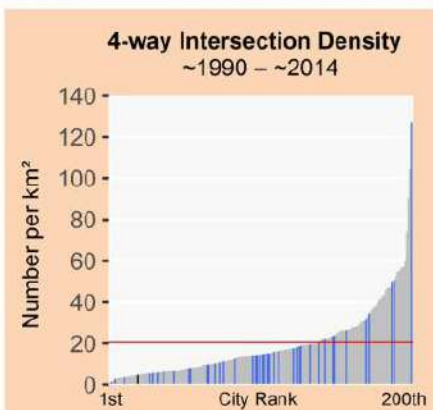
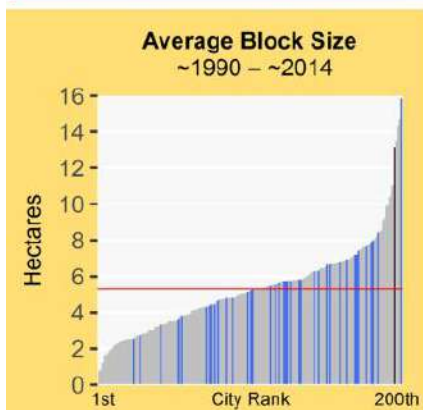
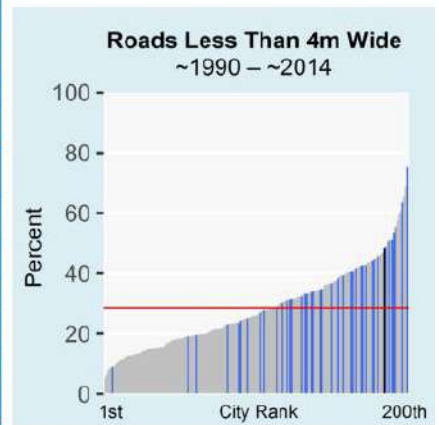
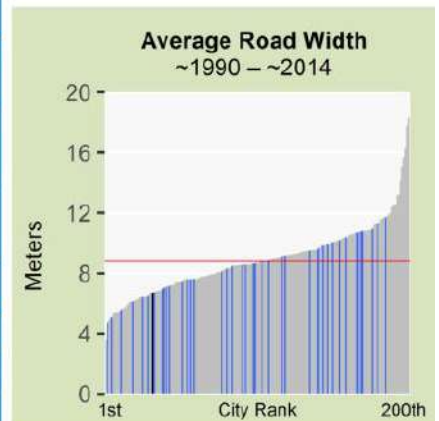
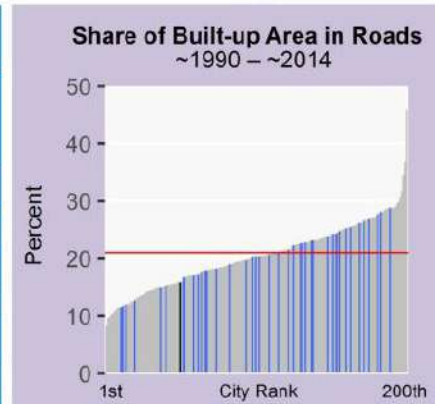
N

- Urban Extent in 1994
- Expansion, 1994 - 1999
- Expansion, 1999 - 2013
- Arterial Roads

# Yiyang, Hunan, China (East Asia and the Pacific)



Legend for Charts		
	Yiyang	Other cities in region   All other cities   Global average
Metrics	Pre-1994	1994-2013
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	19%	20%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	6.7	6.0
Share of Roads less than 4m Wide	43%	48%
Share of Roads more than 16m Wide	10%	6%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.8	1.0
Average Beeline Distance to Arterial Roads (m)	324	591
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	83%	71%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	96%	60%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	8%	7%
Average Block Size (ha)	2.7	5.8
3-way Intersection Density (number per km <sup>2</sup> )	187	156
4-way Intersection Density (number per km <sup>2</sup> )	24	18
Walkability Ratio	1.6	1.5
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	433	
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	51%	56%
Share of Residential Area Not Laid Out Before Occupation	57%	72%
Share of Residential Area Laid Out Before Occupation	42%	27%
Share of Residential Area in Informal Land Subdivisions	1%	11%
Share of Residential Area in Formal Land Subdivisions	26%	8%
Share of Residential Area in Housing Projects	14%	8%



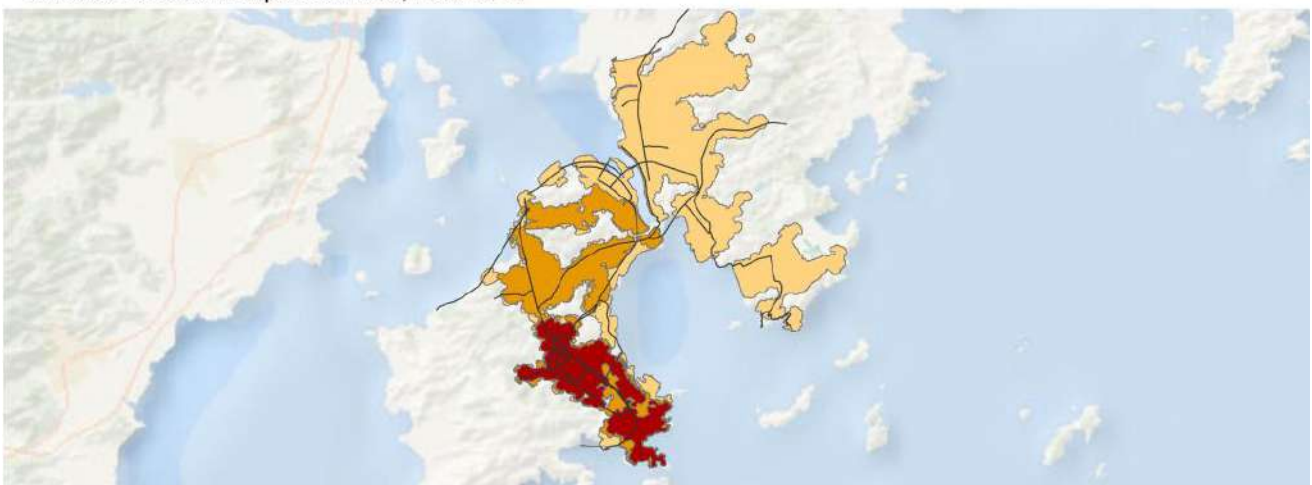
# Yucheng, Zhejiang, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



## Yucheng, Zhejiang, China 1990-2014



- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2014

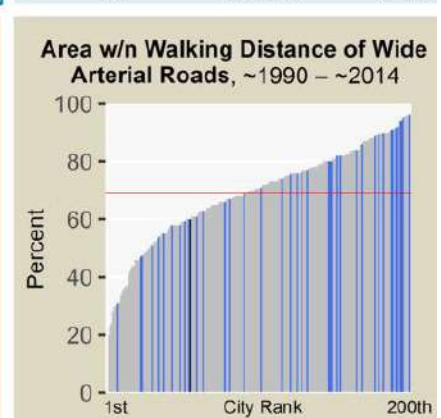
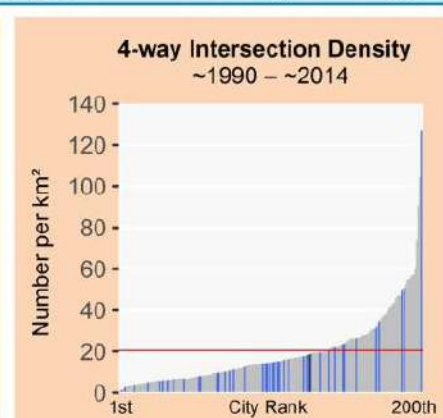
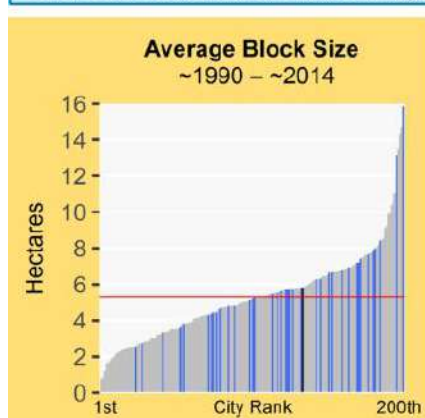
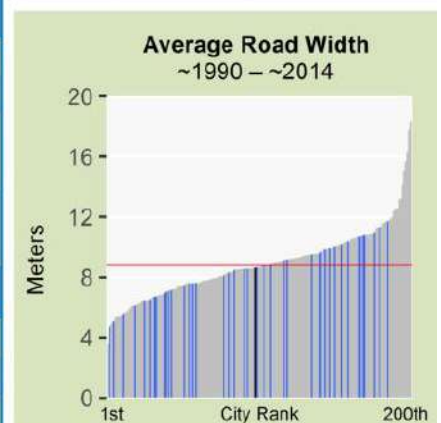
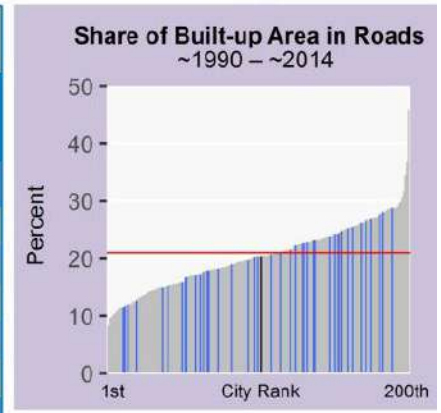
Arterial Roads



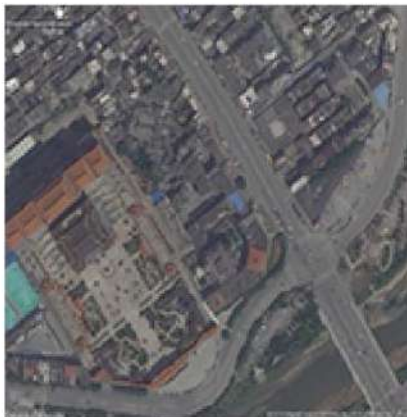
# Yucheng, Zhejiang, China (East Asia and the Pacific)



Legend for Charts		
	Yucheng	Other cities in region   All other cities   Global average
Metrics	Pre-1990	1990-2014
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	16%	15%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	8.6	6.9
Share of Roads less than 4m Wide	30%	45%
Share of Roads more than 16m Wide	15%	9%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.8	1.0
Average Beeline Distance to Arterial Roads (m)	208	616
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	97%	72%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	97%	66%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	9%	5%
Average Block Size (ha)	4.5	5.1
3-way Intersection Density (number per km <sup>2</sup> )	73	91
4-way Intersection Density (number per km <sup>2</sup> )	9	6
Walkability Ratio	1.8	1.7
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		187
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	305	141
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	59%	69%
Share of Residential Area Not Laid Out Before Occupation	51%	70%
Share of Residential Area Laid Out Before Occupation	48%	29%
Share of Residential Area in Informal Land Subdivisions	12%	10%
Share of Residential Area in Formal Land Subdivisions	31%	10%
Share of Residential Area in Housing Projects	5%	8%



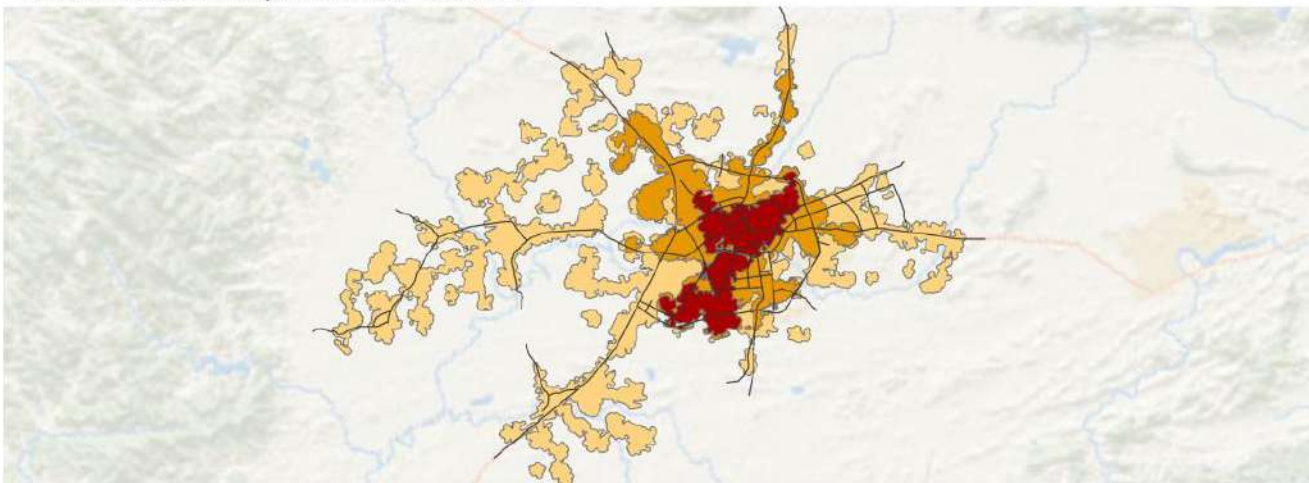
# Yulin, Guangxi, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1991



Selected Locales in Expansion Area, 1991-2009



Yulin, Guangxi, China  
1991-2009

0 4 8 12 16 km

Urban Extent in 1991  
Expansion, 1991 - 2000  
Expansion, 2000 - 2009  
Arterial Roads

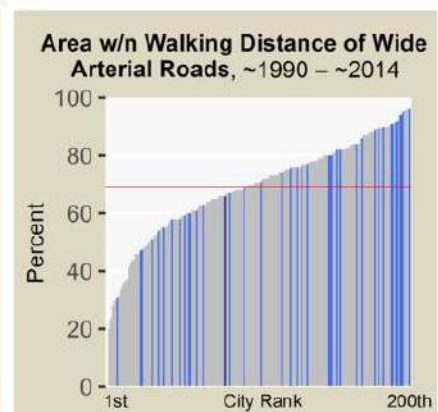
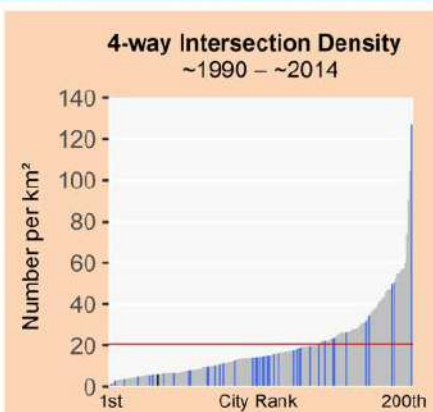
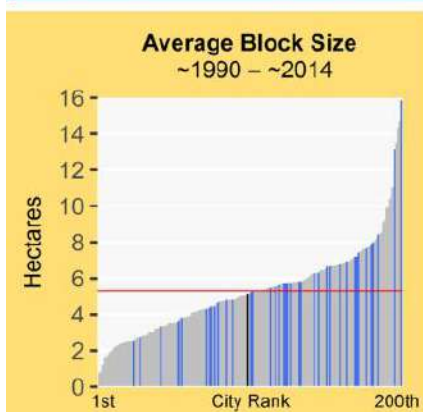
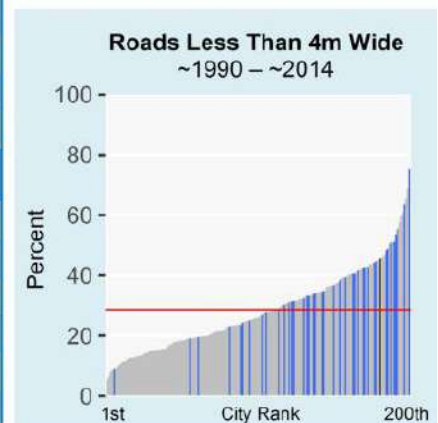
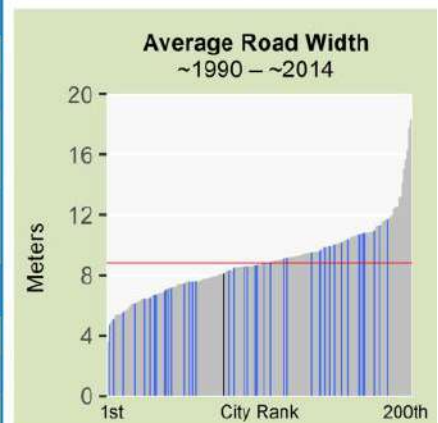
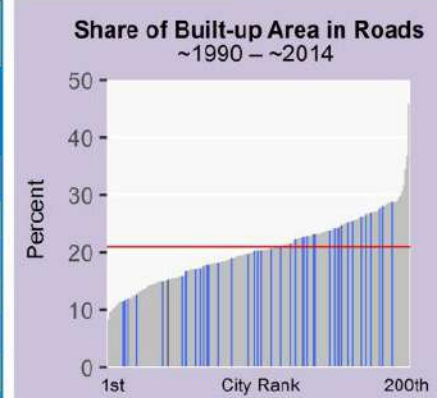
# Yulin, Guangxi, China (East Asia and the Pacific)



### Legend for Charts

Yulin | Other cities in region | All other cities | Global average

Metrics	Pre-1991	1991-2009
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	22%	20%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	8.1	8.5
Share of Roads less than 4m Wide	32%	31%
Share of Roads more than 16m Wide	16%	13%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	2.0	0.8
Average Beeline Distance to Arterial Roads (m)	181	527
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	98%	80%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	98%	76%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	10%	7%
Average Block Size (ha)	4.1	5.7
3-way Intersection Density (number per km <sup>2</sup> )	142	111
4-way Intersection Density (number per km <sup>2</sup> )	14	16
Walkability Ratio	1.9	1.6
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		333
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		357
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	48%	53%
Share of Residential Area Not Laid Out Before Occupation	13%	28%
Share of Residential Area Laid Out Before Occupation	86%	71%
Share of Residential Area in Informal Land Subdivisions	0%	45%
Share of Residential Area in Formal Land Subdivisions	50%	1%
Share of Residential Area in Housing Projects	35%	24%



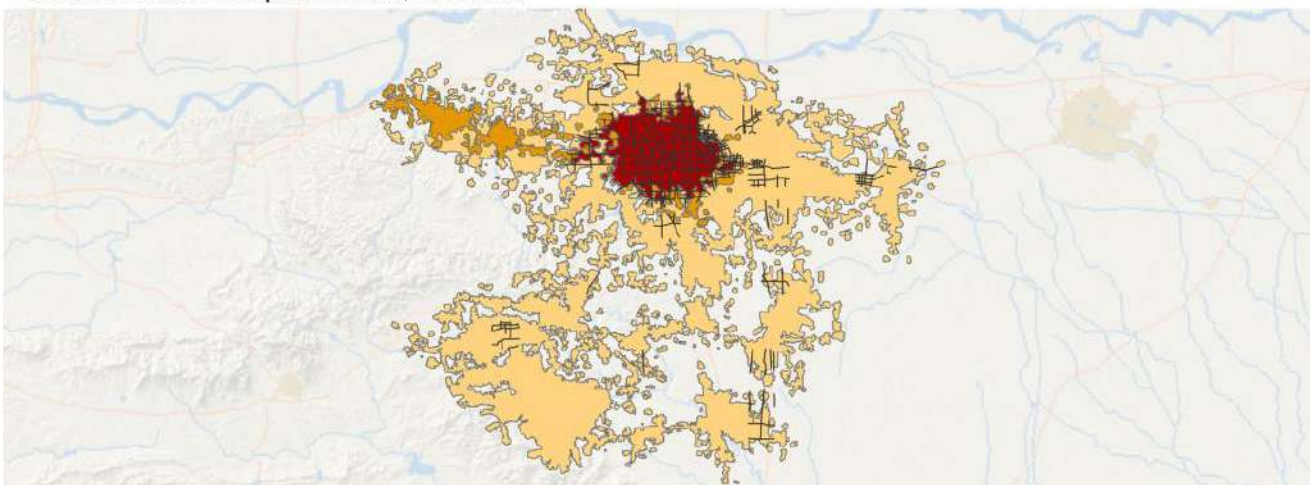
# Zhengzhou, Henan, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1992



Selected Locales in Expansion Area, 1992-2015



Zhengzhou, Henan, China  
1992-2015

0 10 20 30 km

Urban Extent in 1992  
Expansion, 1992 - 2000  
Expansion, 2000 - 2015  
Arterial Roads

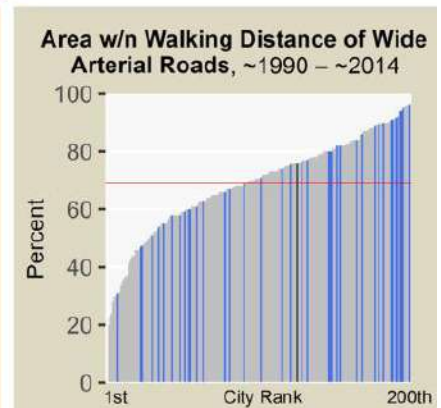
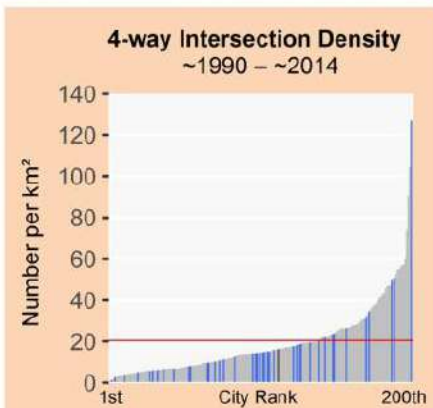
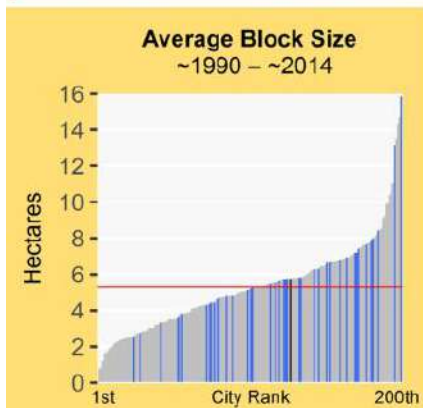
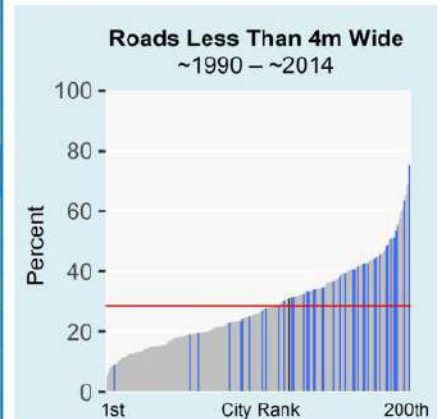
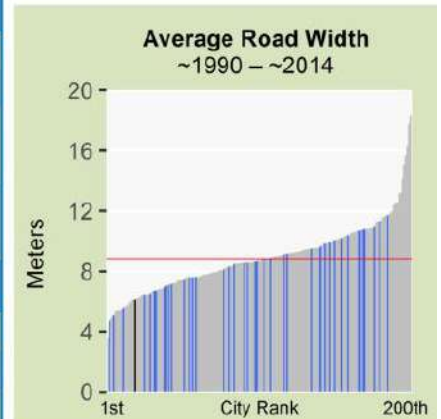
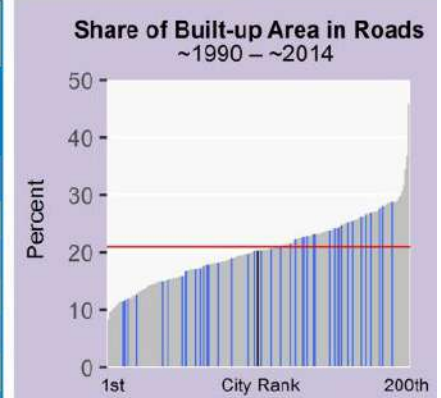
# Zhengzhou, Henan, China (East Asia and the Pacific)



### Legend for Charts

Zhengzhou | Other cities in region | All other cities | Global average

Metrics	Pre-1992	1992-2015
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	23%	22%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	6.1	6.8
Share of Roads less than 4m Wide	39%	33%
Share of Roads more than 16m Wide	5%	7%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	0.7	0.6
Average Beeline Distance to Arterial Roads (m)	662	876
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	59%	56%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	50%	47%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	7%	8%
Average Block Size (ha)	5.3	5.8
3-way Intersection Density (number per km <sup>2</sup> )	144	110
4-way Intersection Density (number per km <sup>2</sup> )	21	18
Walkability Ratio	1.5	1.8
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		206
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	275	275
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	73%	68%
Share of Residential Area Not Laid Out Before Occupation	70%	58%
Share of Residential Area Laid Out Before Occupation	29%	41%
Share of Residential Area in Informal Land Subdivisions	10%	12%
Share of Residential Area in Formal Land Subdivisions	10%	12%
Share of Residential Area in Housing Projects	8%	17%



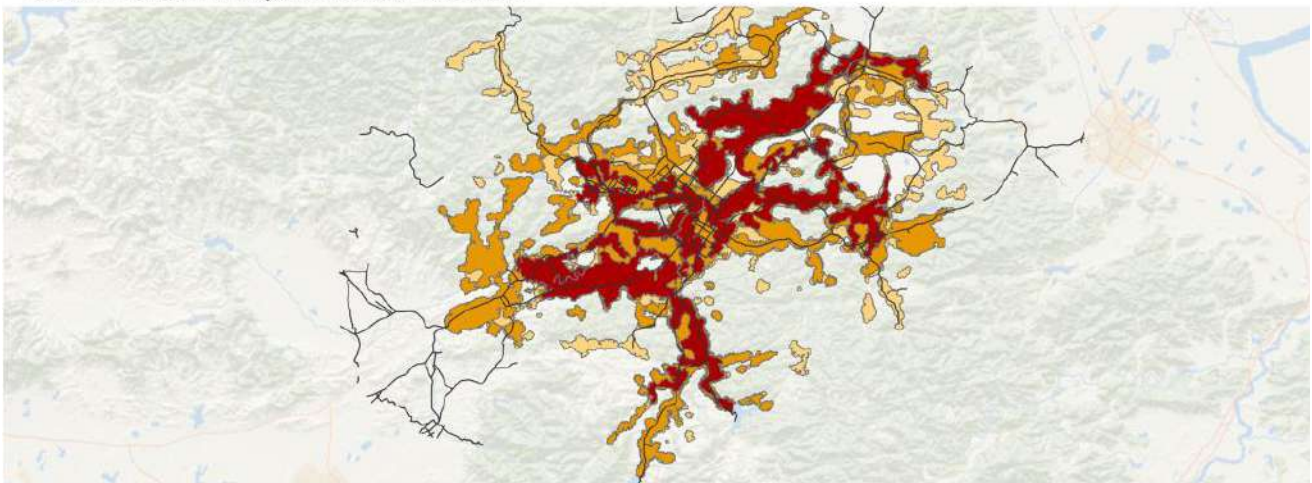
# Zhuji, Zhejiang, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2013



Zhuji, Zhejiang, China  
1990-2013

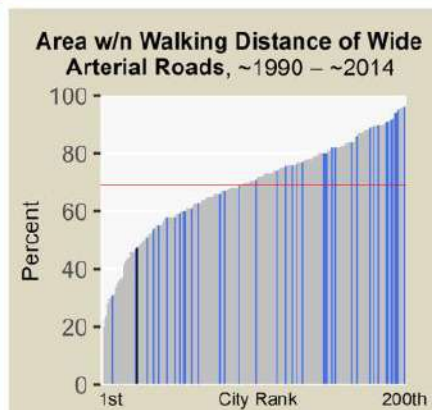
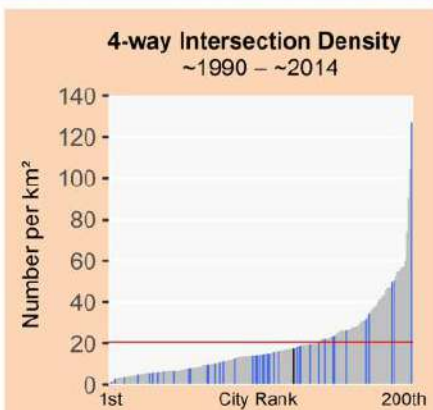
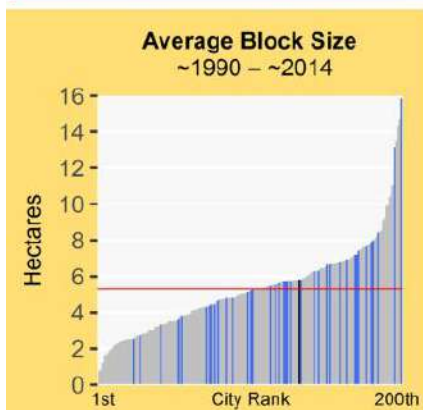
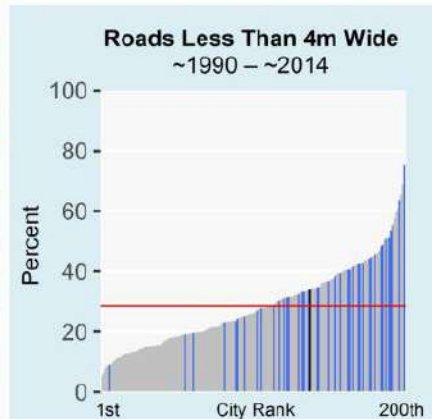
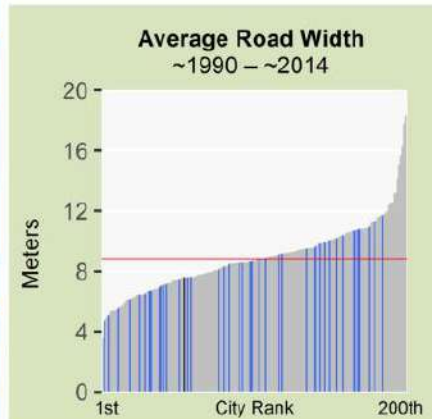
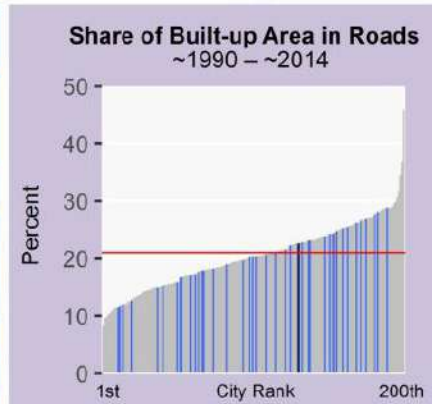
0 5 10 15 20 km

Urban Extent in 1990  
Expansion, 1990 - 2000  
Expansion, 2000 - 2013  
Arterial Roads

# Zhuji, Zhejiang, China (East Asia and the Pacific)



Legend for Charts		
	Zhuji	Other cities in region   All other cities   Global average
Metrics	Pre-1990	1990-2013
Roads		
Share of Built-Up Area Occupied by Roads	20%	16%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	7.6	7.2
Share of Roads less than 4m Wide	28%	32%
Share of Roads more than 16m Wide	11%	10%
Arterial Roads		
Density of Arterial Roads (km/km <sup>2</sup> )	2.2	1.4
Average Beeline Distance to Arterial Roads (m)	163	234
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	100%	92%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	100%	77%
Block Size, Plot Size, Intersection Density, and Walkability		
Share of Intersections that are 4-way	5%	5%
Average Block Size (ha)	7.3	7.2
3-way Intersection Density (number per km <sup>2</sup> )	117	68
4-way Intersection Density (number per km <sup>2</sup> )	9	7
Walkability Ratio	2.5	1.9
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		
Stages in the Evolution of Residential Layouts		
Share of Built-Up Area in Residential Use	51%	50%
Share of Residential Area Not Laid Out Before Occupation	28%	54%
Share of Residential Area Laid Out Before Occupation	71%	45%
Share of Residential Area in Informal Land Subdivisions	2%	12%
Share of Residential Area in Formal Land Subdivisions	39%	10%
Share of Residential Area in Housing Projects	29%	23%



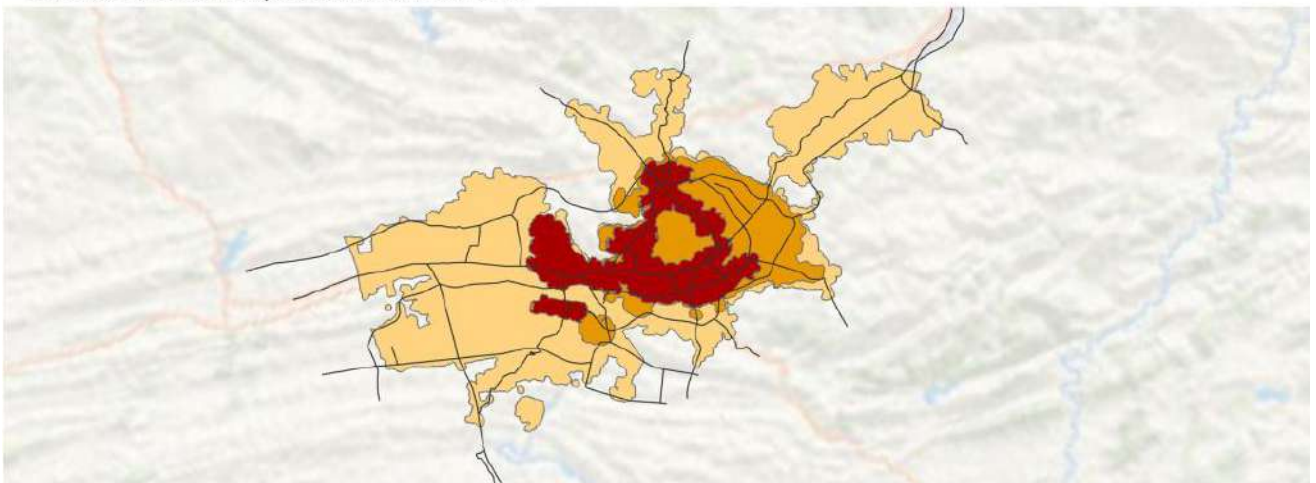
# Zunyi, Guizhou, China (East Asia and the Pacific)



Selected Locales in Area Developed Before 1988



Selected Locales in Expansion Area, 1988-2013



## Zunyi, Guizhou, China 1988-2013



- Urban Extent in 1988
- Expansion, 1988 - 2001
- Expansion, 2001 - 2013

Arterial Roads



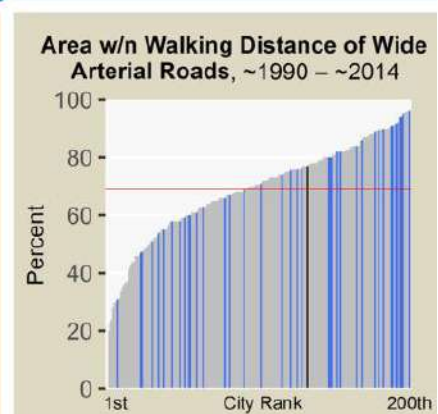
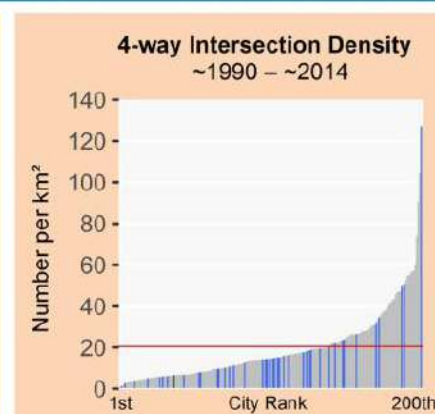
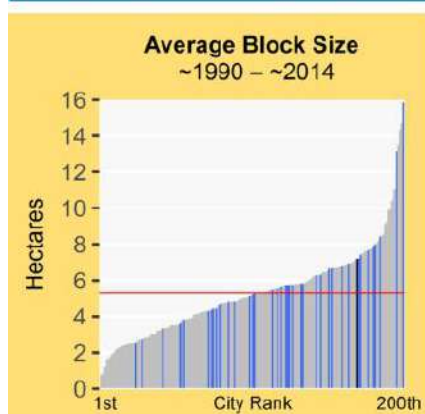
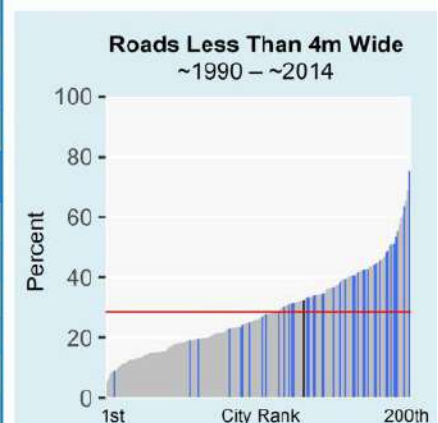
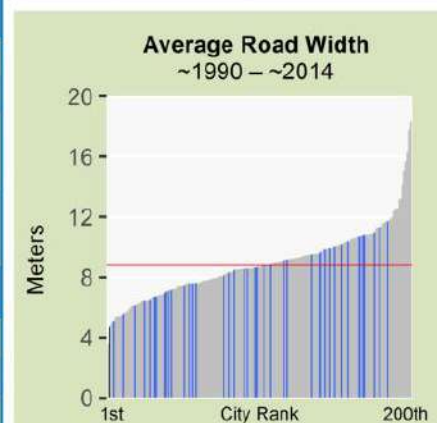
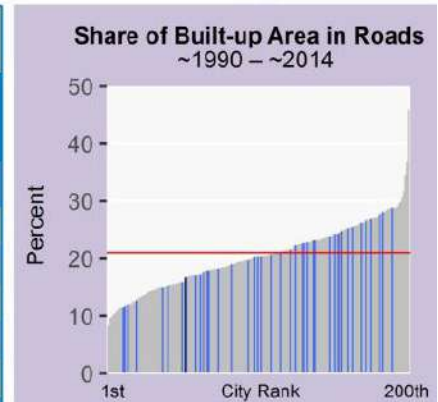
# Zunyi, Guizhou, China (East Asia and the Pacific)



**Legend for Charts**

Zunyi | Other cities in region | All other cities | Global average

Metrics	Pre-1988	1988-2013
<b>Roads</b>		
Share of Built-Up Area Occupied by Roads	22%	26%
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%
Average Road Width (m)	4.7	6.6
Share of Roads less than 4m Wide	49%	34%
Share of Roads more than 16m Wide	3%	7%
<b>Arterial Roads</b>		
Density of Arterial Roads (km/km <sup>2</sup> )	1.7	1.5
Average Beeline Distance to Arterial Roads (m)	214	242
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	95%	93%
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	92%	90%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>		
Share of Intersections that are 4-way	10%	15%
Average Block Size (ha)	1.9	4.1
3-way Intersection Density (number per km <sup>2</sup> )	329	207
4-way Intersection Density (number per km <sup>2</sup> )	43	47
Walkability Ratio	1.8	1.8
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )	646	1219
<b>Stages in the Evolution of Residential Layouts</b>		
Share of Built-Up Area in Residential Use	63%	64%
Share of Residential Area Not Laid Out Before Occupation	8%	19%
Share of Residential Area Laid Out Before Occupation	91%	80%
Share of Residential Area in Informal Land Subdivisions	0%	3%
Share of Residential Area in Formal Land Subdivisions	30%	46%
Share of Residential Area in Housing Projects	60%	30%



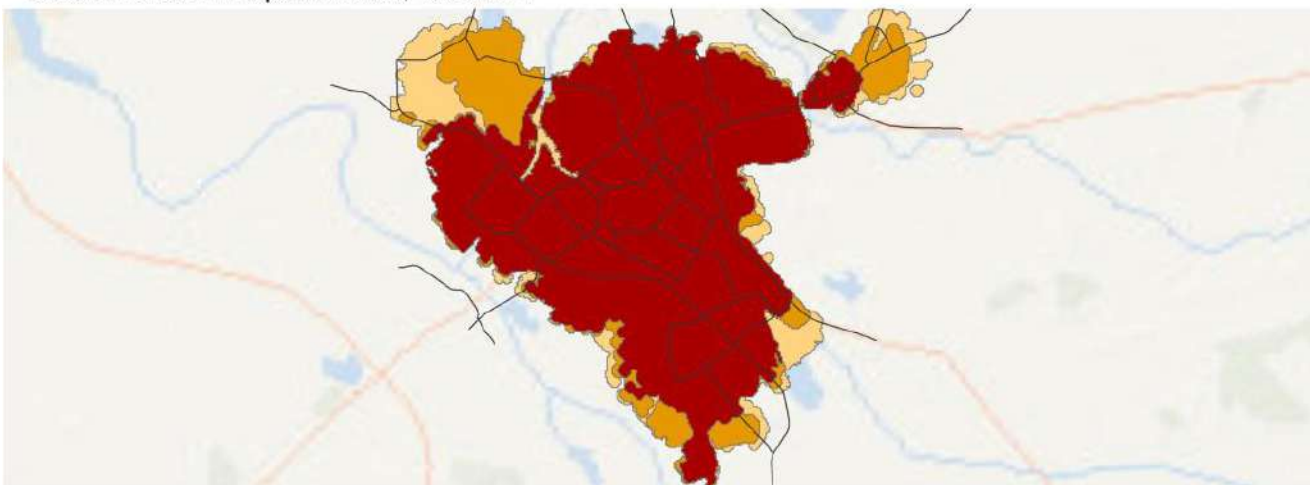
# Zwolle, Netherlands (Europe and Japan)



Selected Locales in Area Developed Before 1990



Selected Locales in Expansion Area, 1990-2014



## Zwolle, Netherlands 1990-2014



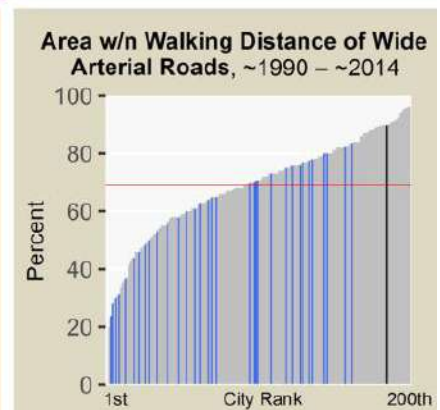
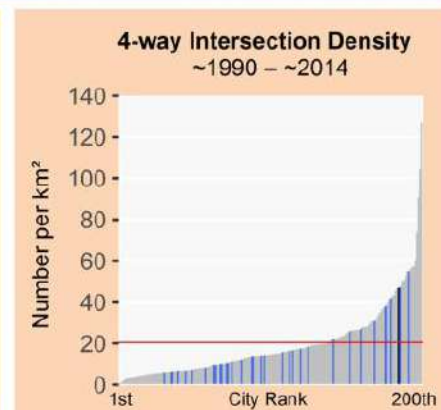
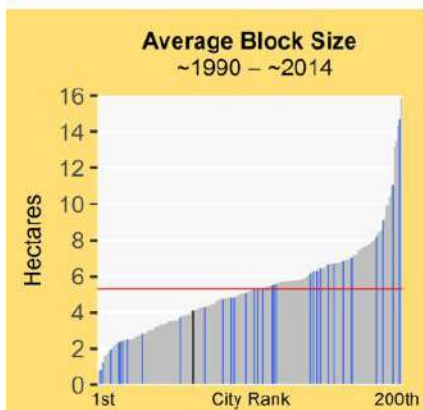
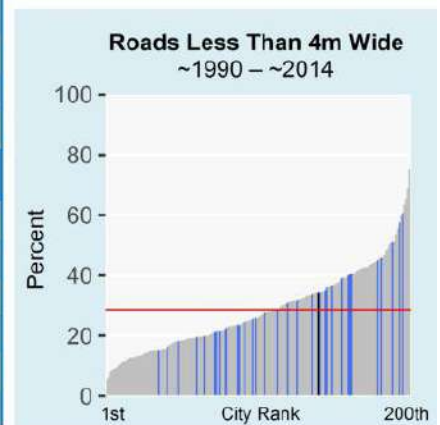
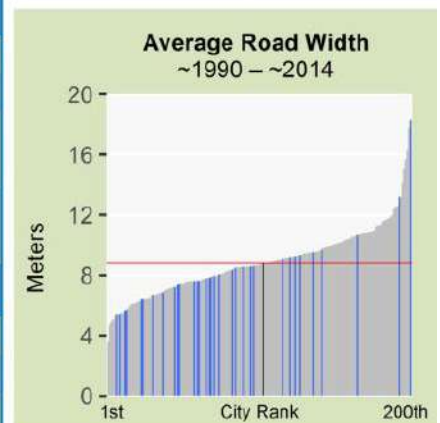
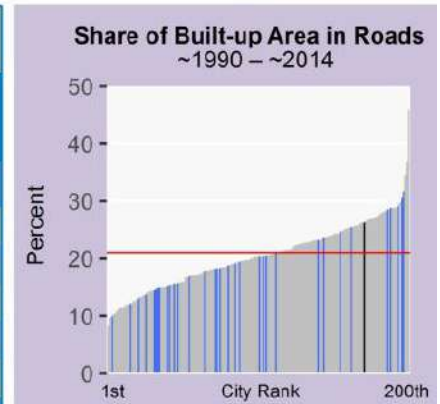
- Urban Extent in 1990
- Expansion, 1990 - 2000
- Expansion, 2000 - 2014

Arterial Roads

# Zwolle, Netherlands (Europe and Japan)



Legend for Charts			
	Zwolle	Other cities in region	All other cities
			Global average —
Metrics	Pre-1990	1990-2014	
Roads			
Share of Built-Up Area Occupied by Roads	16%	26%	
Share of Built-Up Area that is Gridded or Partially Gridded	0%	0%	
Average Road Width (m)	8.8	6.6	
Share of Roads less than 4m Wide	12%	34%	
Share of Roads more than 16m Wide	10%	7%	
Arterial Roads			
Density of Arterial Roads (km/km <sup>2</sup> )	1.7	1.5	
Average Beeline Distance to Arterial Roads (m)	214	242	
Share of Urban Extent Within Walking Distance (625m) of all Arterial Roads	95%	93%	
Share of Urban Extent Within Walking Distance of Wide Arterial Roads (>16m wide)	92%	90%	
Block Size, Plot Size, Intersection Density, and Walkability			
Share of Intersections that are 4-way	7%	15%	
Average Block Size (ha)	5.7	4.1	
3-way Intersection Density (number per km <sup>2</sup> )	61	207	
4-way Intersection Density (number per km <sup>2</sup> )	8	47	
Walkability Ratio	1.8	1.8	
Average Plot Size in Informal Subdivisions (m <sup>2</sup> )	962		
Average Plot Size in Formal Subdivisions (m <sup>2</sup> )		1219	
Stages in the Evolution of Residential Layouts			
Share of Built-Up Area in Residential Use	72%	64%	
Share of Residential Area Not Laid Out Before Occupation	22%	53%	
Share of Residential Area Laid Out Before Occupation	77%	46%	
Share of Residential Area in Informal Land Subdivisions	37%	3%	
Share of Residential Area in Formal Land Subdivisions	37%	46%	
Share of Residential Area in Housing Projects	9%	30%	





# Maps and Metrics for 30 Cities, 1900-2014

The following pages provide maps and metrics for a representative group of 30 cities, 27 of which are in the global sample of 200 cities. The cities are arranged in alphabetical order. The Index at the end of the volume lists them by country and by world region. There are two pages for every city. The left hand pages provide six high-resolution satellite images of typical locales developed at five approximate time periods: pre-1900, 1900-1930, 1930-1960, 1960-1990, and 1990-2014. Below these images, there is a map showing the network of arterial roads overlaid on a map of the city's historical expansion, ~1900 to ~2014. The right hand pages provide a table with metric values for each of five periods, as well as three charts with metric values associated with the different attributes of urban layouts in the city at different time periods and their comparison to the average of the 30 cities in the group.

# Accra, Ghana (Sub-Saharan Africa 1903 – 2014)



1903



1929



1966



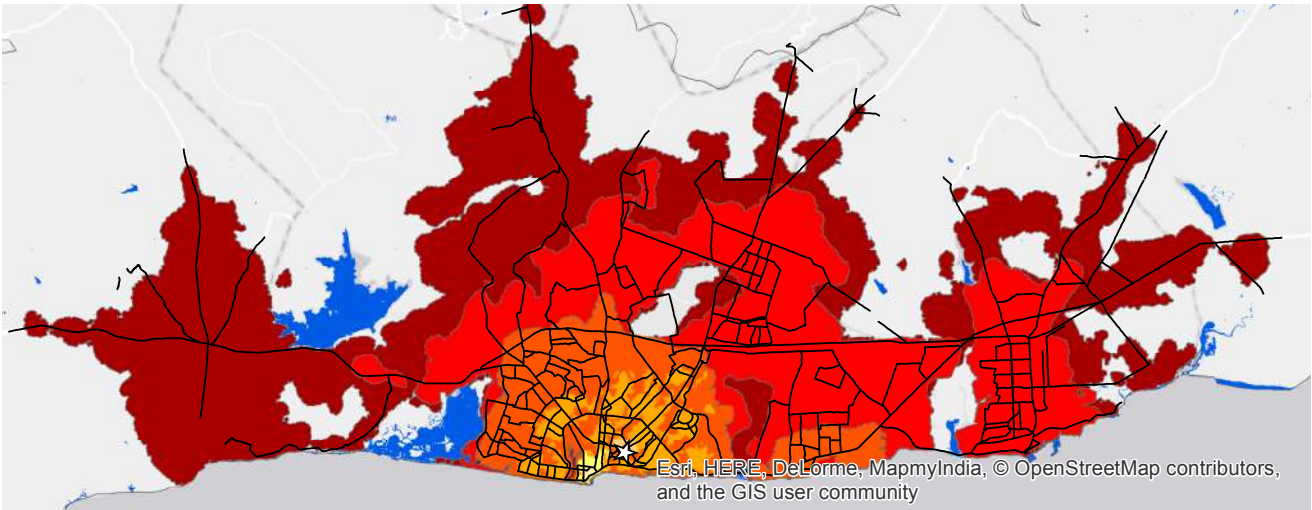
1991



2000



2014



**Accra, Ghana 1903-2014**

0 4.25 8.5 17 km

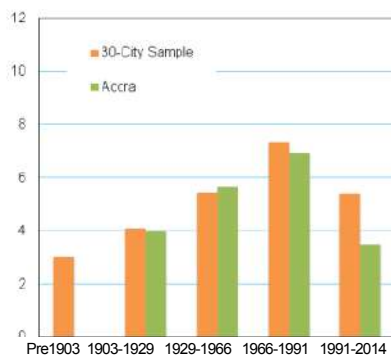
1903	1991	CBD
1929	2000	Study area
1966	2014	Water
	Arterial Roads	No data

## Accra, Ghana (Sub-Saharan Africa 1903 – 2014)



Urban Layout Metrics	Pre-1903	1903 - 1929	1929 - 1966	1966-1991	1991 - 2014
<b>Roads</b>					
Share of Built-up Area Occupied by Roads		17%	15%	15%	17%
Share of Built-up Area That Is Gridded		40%	24%	15%	11%
Share of Roads Less Than 4 Meters Wide		6%	9%	11%	27%
Share of Roads More Than 16 Meters Wide		10%	5%	7%	2%
<b>Arterial Roads</b>					
Total Area of Zone (km <sup>2</sup> )		3	37	156	682
Total Length of Arterial Roads (km <sup>2</sup> )		2	37	141	60
Density of All Arterial Roads (km/km <sup>2</sup> )		0.81	1.01	0.92	0.09
Average Beeline Distance to All Arterial Roads (meters)		254	364	471	2,915
Share of Area within Walking Distance of All Arterial Roads		95%	82%	71%	14%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>					
Share of Intersections that are 4-Way		40%	25%	10%	8%
Average Block Size (ha)		4.0	5.7	7.0	3.5
4-Way Intersection Density (number per km <sup>2</sup> )		29	15	9	12
Walkability Ratio		1.6	1.8	1.6	1.7
Average Plot Size in Informal Land Subdivisions		417	688	757	
Average Plot Size in Formal Land Subdivisions		583	528		
<b>Stages in the Evolution of Residential Layouts</b>					
Share of Built-up Area That Is Residential		43%	59%	70%	82%
Share of Residential Areas Not Laid Out Before Development		42%	40%	65%	47%
Share of Residential Areas Laid Out Before Development		58%	60%	55%	53%
Share of Residential Area in Informal Land Subdivisions		24%	27%	31%	45%
Share of Residential Area in Formal Land Subdivisions		18%	16%	4%	7%
Share of Residential Area in Housing Projects		16%	17%	1%	0%

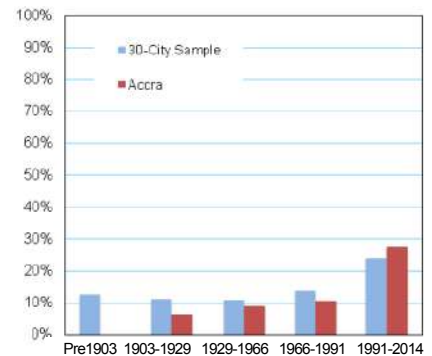
Average Block Size (hectares)



Share of Area Within Walking Distance of Arterial Road (625m)



Share of Roads Less Than 4-meters Wide



# Algiers, Algeria (Northern Africa 1903 – 2014)



1903



1929



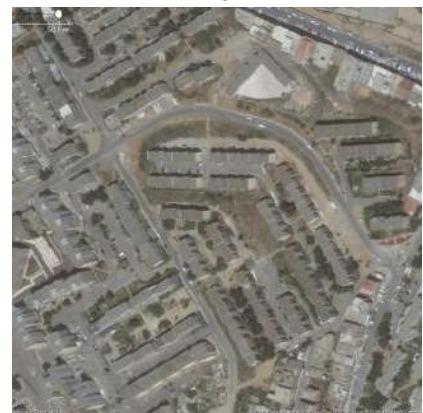
1972



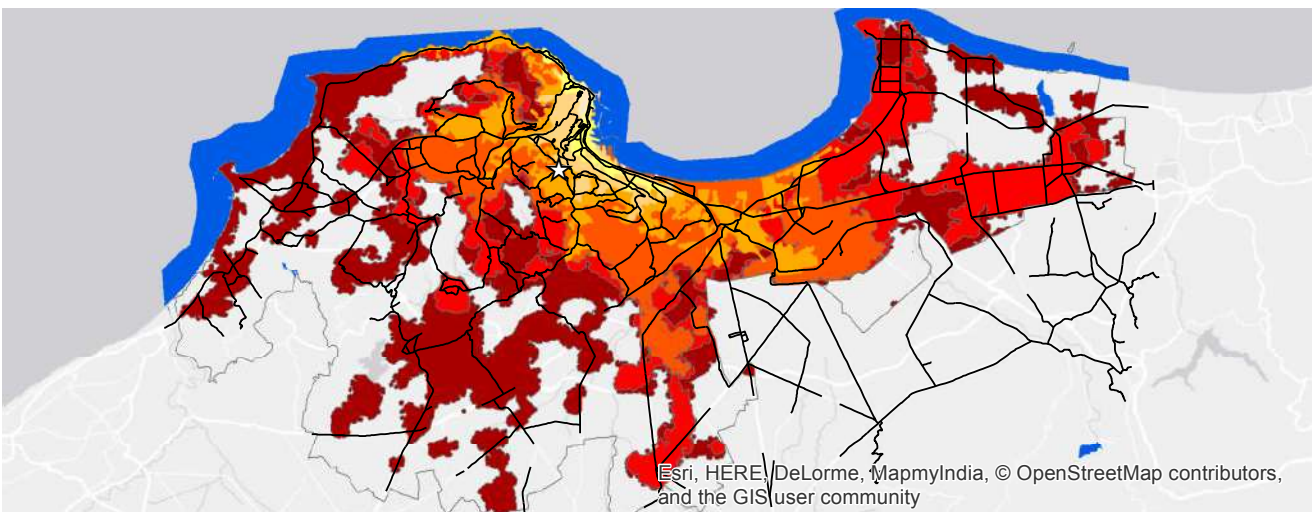
1987



2000



2014



Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

## Algiers, Algeria 1903-2014



- 1903
- 1929
- 1972

- 1987
- 2000
- 2014

Arterial Roads

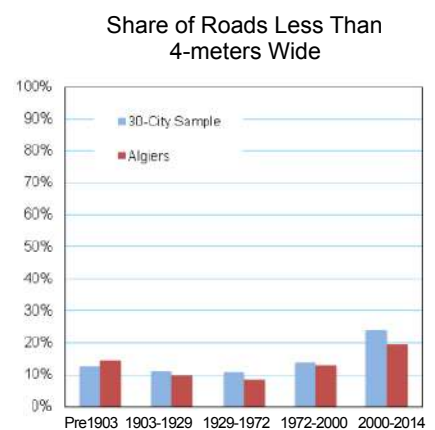
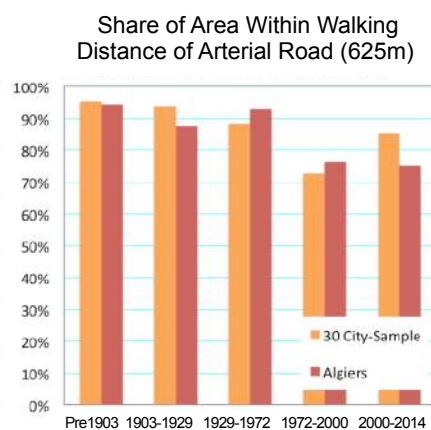
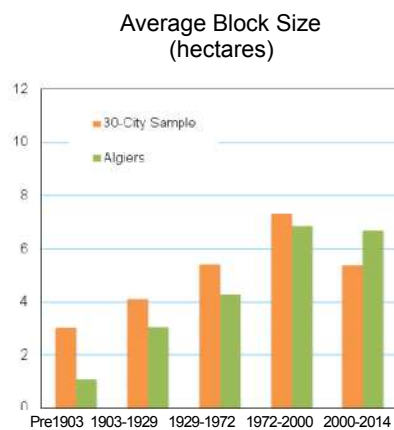
- ★ CBD
- Study area
- Water
- No data



# Algiers, Algeria (Northern Africa 1903 – 2014)



Urban Layout Metrics	Pre-1903	1903 - 1929	1929 - 1972	1972 - 1987	1987 - 2014
<b>Roads</b>					
Share of Built-up Area Occupied by Roads	28%	26%	22%	23%	13%
Share of Built-up Area That Is Gridded	6%	0%	0%	3%	5%
Share of Roads Less Than 4 Meters Wide	14%	10%	8%	13%	16%
Share of Roads More Than 16 Meters Wide	12%	23%	13%	15%	9%
<b>Arterial Roads</b>					
Total Area of Zone (km <sup>2</sup> )	3	5	12	302	427
Total Length of Arterial Roads (km <sup>2</sup> )	6	8	13	373	489
Density of All Arterial Roads (km/km <sup>2</sup> )	1.76	1.63	1.11	1.24	0.88
Average Beeline Distance to All Arterial Roads (meters)	249	288	278	510	431
Share of Area within Walking Distance of All Arterial Roads	94%	87%	93%	76%	75%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>					
Share of Intersections that are 4-Way	18%	12%	10%	10%	15%
Average Block Size (ha)	1.1	3.1	4.3	6.8	6.3
4-Way Intersection Density (number per km <sup>2</sup> )	49	32	14	13	33
Walkability Ratio	1.5	1.6	2.0	1.7	0.7
Average Plot Size in Informal Land Subdivisions					
Average Plot Size in Formal Land Subdivisions	469		353	267	68
<b>Stages in the Evolution of Residential Layouts</b>					
Share of Built-up Area That Is Residential	48%	31%	42%	40%	36%
Share of Residential Areas Not Laid Out Before Development	41%	40%	88%	64%	45%
Share of Residential Areas Laid Out Before Development	59%	60%	12%	36%	55%
Share of Residential Area in Informal Land Subdivisions	0%	0%	0%	1%	28%
Share of Residential Area in Formal Land Subdivisions	58%	53%	6%	14%	38%
Share of Residential Area in Housing Projects	2%	7%	6%	20%	39%



# Bangkok, Thailand (Southeast Asia 1900 – 2015)



1900



1922



1953



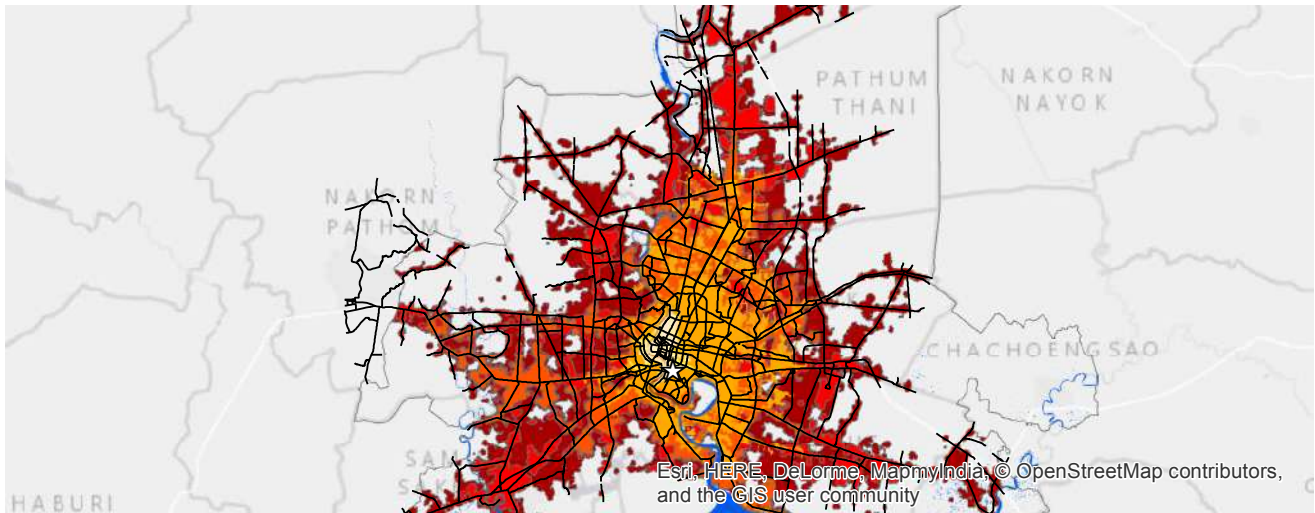
1988



2002



2015



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## Bangkok, Thailand

### 1900-2015

- 1900
- 1922
- 1953

- 1988
- 2002
- 2015
- Arterial Roads

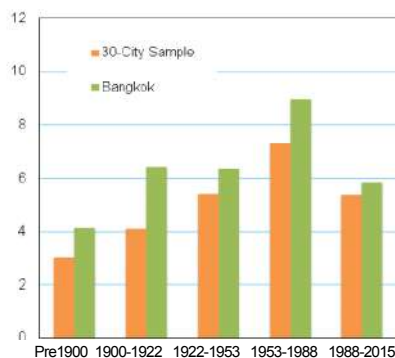
- ★ CBD
- Study area
- Water
- No data

# Bangkok, Thailand (Southeast Asia 1900 – 2015)

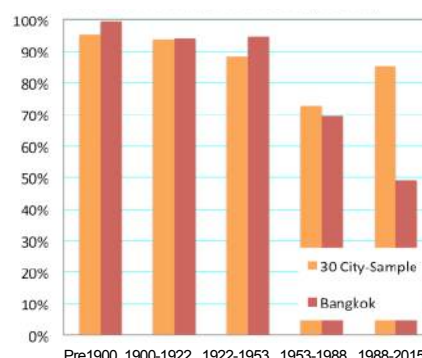


Urban Layout Metrics	Pre-1900	1900 - 1922	1922 - 1953	1953 - 1988	1988 - 2015
<b>Roads</b>					
Share of Built-up Area Occupied by Roads	18%	15%	18%	21%	11%
Share of Built-up Area That Is Gridded	8%	0%	3%	8%	3%
Share of Roads Less Than 4 Meters Wide	19%	23%	14%	17%	27%
Share of Roads More Than 16 Meters Wide	17%	12%	15%	10%	9%
<b>Arterial Roads</b>					
Total Area of Zone (km <sup>2</sup> )	35	13	57	1538	2966
Total Length of Arterial Roads (km <sup>2</sup> )	89	28	82	1390	1667
Density of All Arterial Roads (km/km <sup>2</sup> )	2.55	2.16	1.42	0.90	0.47
Average Beeline Distance to All Arterial Roads (meters)	138	221	240	549	921
Share of Area within Walking Distance of All Arterial Roads	99%	94%	95%	69%	49%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>					
Share of Intersections that are 4-Way	14%	7%	10%	9%	12%
Average Block Size (ha)	4.1	6.4	6.3	9.0	5.5
4-Way Intersection Density (number per km <sup>2</sup> )	13	4	5	5	7
Walkability Ratio	1.6	1.6	1.7	1.5	1.0
Average Plot Size in Informal Land Subdivisions					
Average Plot Size in Formal Land Subdivisions			295	216	
<b>Stages in the Evolution of Residential Layouts</b>					
Share of Built-up Area That Is Residential	43%	50%	47%	51%	30%
Share of Residential Areas Not Laid Out Before Development	87%	94%	93%	61%	35%
Share of Residential Areas Laid Out Before Development	13%	6%	7%	39%	65%
Share of Residential Area in Informal Land Subdivisions	0%	0%	0%	0%	31%
Share of Residential Area in Formal Land Subdivisions	13%	6%	5%	27%	25%
Share of Residential Area in Housing Projects	0%	1%	2%	11%	46%

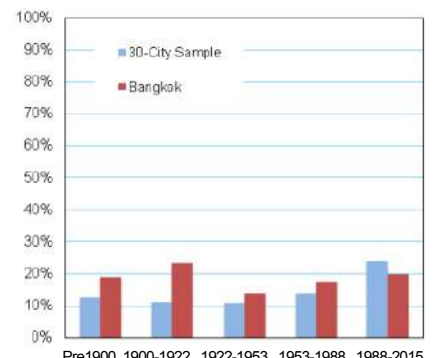
Average Block Size (hectares)



Share of Area Within Walking Distance of Arterial Road (625m)



Share of Roads Less Than 4-meters Wide



# Beijing, China (Eastern Asia & the Pacific 1900 – 2013)



1900



1929



1959



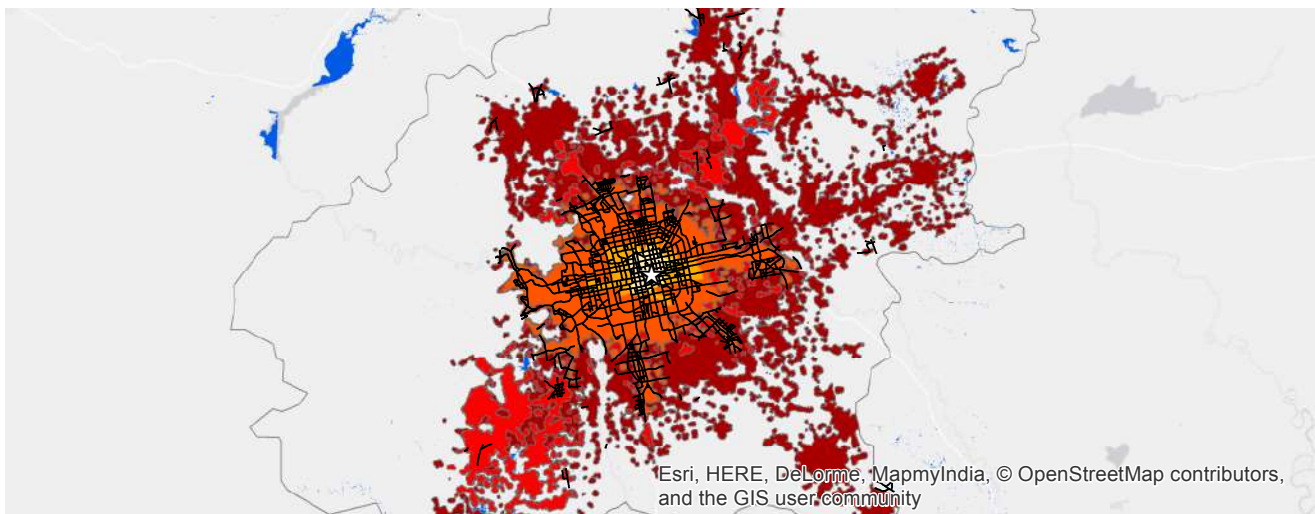
1988



1999



2013



**Beijing, China 1900-2013**

0 15 30 60 km

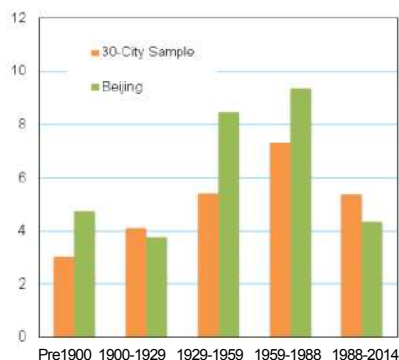
1900	1988	CBD
1929	1999	Study area
1959	2013	Water
	Arterial Roads	No data

# Beijing, China (Eastern Asia & the Pacific 1900 – 2013)

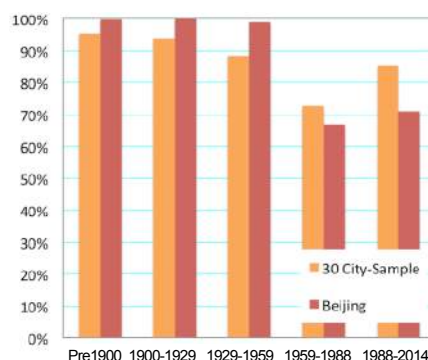


Urban Layout Metrics	Pre-1900	1900 - 1929	1929-1959	1959 - 1988	1988 - 2013
<b>Roads</b>					
Share of Built-up Area Occupied by Roads	23%	32%	24%	24%	12%
Share of Built-up Area That Is Gridded	3%	4%	3%	3%	3%
Share of Roads Less Than 4 Meters Wide	27%	21%	18%	41%	22%
Share of Roads More Than 16 Meters Wide	19%	29%	25%	16%	15%
<b>Arterial Roads</b>					
Total Area of Zone (km <sup>2</sup> )	55	6	107	2628	1301
Total Length of Arterial Roads (km <sup>2</sup> )	204	22	351	3525	1821
Density of All Arterial Roads (km/km <sup>2</sup> )	3.69	3.89	3.26	1.34	0.67
Average Beeline Distance to All Arterial Roads (meters)	103	102	123	791	573
Share of Area within Walking Distance of All Arterial Roads	100%	100%	99%	67%	71%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>					
Share of Intersections that are 4-Way	13%	15%	9%	7%	18%
Average Block Size (ha)	4.7	3.7	8.4	9.4	2.6
4-Way Intersection Density (number per km <sup>2</sup> )	10	14	6	12	36
Walkability Ratio	1.5	1.4	1.6	1.7	0.8
Average Plot Size in Informal Land Subdivisions				377	
Average Plot Size in Formal Land Subdivisions				421	
<b>Stages in the Evolution of Residential Layouts</b>					
Share of Built-up Area That Is Residential	44%	30%	29%	32%	20%
Share of Residential Areas Not Laid Out Before Development	35%	26%	5%	61%	11%
Share of Residential Areas Laid Out Before Development	65%	74%	95%	39%	89%
Share of Residential Area in Informal Land Subdivisions	0%	0%	0%	33%	48%
Share of Residential Area in Formal Land Subdivisions	21%	6%	23%	4%	38%
Share of Residential Area in Housing Projects	44%	68%	72%	43%	47%

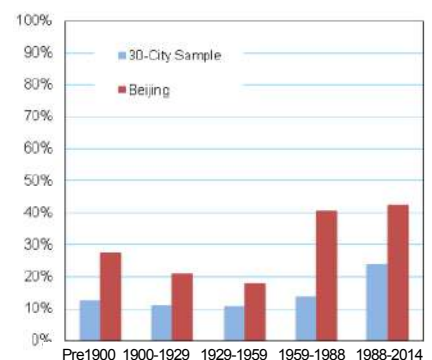
Average Block Size (hectares)



Share of Area Within Walking Distance of Arterial Road (625m)



Share of Roads Less Than 4-meters Wide



# Buenos Aires, Argentina (Latin America & the Caribbean 1887– 2014)



1887



1918



1964



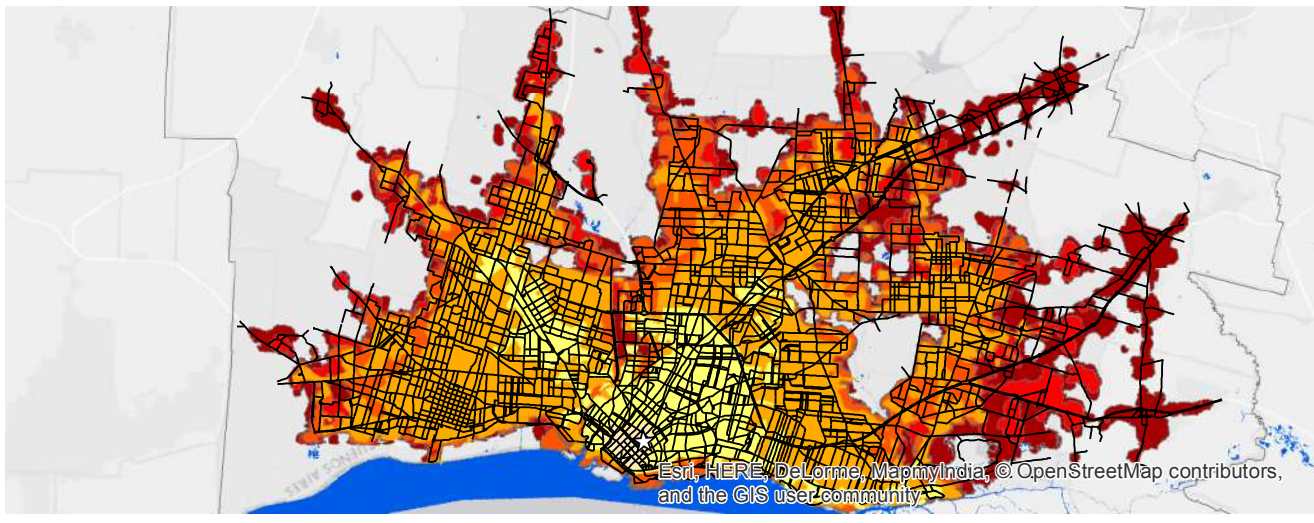
1989



2001



2014



**Buenos Aires, Argentina**  
1887-2014

0 5 10 20 km

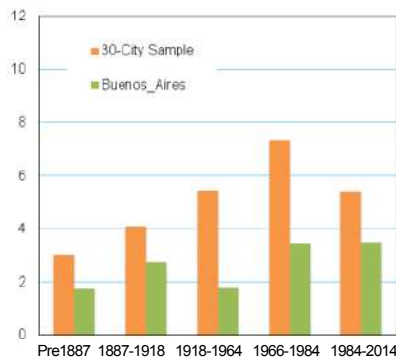
1887	1989	CBD
1918	2001	Study area
1964	2014	Water
	Arterial Roads	No data

## Buenos Aires, Argentina (Latin America & the Caribbean 1887– 2014)

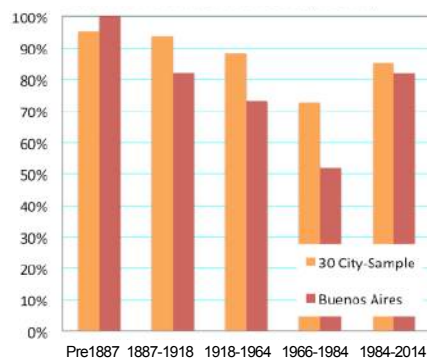


Urban Layout Metrics	Pre-1887	1887-1918	1918 - 1964	1964 - 1989	1989 - 2014
<b>Roads</b>					
Share of Built-up Area Occupied by Roads	27%	26%	26%	25%	6%
Share of Built-up Area That Is Gridded	100%	90%	90%	70%	73%
Share of Roads Less Than 4 Meters Wide	2%	3%	3%	4%	12%
Share of Roads More Than 16 Meters Wide	29%	19%	13%	10%	3%
<b>Arterial Roads</b>					
Total Area of Zone (km <sup>2</sup> )	20	491	496	827	1941
Total Length of Arterial Roads (km <sup>2</sup> )	59	655	467	462	4164
Density of All Arterial Roads (km/km <sup>2</sup> )	2.69	1.33	0.94	0.56	1.22
Average Beeline Distance to All Arterial Roads (meters)	104	352	468	809	349
Share of Area within Walking Distance of All Arterial Roads	100%	82%	73%	52%	82%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>					
Share of Intersections that are 4-Way	86%	50%	54%	41%	25%
Average Block Size (ha)	1.8	2.8	1.8	3.5	3.6
4-Way Intersection Density (number per km <sup>2</sup> )	58	46	54	37	42
Walkability Ratio	1.3	1.4	1.4	1.5	0.5
Average Plot Size in Informal Land Subdivisions		332	277		103
Average Plot Size in Formal Land Subdivisions	168	197	311	324	
<b>Stages in the Evolution of Residential Layouts</b>					
Share of Built-up Area That Is Residential	43%	52%	62%	52%	67%
Share of Residential Areas Not Laid Out Before Development	0%	4%	2%	0%	13%
Share of Residential Areas Laid Out Before Development	100%	96%	98%	100%	87%
Share of Residential Area in Informal Land Subdivisions	0%	6%	45%	65%	28%
Share of Residential Area in Formal Land Subdivisions	100%	89%	51%	34%	17%
Share of Residential Area in Housing Projects	0%	1%	2%	1%	18%

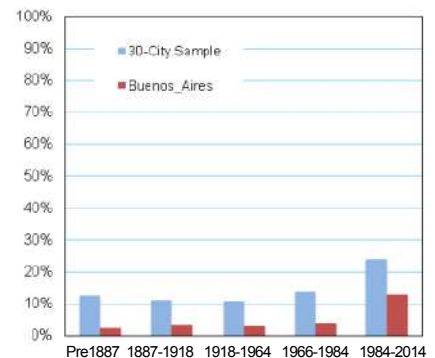
Average Block Size (hectares)



Share of Area Within Walking Distance of Arterial Road (625m)



Share of Roads Less Than 4-meters Wide



# Cairo, Egypt (Western Asia and North Africa 1897– 2013)



1897



1927



1960



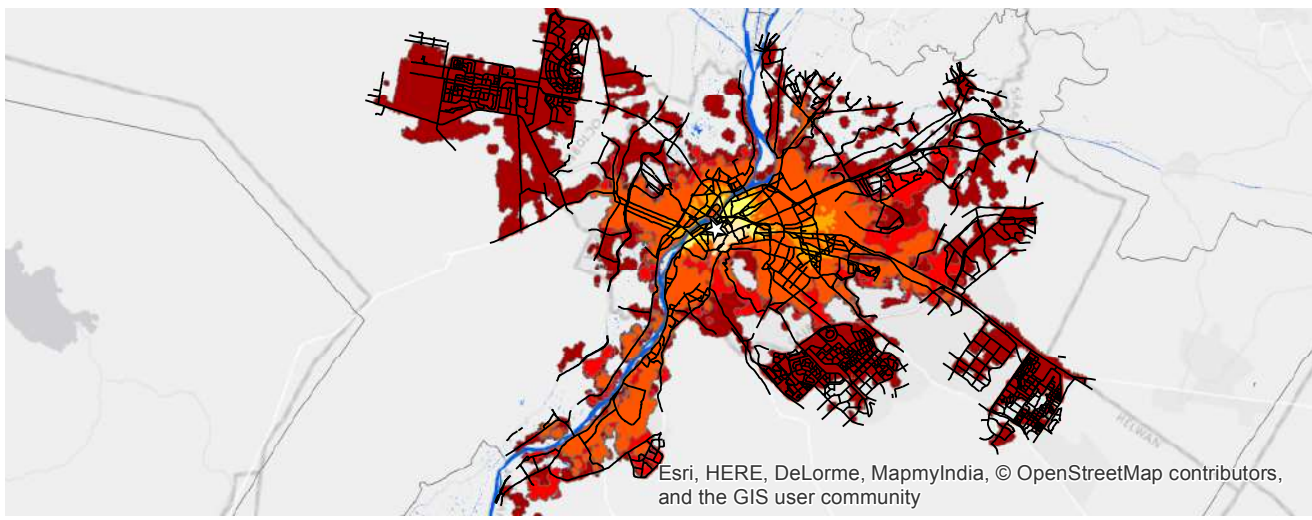
1992



2003



2013

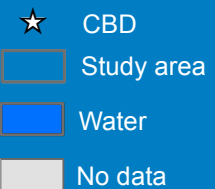


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## Cairo, Egypt 1897-2013



Arterial Roads



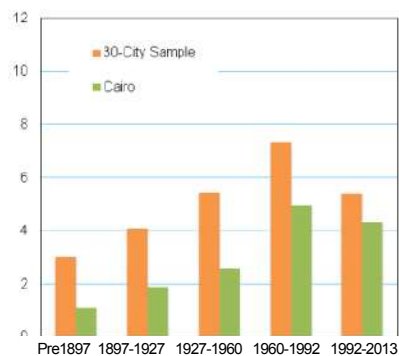


## Cairo, Egypt (Western Asia and North Africa 1897– 2013)

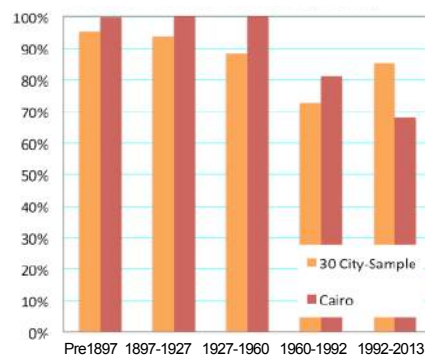


Urban Layout Metrics	Pre-1987	1897-1927	1927-1960	1960-1992	1992-2013
<b>Roads</b>					
Share of Built-up Area Occupied by Roads	23%	27%	29%	21%	12%
Share of Built-up Area That Is Gridded	15%	13%	17%	5%	8%
Share of Roads Less Than 4 Meters Wide	38%	14%	14%	14%	26%
Share of Roads More Than 16 Meters Wide	13%	24%	26%	18%	19%
<b>Arterial Roads</b>					
Total Area of Zone (km <sup>2</sup> )	16	20	29	550	1368
Total Length of Arterial Roads (km <sup>2</sup> )	45	82	122	1294	1560
Density of All Arterial Roads (km/km <sup>2</sup> )	2.85	4.14	4.25	2.35	1.13
Average Beeline Distance to All Arterial Roads (meters)	137	101	97	488	584
Share of Area within Walking Distance of All Arterial Roads	100%	100%	100%	81%	68%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>					
Share of Intersections that are 4-Way	14%	25%	26%	14%	16%
Average Block Size (ha)	1.1	1.9	2.6	5.0	4.5
4-Way Intersection Density (number per km <sup>2</sup> )	44	46	49	20	36
Walkability Ratio	1.5	1.6	1.6	1.6	0.6
Average Plot Size in Informal Land Subdivisions	128	148	87	77	190
Average Plot Size in Formal Land Subdivisions	332	665	618	486	217
<b>Stages in the Evolution of Residential Layouts</b>					
Share of Built-up Area That Is Residential	59%	44%	46%	39%	42%
Share of Residential Areas Not Laid Out Before Development	58%	7%	4%	35%	41%
Share of Residential Areas Laid Out Before Development	42%	93%	96%	65%	59%
Share of Residential Area in Informal Land Subdivisions	5%	14%	22%	35%	37%
Share of Residential Area in Formal Land Subdivisions	36%	78%	70%	25%	28%
Share of Residential Area in Housing Projects	2%	1%	4%	6%	42%

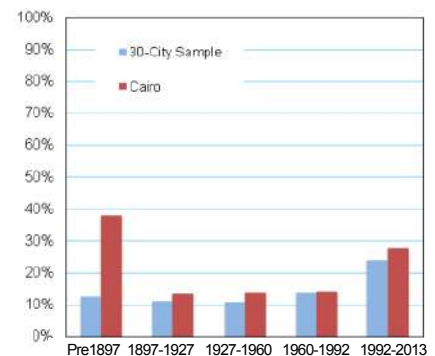
Average Block Size (hectares)



Share of Area Within Walking Distance of Arterial Road (625m)



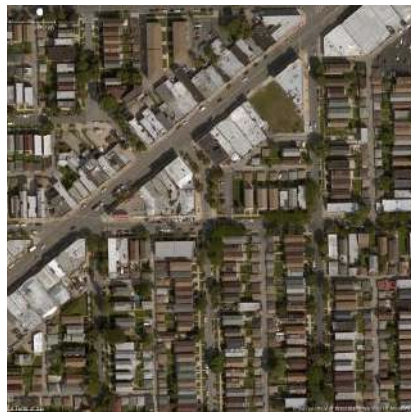
Share of Roads Less Than 4-meters Wide



# Chicago, United States (Land-Rich Developed Countries 1893 – 2014)



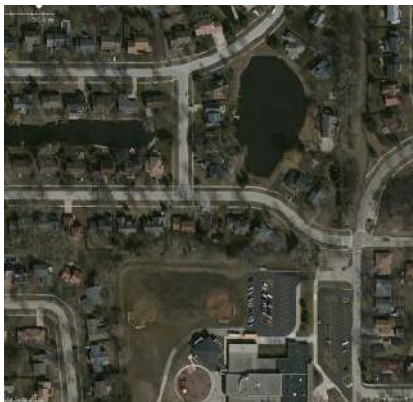
1893



1945



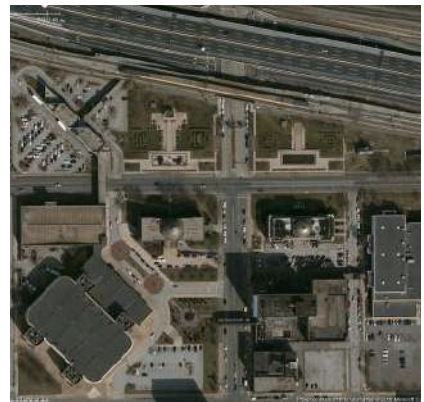
1967



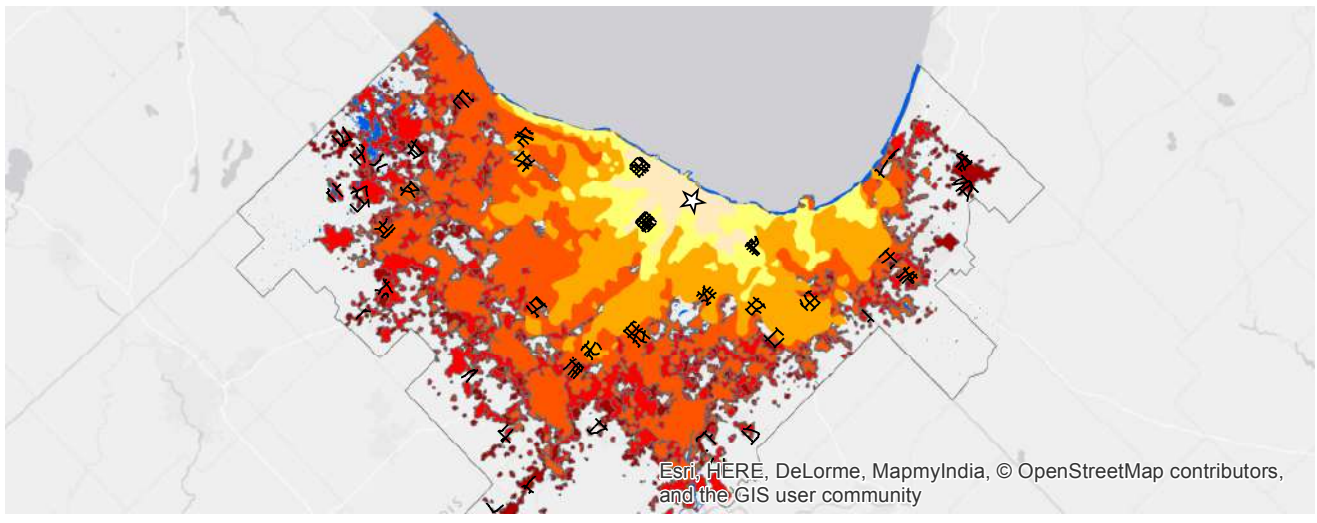
1989



2001



2014



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**Chicago, USA**  
1893-2014

1893

1945

1967

1989

2001

2014

Arterial Roads

★ CBD

Study area

Water

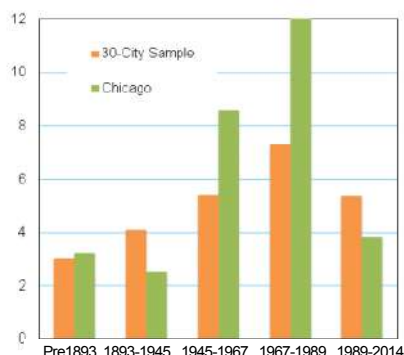
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# Chicago, United States (Land-Rich Developed Countries 1893 – 2014)

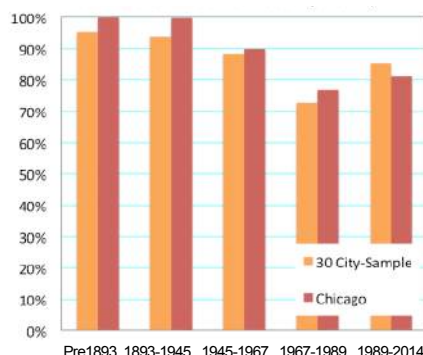


Urban Layout Metrics	Pre-1893	1893-1945	1945-1967	1967-1989	1989-2014
<b>Roads</b>					
Share of Built-up Area Occupied by Roads	34%	28%	23%	19%	14%
Share of Built-up Area That Is Gridded	83%	80%	30%	8%	0%
Share of Roads Less Than 4 Meters Wide	8%	8%	8%	11%	29%
Share of Roads More Than 16 Meters Wide	49%	44%	40%	31%	32%
<b>Arterial Roads</b>					
Total Area of Zone (km <sup>2</sup> )	302	101	2099	84	618
Total Length of Arterial Roads (km <sup>2</sup> )	2990	913	9043	234	681
Density of All Arterial Roads (km/km <sup>2</sup> )	9.89	9.07	4.31	2.78	0.79
Average Beeline Distance to All Arterial Roads (meters)	49	67	241	410	358
Share of Area within Walking Distance of All Arterial Roads	100%	100%	90%	77%	81%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>					
Share of Intersections that are 4-Way	45%	43%	18%	15%	14%
Average Block Size (ha)	3.2	2.5	0.1	20.8	3.2
4-Way Intersection Density (number per km <sup>2</sup> )	64	51	15	7	12
Walkability Ratio	1.5	1.5	1.6	1.4	0.5
Average Plot Size in Informal Land Subdivisions					
Average Plot Size in Formal Land Subdivisions	374	463	812	1348	1622
<b>Stages in the Evolution of Residential Layouts</b>					
Share of Built-up Area That Is Residential	39%	46%	45%	54%	58%
Share of Residential Areas Not Laid Out Before Development	0%	0%	7%	2%	19%
Share of Residential Areas Laid Out Before Development	100%	100%	93%	98%	81%
Share of Residential Area in Informal Land Subdivisions	0%	0%	3%	8%	0%
Share of Residential Area in Formal Land Subdivisions	94%	98%	78%	72%	44%
Share of Residential Area in Housing Projects	6%	2%	11%	18%	36%

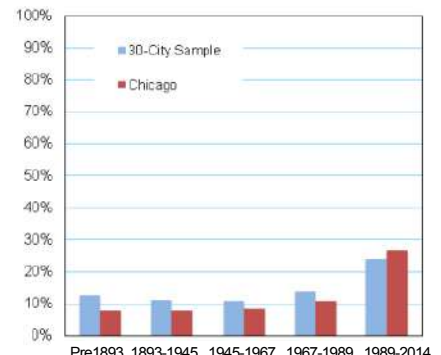
Average Block Size (hectares)



Share of Area Within Walking Distance of Arterial Road (625m)



Share of Roads Less Than 4-meters Wide



# Guatemala City, Guatemala (Latin America & the Caribbean 1900 – 2013)



1900



1936



1976



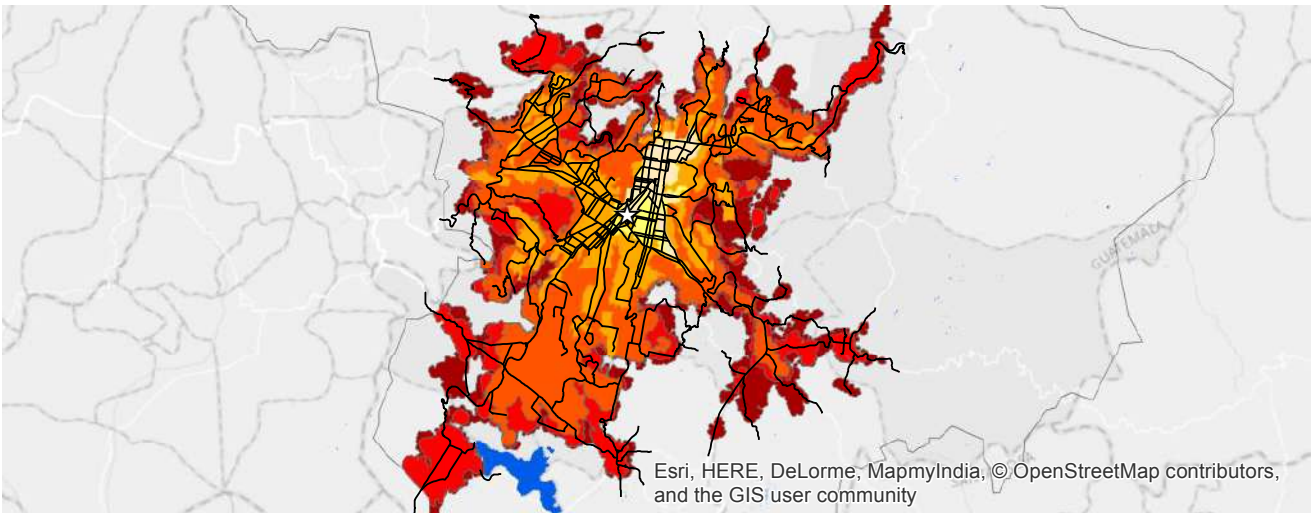
1990



2001



2013



**Guatemala City, Guatemala**  
1900-2013

0 4.25 8.5 17 km

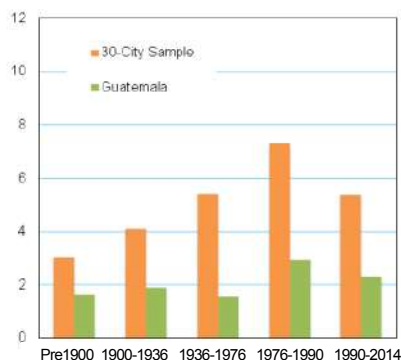
	1900		1990		CBD
	1936		2001		Study area
	1976		2013		Water
			Arterial Roads		No data

# Guatemala City, Guatemala (Latin America & the Caribbean 1900 – 2013)

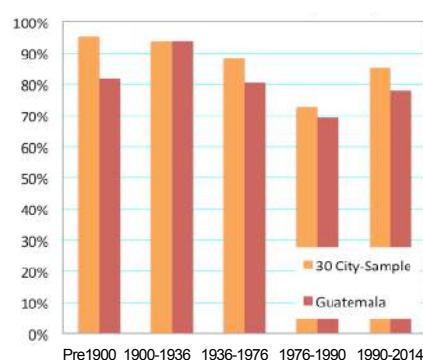


Urban Layout Metrics	Pre-1900	1900 - 1936	1936-1976	1976-1990	1990 - 2013
<b>Roads</b>					
Share of Built-up Area Occupied by Roads	24%	26%	18%	18%	19%
Share of Built-up Area That Is Gridded	84%	78%	58%	14%	3%
Share of Roads Less Than 4 Meters Wide	8%	7%	12%	15%	13%
Share of Roads More Than 16 Meters Wide	12%	22%	4%	8%	4%
<b>Arterial Roads</b>					
Total Area of Zone (km <sup>2</sup> )	11	6	7	198	376
Total Length of Arterial Roads (km <sup>2</sup> )	22	18	11	150	579
Density of All Arterial Roads (km/km <sup>2</sup> )	1.89	3.16	1.53	0.76	0.88
Average Beeline Distance to All Arterial Roads (meters)	323	182	352	504	390
Share of Area within Walking Distance of All Arterial Roads	82%	94%	80%	69%	78%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>					
Share of Intersections that are 4-Way	49%	46%	31%	16%	8%
Average Block Size (ha)	1.6	1.9	1.5	2.9	2.3
4-Way Intersection Density (number per km <sup>2</sup> )	62	70	48	22	14
Walkability Ratio	1.5	1.4	1.6	1.7	1.9
Average Plot Size in Informal Land Subdivisions				748	143
Average Plot Size in Formal Land Subdivisions					
<b>Stages in the Evolution of Residential Layouts</b>					
Share of Built-up Area That Is Residential	28%	26%	47%	57%	58%
Share of Residential Areas Not Laid Out Before Development	11%	24%	46%	28%	16%
Share of Residential Areas Laid Out Before Development	89%	76%	54%	72%	84%
Share of Residential Area in Informal Land Subdivisions	1%	29%	3%	14%	46%
Share of Residential Area in Formal Land Subdivisions	86%	48%	52%	53%	30%
Share of Residential Area in Housing Projects	1%	0%	0%	6%	9%

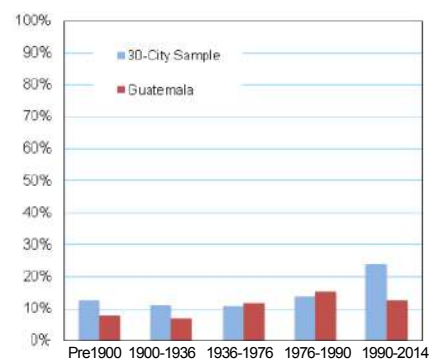
Average Block Size (hectares)



Share of Area Within Walking Distance of Arterial Road (625m)



Share of Roads Less Than 4-meters Wide



# Istanbul, Turkey (Western Asia 1899 – 2013)



1899



1934



1960



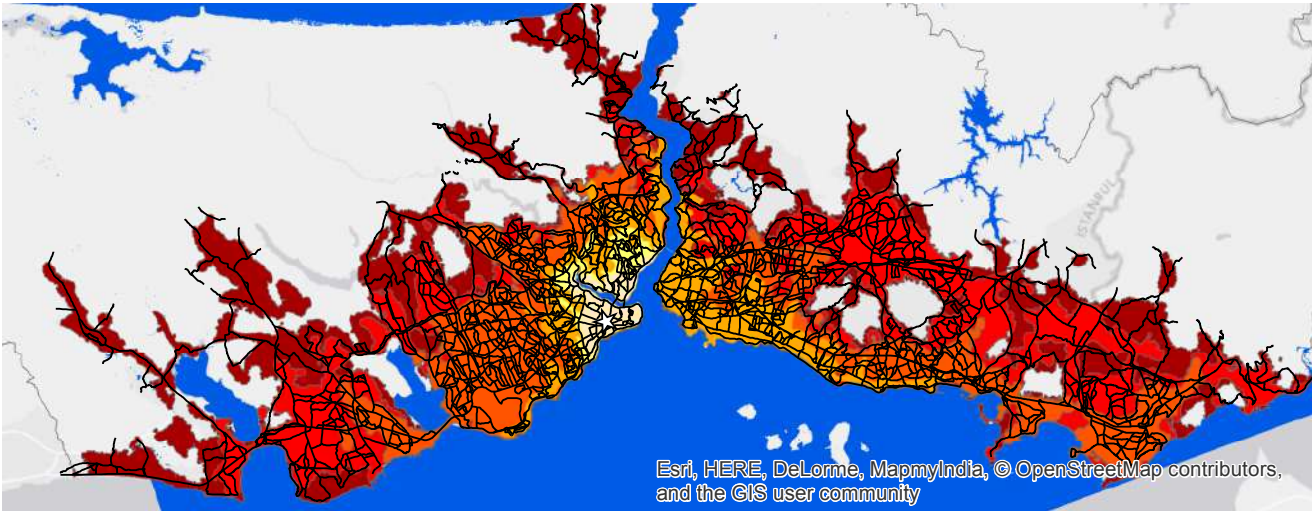
1990



2002



2013



**Istanbul, Turkey 1899-2013**

0 5 10 20 km

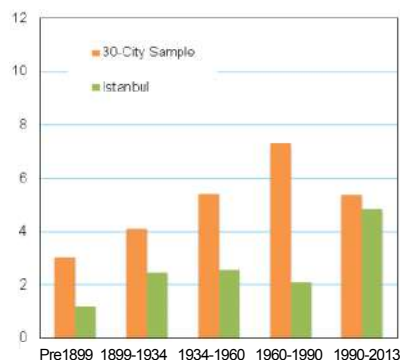
1899	1990	CBD
1934	2002	Study area
1960	2013	Water
	Arterial Roads	No data

# Istanbul, Turkey (Western Asia 1899 – 2013)

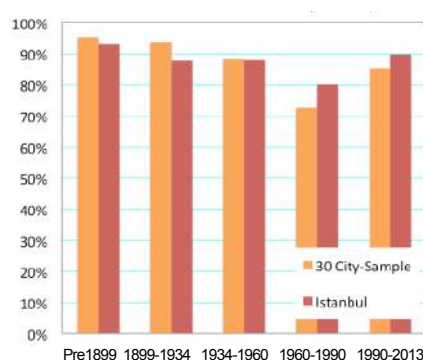


Urban Layout Metrics	Pre-1899	1899-1934	1934 - 1960	1960 - 1990	1990 - 2013
<b>Roads</b>					
Share of Built-up Area Occupied by Roads	24%	27%	29%	25%	30%
Share of Built-up Area That Is Gridded	13%	15%	3%	10%	5%
Share of Roads Less Than 4 Meters Wide	15%	6%	10%	7%	15%
Share of Roads More Than 16 Meters Wide	6%	13%	13%	6%	7%
<b>Arterial Roads</b>					
Total Area of Zone (km <sup>2</sup> )	32	58	86	426	1319
Total Length of Arterial Roads (km <sup>2</sup> )	50	87	114	538	2989
Density of All Arterial Roads (km/km <sup>2</sup> )	1.59	1.50	1.32	1.26	1.69
Average Beeline Distance to All Arterial Roads (meters)	256	309	308	592	263
Share of Area within Walking Distance of All Arterial Roads	93%	88%	88%	80%	90%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>					
Share of Intersections that are 4-Way	21%	17%	16%	17%	6%
Average Block Size (ha)	1.2	2.5	2.6	2.1	4.8
4-Way Intersection Density (number per km <sup>2</sup> )	57	26	24	36	15
Walkability Ratio	1.6	1.8	1.8	1.7	2.0
Average Plot Size in Informal Land Subdivisions					
Average Plot Size in Formal Land Subdivisions		473	446	235	318
<b>Stages in the Evolution of Residential Layouts</b>					
Share of Built-up Area That Is Residential	48%	50%	46%	48%	36%
Share of Residential Areas Not Laid Out Before Development	59%	42%	28%	39%	25%
Share of Residential Areas Laid Out Before Development	41%	58%	72%	61%	75%
Share of Residential Area in Informal Land Subdivisions	0%	0%	0%	0%	16%
Share of Residential Area in Formal Land Subdivisions	40%	55%	59%	50%	31%
Share of Residential Area in Housing Projects	2%	3%	13%	10%	29%

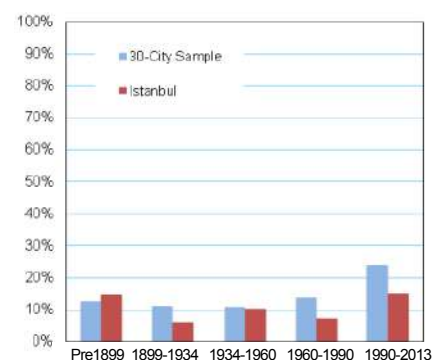
Average Block Size (hectares)



Share of Area Within Walking Distance of Arterial Road (625m)



Share of Roads Less Than 4-meters Wide



# Jeddah, Saudi Arabia (Western Asia and North Africa 1900 – 2013)



1900



1925



1964



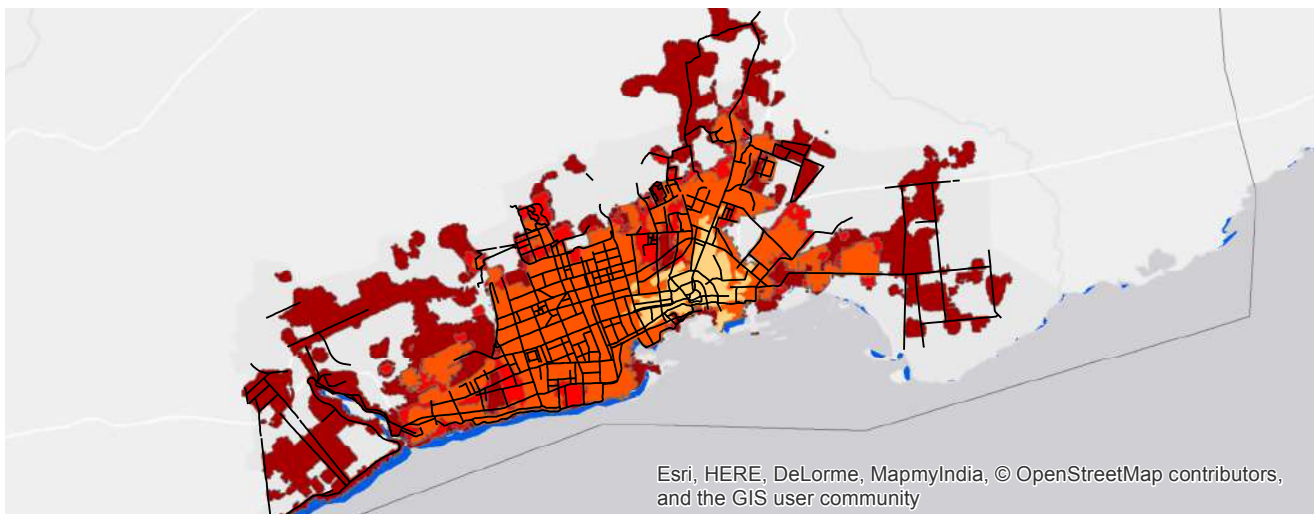
1990



2000



2013



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**Jeddah, Saudi Arabia**  
1900-2013

0 5 10 20 km

	1900		1990		CBD
	1925		2000		Study area
	1964		2013		Water
			Arterial Roads		No data

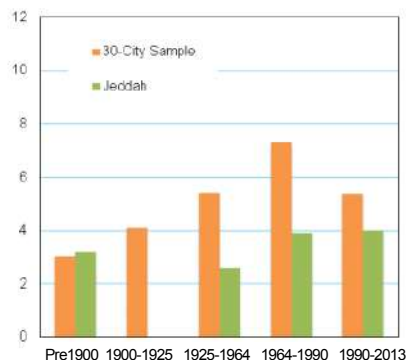


# Jeddah, Saudi Arabia (Western Asia and North Africa 1900 – 2013)

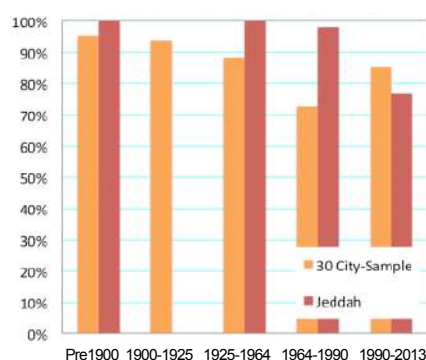


Urban Layout Metrics	Pre-1900	1900 - 1925	1925 - 1964	1964 - 1990	1990 - 2013
<b>Roads</b>					
Share of Built-up Area Occupied by Roads	19%		31%	30%	28%
Share of Built-up Area That Is Gridded	0%		16%	5%	3%
Share of Roads Less Than 4 Meters Wide	14%		8%	5%	14%
Share of Roads More Than 16 Meters Wide	24%		21%	41%	15%
<b>Arterial Roads</b>					
Total Area of Zone (km <sup>2</sup> )	0.4		35	249	798
Total Length of Arterial Roads (km <sup>2</sup> )	1		108	1107	804
Density of All Arterial Roads (km/km <sup>2</sup> )	3.67		3.08	4.44	1.18
Average Beeline Distance to All Arterial Roads (meters)	70		127	124	505
Share of Area within Walking Distance of All Arterial Roads	100%		100%	98%	77%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>					
Share of Intersections that are 4-Way	6%		24%	13%	12%
Average Block Size (ha)	3.2		2.6	3.9	4.0
4-Way Intersection Density (number per km <sup>2</sup> )	3		51	21	22
Walkability Ratio	1.9		1.5	1.6	1.7
Average Plot Size in Informal Land Subdivisions					
Average Plot Size in Formal Land Subdivisions			496	583	
<b>Stages in the Evolution of Residential Layouts</b>					
Share of Built-up Area That Is Residential	36%		38%	33%	27%
Share of Residential Areas Not Laid Out Before Development	67%		44%	8%	11%
Share of Residential Areas Laid Out Before Development	33%		56%	92%	89%
Share of Residential Area in Informal Land Subdivisions	0%		0%	4%	18%
Share of Residential Area in Formal Land Subdivisions	33%		53%	39%	67%
Share of Residential Area in Housing Projects	0%		3%	16%	4%

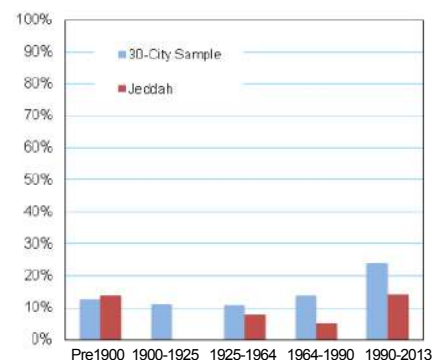
Average Block Size (hectares)



Share of Area Within Walking Distance of Arterial Road (625m)



Share of Roads Less Than 4-meters Wide



# Johannesburg, South Africa (Sub-Saharan Africa 1900 – 2013)



1900



1938



1957



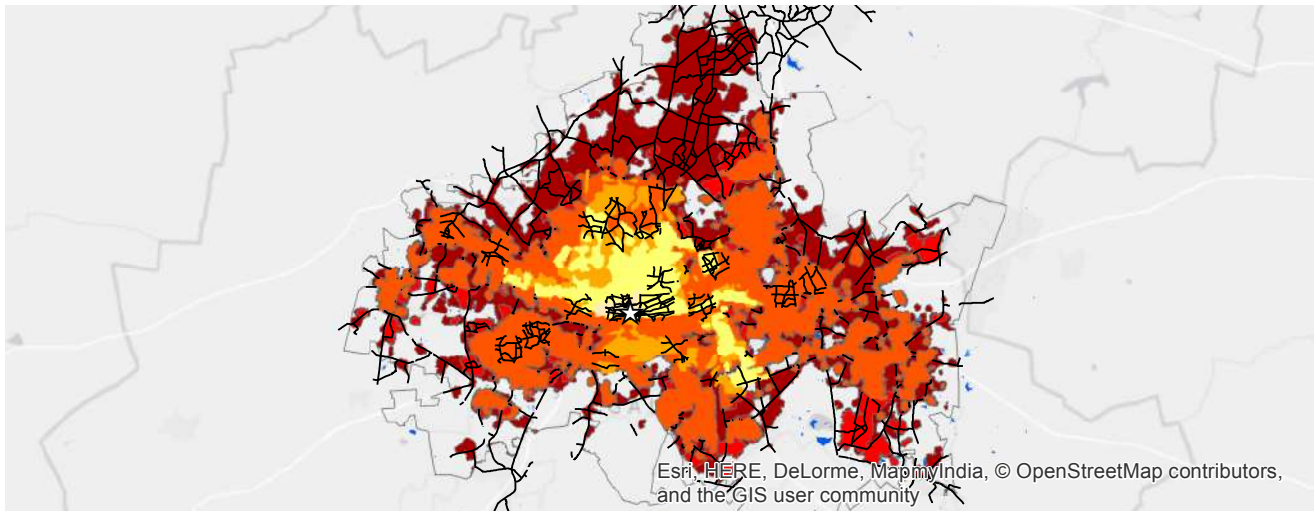
1990



1998



2013



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**Johannesburg, South Africa 1900-2013**

	1900		1990		CBD
	1938		1998		Study area
	1957		2013		Water
			Arterial Roads		No data

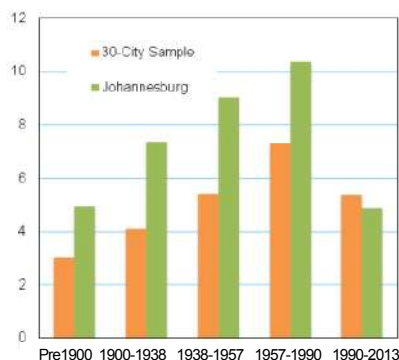
0 10 20 40 km

# Johannesburg, South Africa (Sub-Saharan Africa 1900 – 2013)



Urban Layout Metrics	Pre-1900	1900 - 1938	1938 - 1957	1957 - 1990	1990 - 2013
<b>Roads</b>					
Share of Built-up Area Occupied by Roads	29%	23%	24%	24%	17%
Share of Built-up Area That Is Gridded	52%	30%	10%	3%	3%
Share of Roads Less Than 4 Meters Wide	6%	5%	5%	10%	24%
Share of Roads More Than 16 Meters Wide	38%	31%	37%	25%	4%
<b>Arterial Roads</b>					
Total Area of Zone (km <sup>2</sup> )	23	372	198	1424	2880
Total Length of Arterial Roads (km <sup>2</sup> )	91	1075	525	2807	1827
Density of All Arterial Roads (km/km <sup>2</sup> )	3.95	2.89	2.65	1.97	0.53
Average Beeline Distance to All Arterial Roads (meters)	107	187	166	287	582
Share of Area within Walking Distance of All Arterial Roads	100%	95%	98%	89%	64%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>					
Share of Intersections that are 4-Way	38%	30%	20%	6%	10%
Average Block Size (ha)	4.9	7.4	9.0	10.4	4.9
4-Way Intersection Density (number per km <sup>2</sup> )	42	18	9	6	16
Walkability Ratio	1.5	1.7	1.6	1.7	2.3
Average Plot Size in Informal Land Subdivisions				230	205
Average Plot Size in Formal Land Subdivisions	560	1034	1136	960	493
<b>Stages in the Evolution of Residential Layouts</b>					
Share of Built-up Area That Is Residential	26%	52%	47%	57%	64%
Share of Residential Areas Not Laid Out Before Development	2%	0%	0%	1%	18%
Share of Residential Areas Laid Out Before Development	98%	100%	100%	99%	82%
Share of Residential Area in Informal Land Subdivisions		6%		11%	41%
Share of Residential Area in Formal Land Subdivisions	98%	88%	89%	74%	38%
Share of Residential Area in Housing Projects	0%	6%	11%	14%	3%

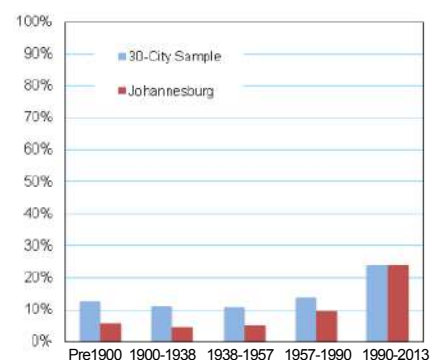
Average Block Size (hectares)



Share of Area Within Walking Distance of Arterial Road (625m)



Share of Roads Less Than 4-meters Wide



# Kolkata, India (South and Central Asia 1883 – 2014)



1883



1931



1961



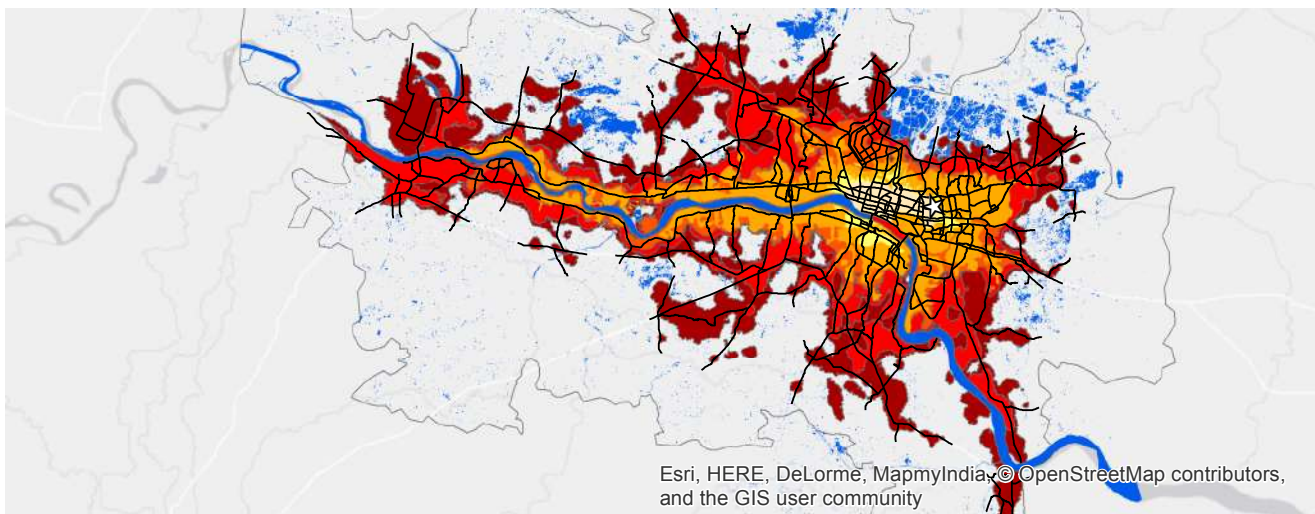
1990



2003



2014



**Kolkata, India**  
1883-2014

0 5 10 20 km

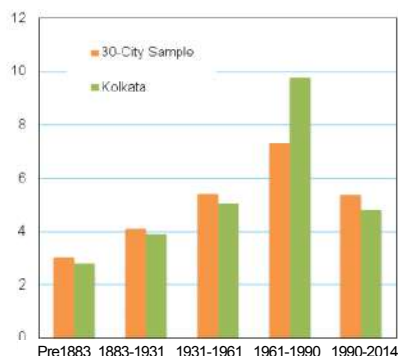
1883	1990	CBD
1931	2003	Study area
1961	2014	Water
	Arterial Roads	No data

# Kolkata, India (South and Central Asia 1883 – 2014)

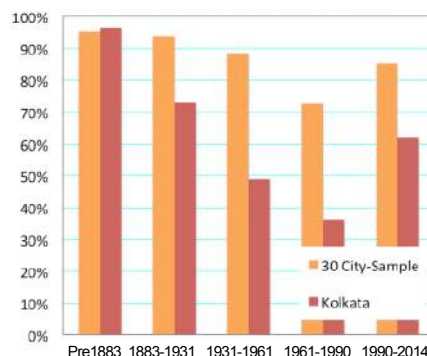


Urban Layout Metrics	Pre-1883	1883-1931	1931 - 1961	1961 - 1990	1990 - 2014
<b>Roads</b>					
Share of Built-up Area Occupied by Roads	19%	13%	11%	9%	10%
Share of Built-up Area That Is Gridded	0%	3%	0%	3%	3%
Share of Roads Less Than 4 Meters Wide	29%	31%	46%	58%	60%
Share of Roads More Than 16 Meters Wide	12%	5%	3%	1%	2%
<b>Arterial Roads</b>					
Total Area of Zone (km <sup>2</sup> )	28	13	211	398	989
Total Length of Arterial Roads (km <sup>2</sup> )	72	15	124	190	794
Density of All Arterial Roads (km/km <sup>2</sup> )	2.57	1.13	0.59	0.48	0.57
Average Beeline Distance to All Arterial Roads (meters)	179	466	1151	1595	650
Share of Area within Walking Distance of All Arterial Roads	96%	73%	49%	36%	62%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>					
Share of Intersections that are 4-Way	19%	8%	7%	4%	4%
Average Block Size (ha)	2.8	3.9	5.0	9.8	4.8
4-Way Intersection Density (number per km <sup>2</sup> )	24	8	8	4	6
Walkability Ratio	1.4	1.7	1.8	1.6	1.6
Average Plot Size in Informal Land Subdivisions					217
Average Plot Size in Formal Land Subdivisions	141	263	318	351	
<b>Stages in the Evolution of Residential Layouts</b>					
Share of Built-up Area That Is Residential	62%	64%	61%	73%	67%
Share of Residential Areas Not Laid Out Before Development	91%	91%	90%	96%	73%
Share of Residential Areas Laid Out Before Development	9%	9%	10%	4%	27%
Share of Residential Area in Informal Land Subdivisions	0%	0%	0%	0%	16%
Share of Residential Area in Formal Land Subdivisions	9%	4%	5%	3%	3%
Share of Residential Area in Housing Projects	1%	5%	5%	1%	8%

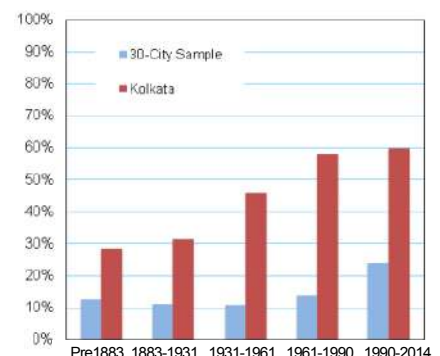
Average Block Size (hectares)



Share of Area Within Walking Distance of Arterial Road (625m)



Share of Roads Less Than 4-meters Wide



# Kuwait City, Kuwait (Western Asia and North Africa 1900 – 2013)



1900



1922



1963



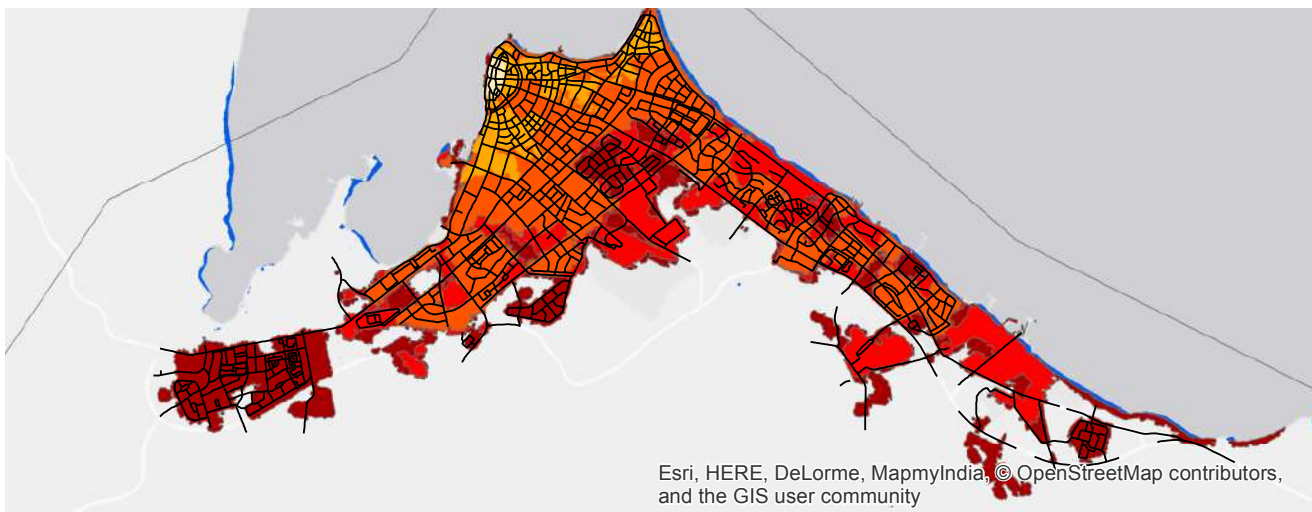
1990



2000



2013



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## Kuwait City, Kuwait 1900-2013



- 1900
- 1922
- 1963

- 1990
- 2000
- 2013
- Arterial Roads

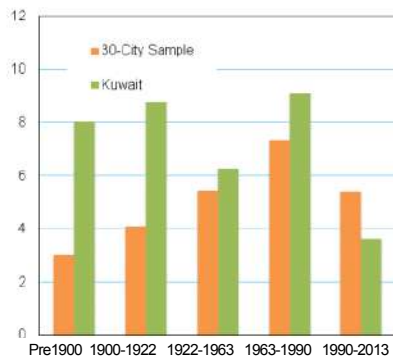
- ★ CBD
- Study area
- Water
- No data

# Kuwait City, Kuwait (Western Asia and North Africa 1900 – 2013)

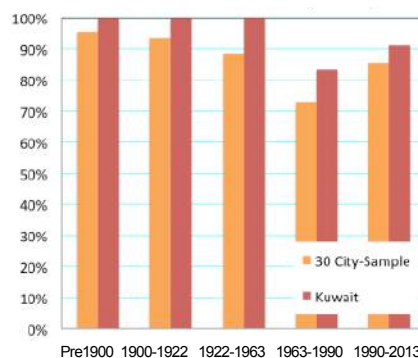


Urban Layout Metrics	Pre-1900	1900 - 1922	1922 - 1963	1963 - 1990	1990 - 2013
<b>Roads</b>					
Share of Built-up Area Occupied by Roads	22%	30%	30%	21%	27%
Share of Built-up Area That Is Gridded	0%	5%	0%	0%	0%
Share of Roads Less Than 4 Meters Wide	7%	17%	8%	6%	7%
Share of Roads More Than 16 Meters Wide	35%	46%	31%	16%	11%
<b>Arterial Roads</b>					
Total Area of Zone (km <sup>2</sup> )	3	1	37	508	565
Total Length of Arterial Roads (km <sup>2</sup> )	8	2	103	945	1175
Density of All Arterial Roads (km/km <sup>2</sup> )	2.77	2.13	2.78	1.86	2.08
Average Beeline Distance to All Arterial Roads (meters)	113	101	117	542	248
Share of Area within Walking Distance of All Arterial Roads	100%	100%	100%	83%	91%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>					
Share of Intersections that are 4-Way	26%	38%	14%	5%	7%
Average Block Size (ha)	8.0	9.8	6.3	9.1	3.6
4-Way Intersection Density (number per km <sup>2</sup> )	8	5	6	2	13
Walkability Ratio	1.6	2.1	1.8	2.0	2.1
Average Plot Size in Informal Land Subdivisions					
Average Plot Size in Formal Land Subdivisions			615	639	
<b>Stages in the Evolution of Residential Layouts</b>					
Share of Built-up Area That Is Residential	9%	13%	30%	33%	28%
Share of Residential Areas Not Laid Out Before Development	0%	0%	0%	0%	4%
Share of Residential Areas Laid Out Before Development	100%	100%	100%	100%	96%
Share of Residential Area in Informal Land Subdivisions	0%	0%	0%	4%	19%
Share of Residential Area in Formal Land Subdivisions	28%	100%	97%	94%	73%
Share of Residential Area in Housing Projects	24%	0%	18%	7%	4%

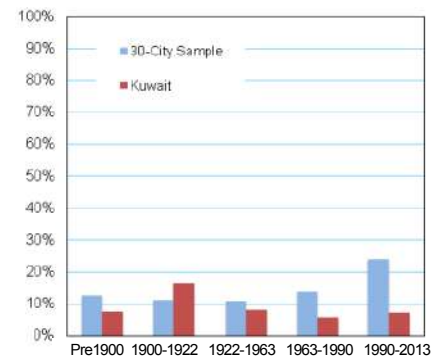
Average Block Size (hectares)



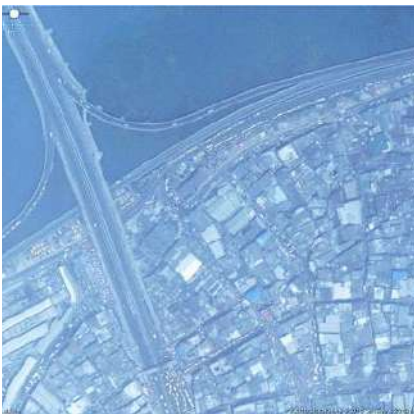
Share of Area Within Walking Distance of Arterial Road (625m)



Share of Roads Less Than 4-meters Wide



# Lagos, Nigeria (West Africa 1900 – 2013)



1900



1920



1962



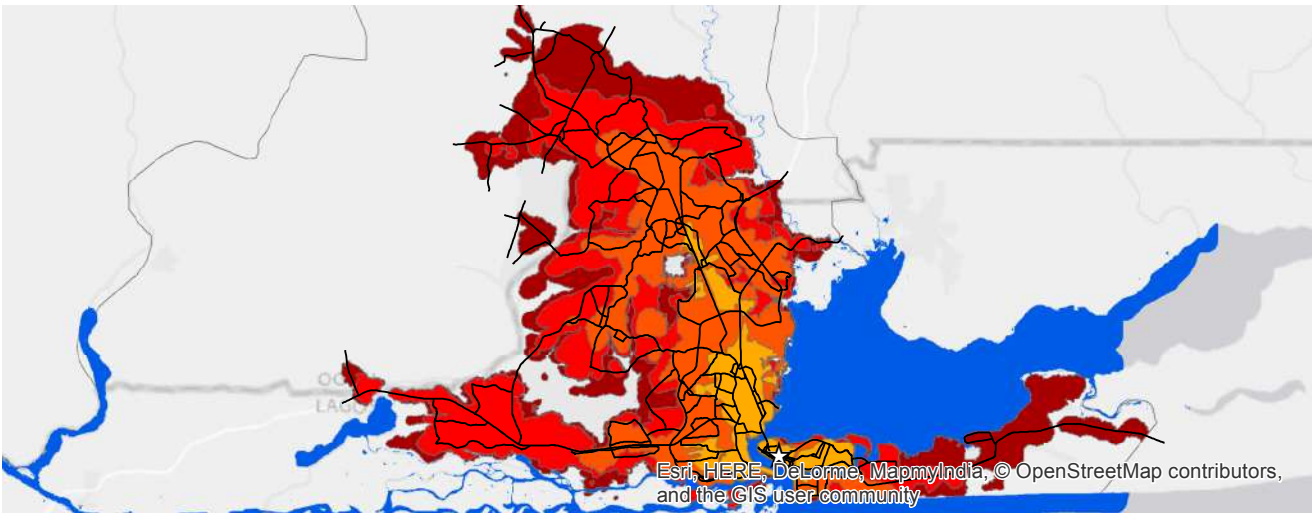
1984



2000



2013



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**Lagos, Nigeria 1900-2013**

0 5 10 20 km

1900	1984	CBD
1920	2000	Study area
1962	2013	Water
	Arterial Roads	No data

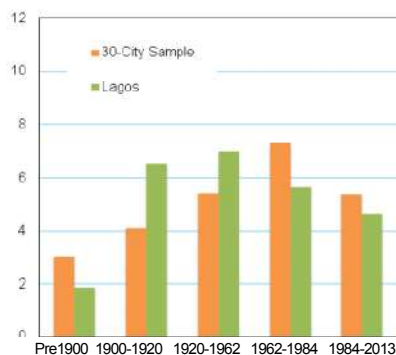


# Lagos, Nigeria (West Africa 1900 – 2013)

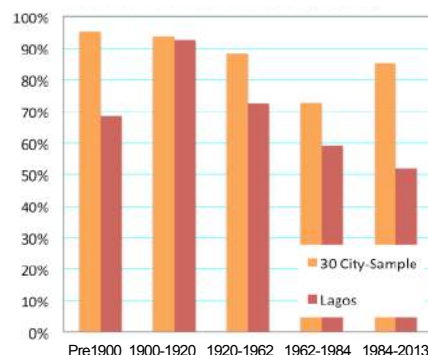


Urban Layout Metrics	Pre-1900	1900 - 1920	1920 - 1962	1962 - 1984	1984 - 2013
<b>Roads</b>					
Share of Built-up Area Occupied by Roads	23%	17%	16%	17%	17%
Share of Built-up Area That Is Gridded	0%	43%	20%	5%	0%
Share of Roads Less Than 4 Meters Wide	17%	5%	5%	6%	25%
Share of Roads More Than 16 Meters Wide	10%	12%	10%	9%	3%
<b>Arterial Roads</b>					
Total Area of Zone (km <sup>2</sup> )	4	5	66	250	830
Total Length of Arterial Roads (km <sup>2</sup> )	2	9	57	242	509
Density of All Arterial Roads (km/km <sup>2</sup> )	0.52	1.66	0.87	0.97	0.42
Average Beeline Distance to All Arterial Roads (meters)	476	247	472	1750	787
Share of Area within Walking Distance of All Arterial Roads	68%	93%	72%	59%	52%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>					
Share of Intersections that are 4-Way	28%	32%	9%	7%	2%
Average Block Size (ha)	1.9	6.5	7.0	5.6	4.7
4-Way Intersection Density (number per km <sup>2</sup> )	49	10	7	5	3
Walkability Ratio	1.4	1.6	1.6	1.8	1.8
Average Plot Size in Informal Land Subdivisions				648	
Average Plot Size in Formal Land Subdivisions			399	610	
<b>Stages in the Evolution of Residential Layouts</b>					
Share of Built-up Area That Is Residential	45%	28%	43%	62%	60%
Share of Residential Areas Not Laid Out Before Development	84%	20%	58%	58%	52%
Share of Residential Areas Laid Out Before Development	16%	80%	42%	42%	48%
Share of Residential Area in Informal Land Subdivisions	3%	16%	9%	23%	41%
Share of Residential Area in Formal Land Subdivisions	13%	43%	29%	13%	0%
Share of Residential Area in Housing Projects	0%	21%	4%	6%	6%

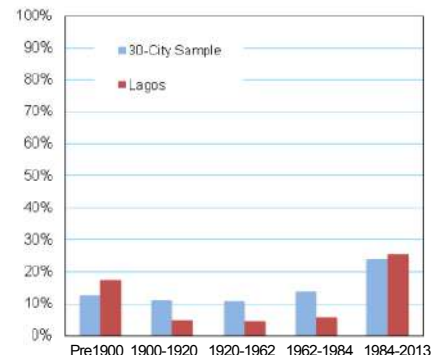
Average Block Size (hectares)



Share of Area Within Walking Distance of Arterial Road (625m)



Share of Roads Less Than 4-meters Wide



# London, United Kingdom (Europe & Japan 1880– 2013)



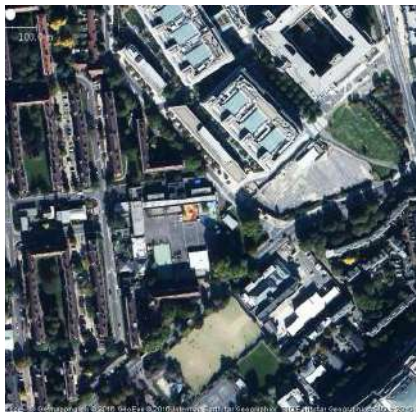
1880



1929



1955



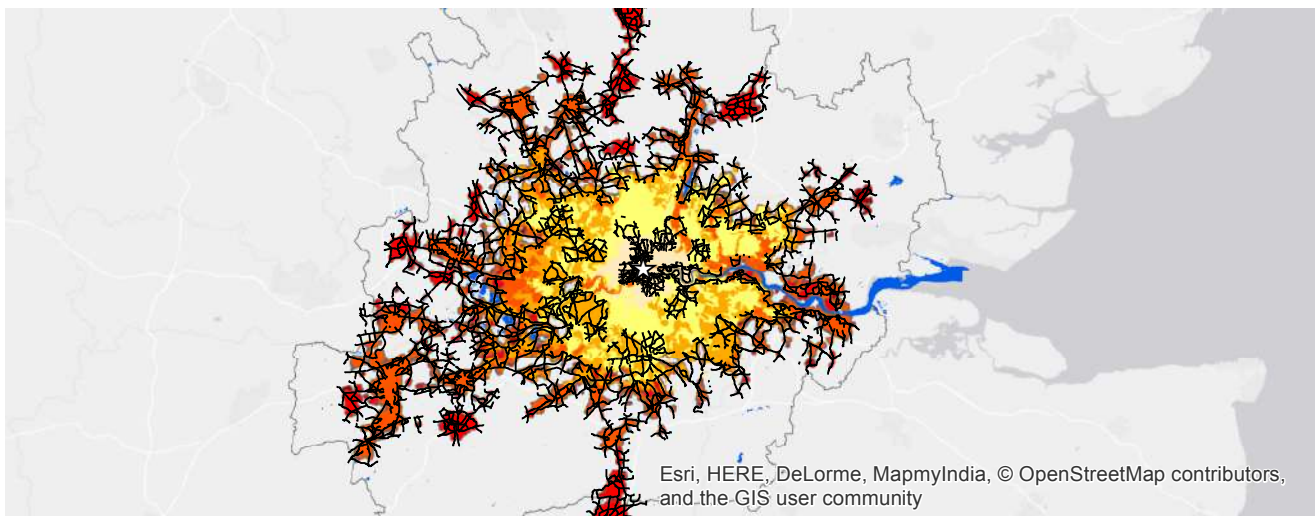
1989



2000



2013



**London, United Kingdom**  
**1880-2013**

0 12.5 25 50 km

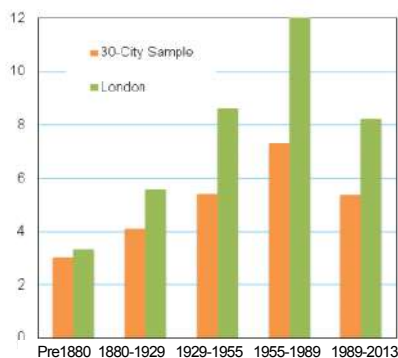
	1880		1989		CBD
	1929		2000		Study area
	1955		2013		Water
			Arterial Roads		No data

# London, United Kingdom (Europe & Japan 1880– 2013)

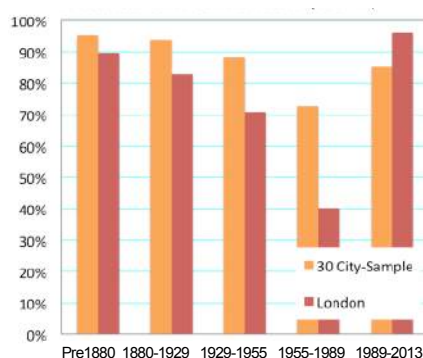


Urban Layout Metrics	Pre-1880	1880 - 1929	1929 - 1955	1955 - 1989	1989 - 2013
<b>Roads</b>					
Share of Built-up Area Occupied by Roads	21%	18%	18%	20%	10%
Share of Built-up Area That Is Gridded	0%	0%	0%	0%	0%
Share of Roads Less Than 4 Meters Wide	5%	8%	9%	12%	18%
Share of Roads More Than 16 Meters Wide	10%	9%	12%	7%	4%
<b>Arterial Roads</b>					
Total Area of Zone (km <sup>2</sup> )	376	307	455	1719	838
Total Length of Arterial Roads (km <sup>2</sup> )	558	323	399	626	1527
Density of All Arterial Roads (km/km <sup>2</sup> )	1.48	1.05	0.88	0.36	1.62
Average Beeline Distance to All Arterial Roads (meters)	281	366	554	1477	207
Share of Area within Walking Distance of All Arterial Roads	90%	83%	71%	40%	95%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>					
Share of Intersections that are 4-Way	15%	17%	16%	2%	4%
Average Block Size (ha)	3.3	5.6	8.6	17.2	8.2
4-Way Intersection Density (number per km <sup>2</sup> )	15	10	6	2	10
Walkability Ratio	1.6	1.9	1.6	1.7	1.7
Average Plot Size in Informal Land Subdivisions					
Average Plot Size in Formal Land Subdivisions	404	491	528	698	612
<b>Stages in the Evolution of Residential Layouts</b>					
Share of Built-up Area That Is Residential	57%	65%	60%	52%	43%
Share of Residential Areas Not Laid Out Before Development	0%	0%	0%	9%	13%
Share of Residential Areas Laid Out Before Development	100%	100%	100%	91%	87%
Share of Residential Area in Informal Land Subdivisions	0%	0%	0%	0%	0%
Share of Residential Area in Formal Land Subdivisions	24%	46%	67%	42%	87%
Share of Residential Area in Housing Projects	76%	54%	33%	49%	0%

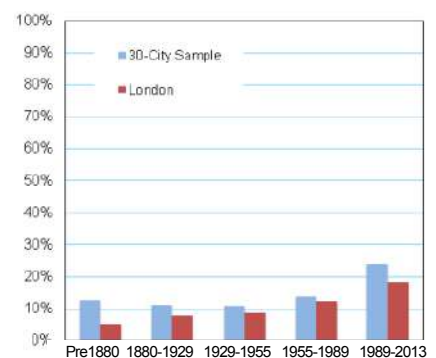
Average Block Size (hectares)



Share of Area Within Walking Distance of Arterial Road (625m)



Share of Roads Less Than 4-meters Wide



# Los Angeles, United States (Land-Rich Developed Countries 1907 – 2014)



1907



1937



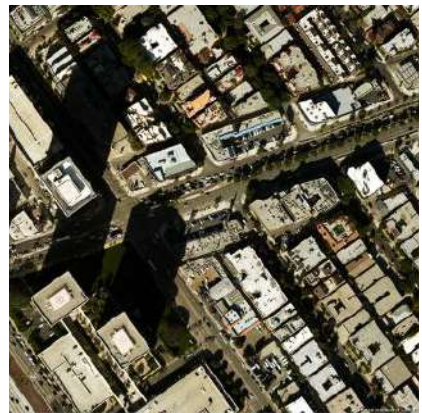
1970



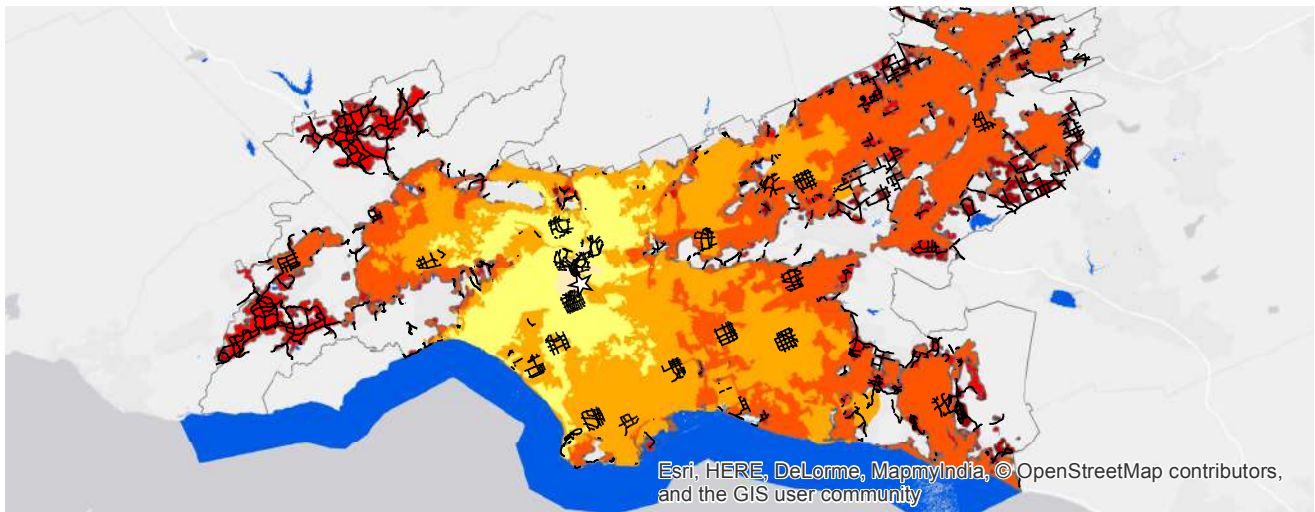
1990



2000














2014



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**Los Angeles, United States**  
**1907-2014**

 1907	 1990	 CBD
 1937	 2000	 Study area
 1970	 2014	 Water
	 Arterial Roads	 No data

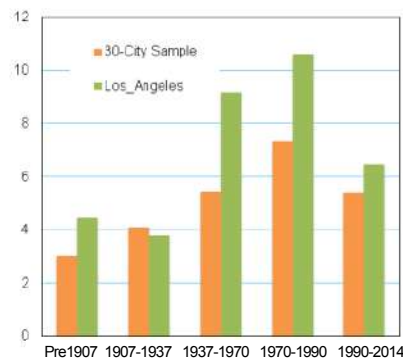
0 12.5 25 50 km

# Los Angeles, United States (Land-Rich Developed Countries 1907 – 2014)



Urban Layout Metrics	Pre-1907	1907 - 1937	1930 - 1970	1970 - 1990	1990 - 2014
<b>Roads</b>					
Share of Built-up Area Occupied by Roads	27%	24%	23%	22%	26%
Share of Built-up Area That Is Gridded	33%	53%	28%	0%	0%
Share of Roads Less Than 4 Meters Wide	7%	5%	7%	6%	18%
Share of Roads More Than 16 Meters Wide	50%	48%	41%	44%	21%
<b>Arterial Roads</b>					
Total Area of Zone (km <sup>2</sup> )	89	900	948	84	1298
Total Length of Arterial Roads (km <sup>2</sup> )	706	5167	3774	321	1665
Density of All Arterial Roads (km/km <sup>2</sup> )	7.90	5.74	3.98	3.82	1.04
Average Beeline Distance to All Arterial Roads (meters)	72	122	177	120	461
Share of Area within Walking Distance of All Arterial Roads	99%	97%	94%	100%	78%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>					
Share of Intersections that are 4-Way	33%	45%	19%	10%	6%
Average Block Size (ha)	4.5	3.8	9.2	10.6	6.5
4-Way Intersection Density (number per km <sup>2</sup> )	23	29	16	5	8
Walkability Ratio	1.7	1.4	1.7	1.8	2.0
<b>Stages in the Evolution of Residential Layouts</b>					
Share of Built-up Area That Is Residential	38%	59%	53%	59%	48%
Share of Residential Areas Not Laid Out Before Development	7%	0%	0%	2%	20%
Share of Residential Areas Laid Out Before Development	93%	100%	100%	98%	80%
Share of Residential Area in Informal Land Subdivisions	0%	0%	0%	1%	3%
Share of Residential Area in Formal Land Subdivisions	89%	95%	92%	88%	62%
Share of Residential Area in Housing Projects	4%	5%	8%	9%	15%

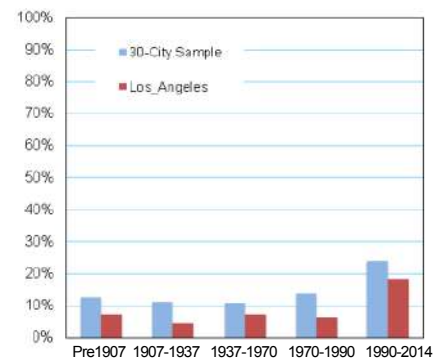
Average Block Size (hectares)



Share of Area Within Walking Distance of Arterial Road (625m)



Share of Roads Less Than 4-meters Wide



# Manila, Philippines (Southeast Asia 1898 – 2014)



1898



1945



1971



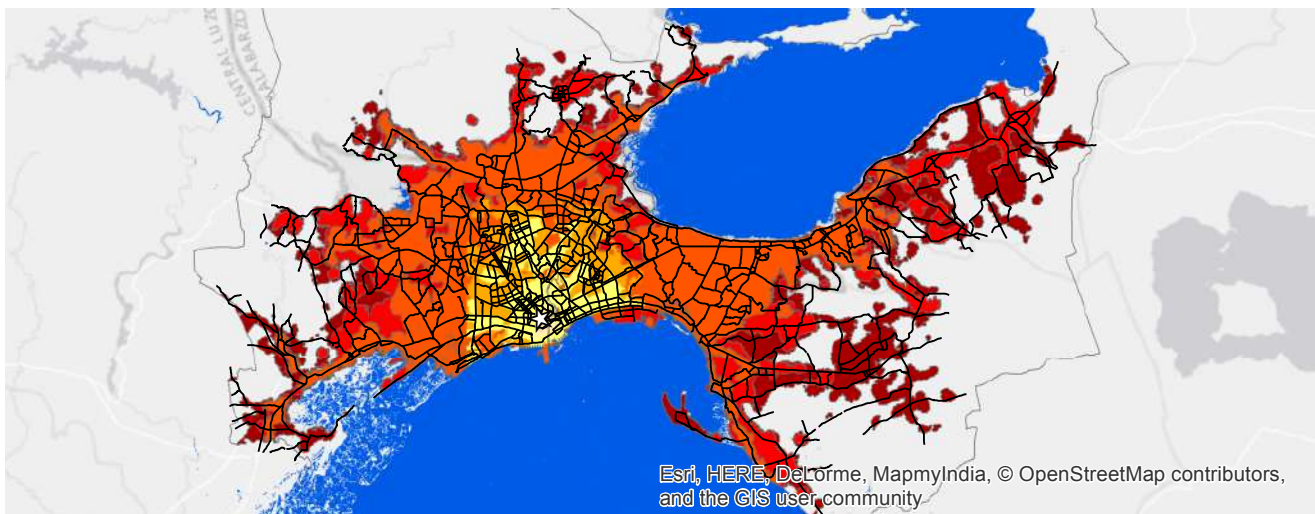
1990



2000



2014



**Manila, Philippines**  
1898-2014

0 5 10 20 km

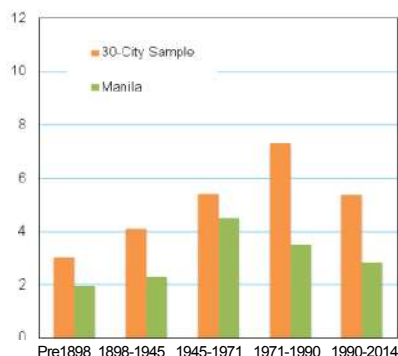
1898	1990	CBD
1945	2000	Study area
1971	2014	Water
	Arterial Roads	No data

# Manila, Philippines (Southeast Asia 1898 – 2014)

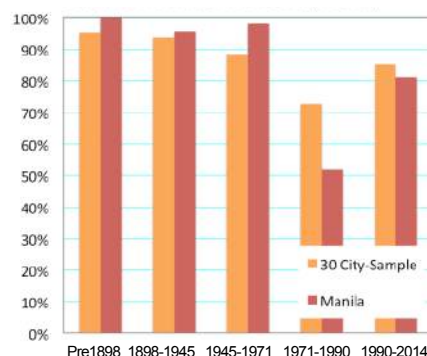


Urban Layout Metrics	Pre-1898	1898 - 1945	1945 - 1971	1971 - 1990	1990 - 2014
<b>Roads</b>					
Share of Built-up Area Occupied by Roads	25%	23%	19%	15%	23%
Share of Built-up Area That Is Gridded	35%	20%	8%	0%	0%
Share of Roads Less Than 4 Meters Wide	10%	9%	10%	17%	26%
Share of Roads More Than 16 Meters Wide	14%	18%	13%	1%	1%
<b>Arterial Roads</b>					
Total Area of Zone (km <sup>2</sup> )	6	69	67	752	1112
Total Length of Arterial Roads (km <sup>2</sup> )	7	131	139	476	1681
Density of All Arterial Roads (km/km <sup>2</sup> )	1.28	1.89	2.08	0.63	1.05
Average Beeline Distance to All Arterial Roads (meters)	169	219	186	1014	372
Share of Area within Walking Distance of All Arterial Roads	100%	96%	98%	52%	81%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>					
Share of Intersections that are 4-Way	25%	31%	20%	10%	10%
Average Block Size (ha)	2.0	2.3	4.5	3.5	2.8
4-Way Intersection Density (number per km <sup>2</sup> )	51	34	19	11	29
Walkability Ratio	1.4	1.5	1.7	1.6	1.7
Average Plot Size in Informal Land Subdivisions					94
Average Plot Size in Formal Land Subdivisions	308	260	471	247	97
<b>Stages in the Evolution of Residential Layouts</b>					
Share of Built-up Area That Is Residential	45%	45%	47%	62%	55%
Share of Residential Areas Not Laid Out Before Development	39%	46%	40%	58%	36%
Share of Residential Areas Laid Out Before Development	61%	54%	60%	42%	64%
Share of Residential Area in Informal Land Subdivisions	2%	0%	0%	0%	33%
Share of Residential Area in Formal Land Subdivisions	59%	54%	57%	42%	25%
Share of Residential Area in Housing Projects	0%	0%	3%	0%	6%

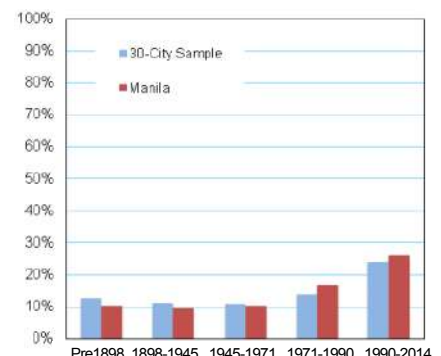
Average Block Size (hectares)



Share of Area Within Walking Distance of Arterial Road (625m)



Share of Roads Less Than 4-meters Wide



# Mexico City, Mexico (Latin America & the Caribbean 1886 – 2014)



1886



1929



1970



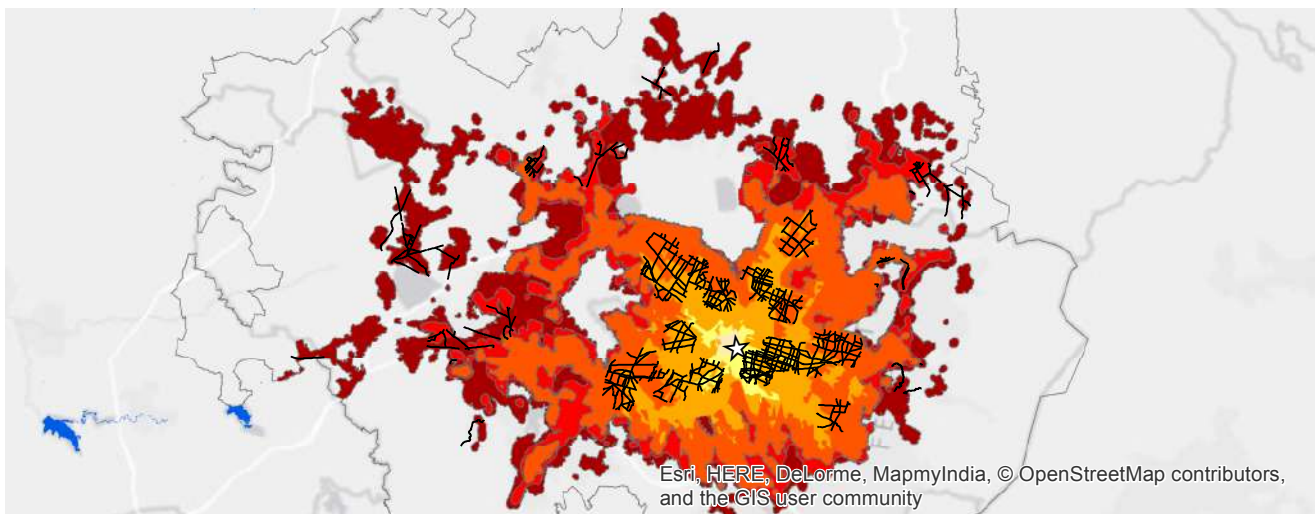
1990



2000



2014



**Mexico City, Mexico**  
1886-2014

0 5 10 20 km

	1886		1990		CBD
	1929		2000		Study area
	1970		2014		Water
			Arterial Roads		No data

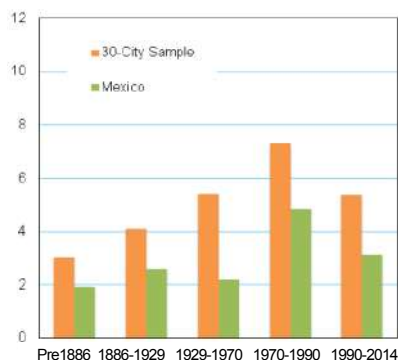


# Mexico City, Mexico (Latin America & the Caribbean 1886 – 2014)

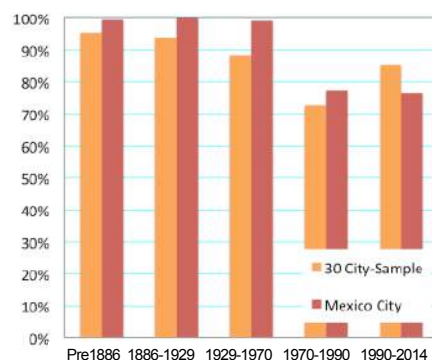


Urban Layout Metrics	Pre-1886	1886 - 1929	1929 - 1970	1970 - 1990	1990 - 2014
<b>Roads</b>					
Share of Built-up Area Occupied by Roads	20%	31%	27%	23%	23%
Share of Built-up Area That Is Gridded	63%	75%	50%	28%	8%
Share of Roads Less Than 4 Meters Wide	7%	4%	5%	6%	18%
Share of Roads More Than 16 Meters Wide	14%	32%	25%	14%	4%
<b>Arterial Roads</b>					
Total Area of Zone (km <sup>2</sup> )	12	35	88	1205	572
Total Length of Arterial Roads (km <sup>2</sup> )	32	141	299	1826	876
Density of All Arterial Roads (km/km <sup>2</sup> )	2.64	4.01	3.41	1.52	0.77
Average Beeline Distance to All Arterial Roads (meters)	155	97	123	480	418
Share of Area within Walking Distance of All Arterial Roads	99%	100%	99%	77%	77%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>					
Share of Intersections that are 4-Way	45%	53%	43%	27%	13%
Average Block Size (ha)	1.9	2.6	2.2	4.8	3.1
4-Way Intersection Density (number per km <sup>2</sup> )	45	50	52	29	26
Walkability Ratio	1.4	1.4	1.5	1.7	1.7
Average Plot Size in Informal Land Subdivisions					132
Average Plot Size in Formal Land Subdivisions	109	199	172	247	196
<b>Stages in the Evolution of Residential Layouts</b>					
Share of Built-up Area That Is Residential	35%	45%	47%	52%	48%
Share of Residential Areas Not Laid Out Before Development	2%	3%	2%	9%	27%
Share of Residential Areas Laid Out Before Development	98%	97%	98%	91%	73%
Share of Residential Area in Informal Land Subdivisions	0%	0%	0%	8%	34%
Share of Residential Area in Formal Land Subdivisions	98%	97%	97%	78%	34%
Share of Residential Area in Housing Projects	0%	1%	1%	5%	4%

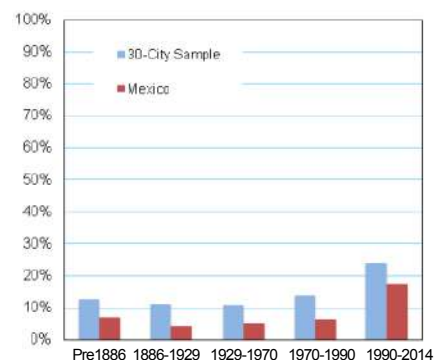
Average Block Size (hectares)



Share of Area Within Walking Distance of Arterial Road (625m)



Share of Roads Less Than 4-meters Wide



# Moscow, The Russian Federation (Europe & Japan 1893 – 2014)



1893



1939



1957



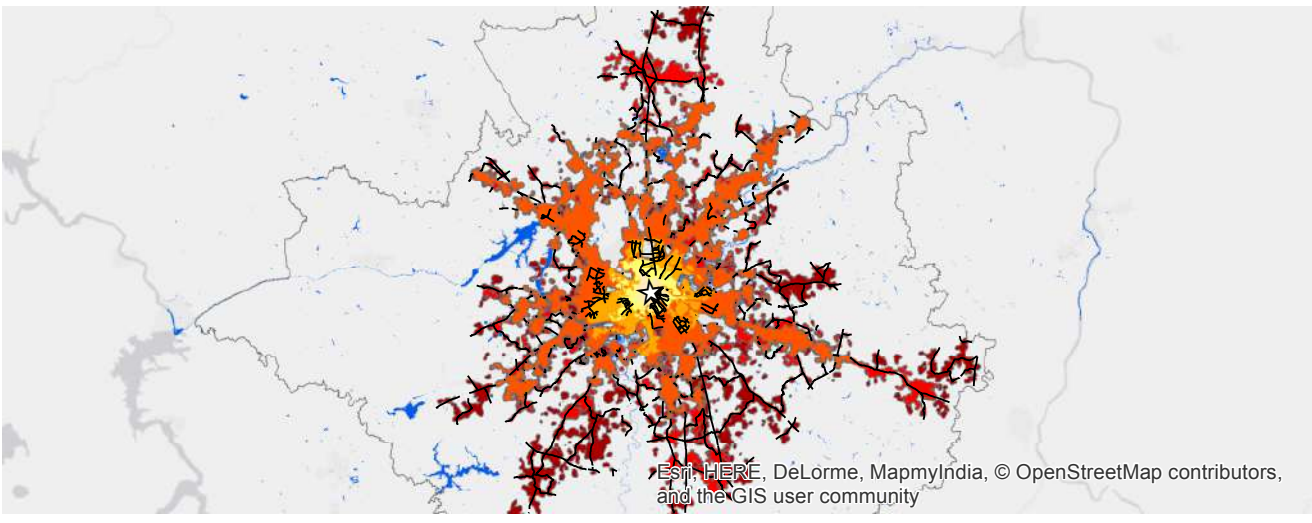
1991



2001



2014



**Moscow, Russia**  
1893-2014

0 15 30 60 km

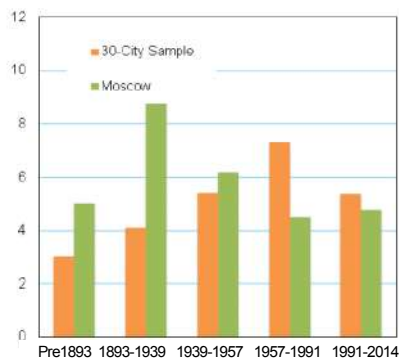
1893	1991	CBD
1939	2001	Study area
1957	2014	Water
	Arterial Roads	No data

# Moscow, The Russian Federation (Europe & Japan 1893 – 2014)

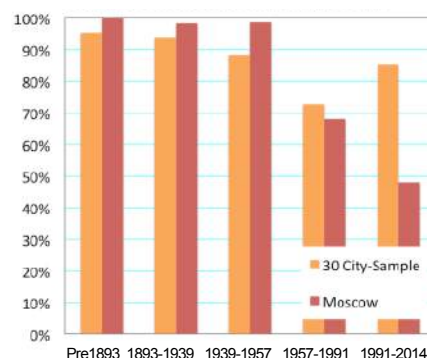


Urban Layout Metrics	Pre-1893	1893 - 1939	1939 - 1957	1957 - 1991	1991 - 2014
<b>Roads</b>					
Share of Built-up Area Occupied by Roads	22%	20%	20%	18%	15%
Share of Built-up Area That Is Gridded	0%	5%	0%	8%	3%
Share of Roads Less Than 4 Meters Wide	3%	8%	10%	9%	32%
Share of Roads More Than 16 Meters Wide	31%	30%	34%	15%	3%
<b>Arterial Roads</b>					
Total Area of Zone (km <sup>2</sup> )	68	100	193	1253	2109
Total Length of Arterial Roads (km <sup>2</sup> )	294	272	486	1519	1202
Density of All Arterial Roads (km/km <sup>2</sup> )	4.35	2.73	2.52	1.21	0.48
Average Beeline Distance to All Arterial Roads (meters)	87	144	152	761	981
Share of Area within Walking Distance of All Arterial Roads	100%	98%	99%	68%	48%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>					
Share of Intersections that are 4-Way	21%	18%	16%	8%	11%
Average Block Size (ha)	5.0	9.4	6.2	4.5	4.8
4-Way Intersection Density (number per km <sup>2</sup> )	10	6	13	7	22
Walkability Ratio	1.7	1.6	1.6	1.6	2.1
Average Plot Size in Informal Land Subdivisions					1099
Average Plot Size in Formal Land Subdivisions					962
<b>Stages in the Evolution of Residential Layouts</b>					
Share of Built-up Area That Is Residential	31%	41%	34%	38%	73%
Share of Residential Areas Not Laid Out Before Development	0%	0%	0%	15%	0%
Share of Residential Areas Laid Out Before Development	100%	100%	100%	85%	100%
Share of Residential Area in Informal Land Subdivisions	0%	6%	0%	21%	75%
Share of Residential Area in Formal Land Subdivisions	89%	56%	48%	28%	11%
Share of Residential Area in Housing Projects	11%	38%	52%	36%	14%

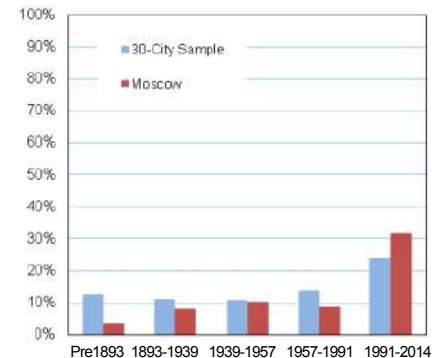
Average Block Size (hectares)



Share of Area Within Walking Distance of Arterial Road (625m)



Share of Roads Less Than 4-meters Wide



# Mumbai, India (South and Central Asia 1909 – 2014)



1909



1931



1968



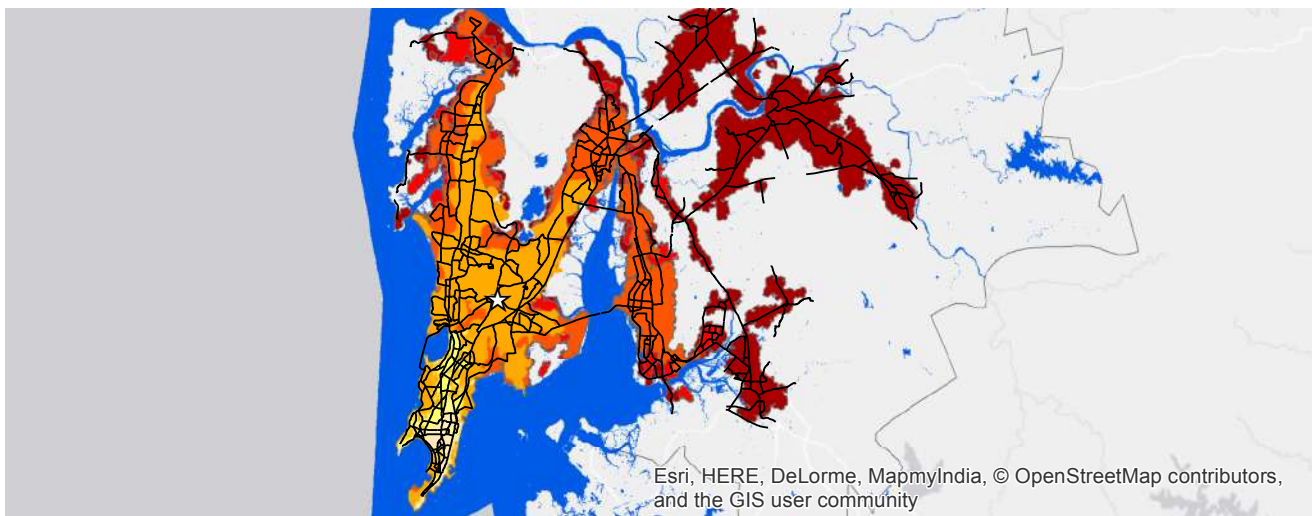
1991



2000



2014



## Mumbai, India 1909-2014

0 5 10 20 km



- 1909
- 1931
- 1968

- 1991
- 2001
- 2014

— Arterial Roads

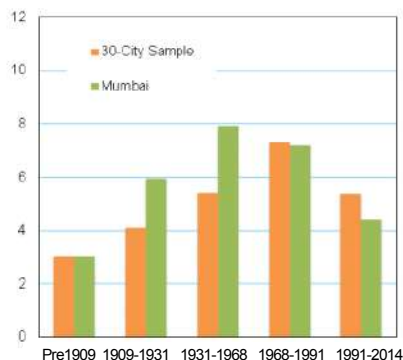
- ★ CBD
- Study area
- Water
- No data

## Mumbai, India (South and Central Asia 1909 – 2014)

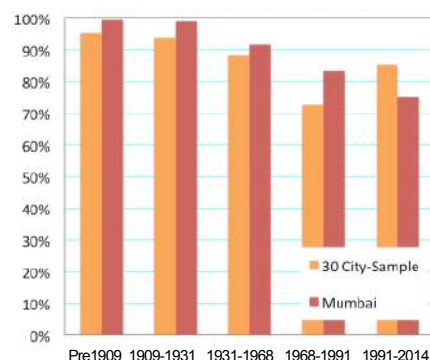


Urban Layout Metrics	Pre-1909	1909 - 1931	1931 - 1968	1968 - 1991	1991 - 2014
<b>Roads</b>					
Share of Built-up Area Occupied by Roads	18%	14%	13%	15%	21%
Share of Built-up Area That Is Gridded	0%	0%	0%	3%	3%
Share of Roads Less Than 4 Meters Wide	9%	8%	19%	14%	24%
Share of Roads More Than 16 Meters Wide	16%	20%	16%	21%	11%
<b>Arterial Roads</b>					
Total Area of Zone (km <sup>2</sup> )	15	29	23	382	713
Total Length of Arterial Roads (km <sup>2</sup> )	40	75	48	567	897
Density of All Arterial Roads (km/km <sup>2</sup> )	2.58	2.62	2.16	1.48	0.90
Average Beeline Distance to All Arterial Roads (meters)	153	155	225	398	447
Share of Area within Walking Distance of All Arterial Roads	99%	99%	92%	83%	75%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>					
Share of Intersections that are 4-Way	15%	20%	6%	11%	8%
Average Block Size (ha)	3.0	6.0	7.9	7.2	4.4
4-Way Intersection Density (number per km <sup>2</sup> )	17	9	4	4	12
Walkability Ratio	1.5	1.6	1.5	1.6	1.8
Average Plot Size in Informal Land Subdivisions					
Average Plot Size in Formal Land Subdivisions		535	496	779	
<b>Stages in the Evolution of Residential Layouts</b>					
Share of Built-up Area That Is Residential	45%	47%	41%	60%	42%
Share of Residential Areas Not Laid Out Before Development	69%	65%	68%	66%	61%
Share of Residential Areas Laid Out Before Development	31%	35%	32%	34%	39%
Share of Residential Area in Informal Land Subdivisions	0%	0%	0%	0%	0%
Share of Residential Area in Formal Land Subdivisions	29%	18%	16%	17%	14%
Share of Residential Area in Housing Projects	2%	17%	16%	17%	25%

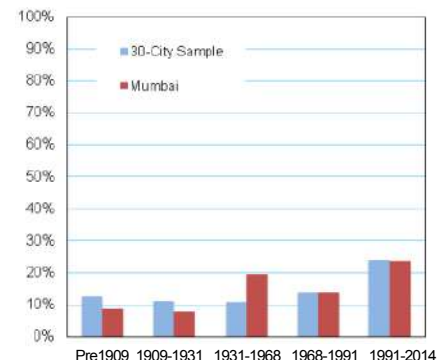
Average Block Size (hectares)



Share of Area Within Walking Distance of Arterial Road (625m)



Share of Roads Less Than 4-meters Wide



# Nairobi, Kenya (East Africa 1906 – 2010)



1906



1926



1964



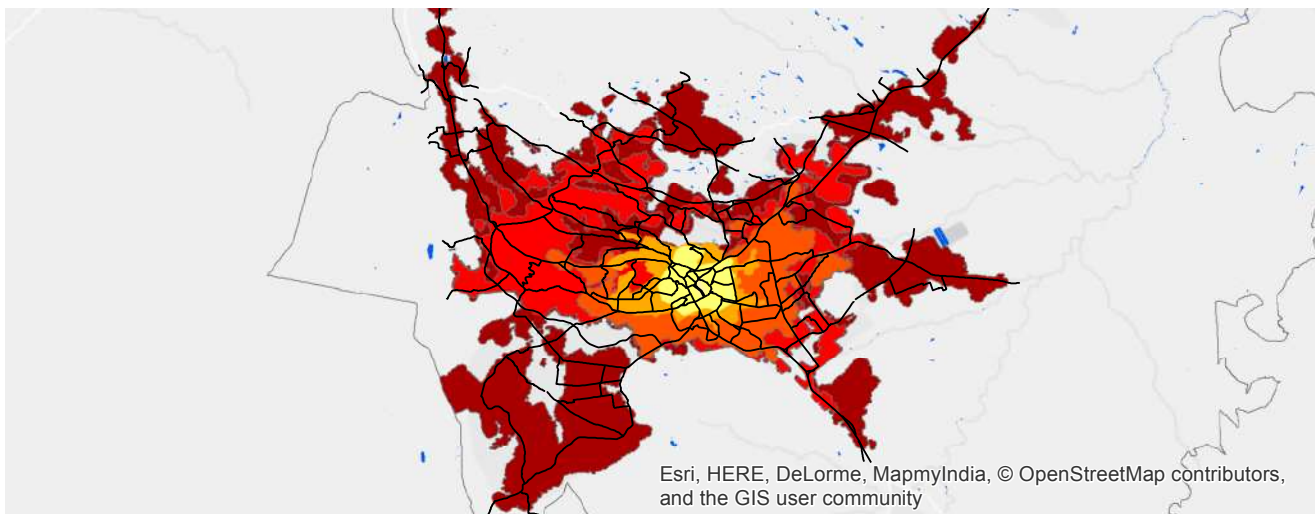
1988



2000



2010














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**Nairobi, Kenya**  
1906-2010

0 5 10 20 km

N

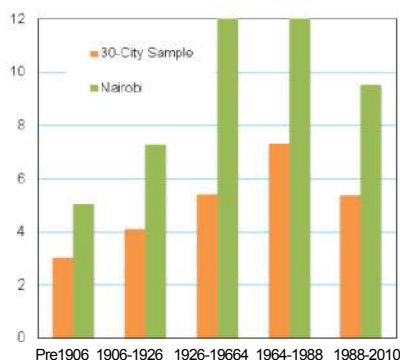
 1906	 1988	 CBD
 1926	 2000	 Study area
 1964	 2010	 Water
	 Arterial Roads	 No data

# Nairobi, Kenya (East Africa 1906 – 2010)

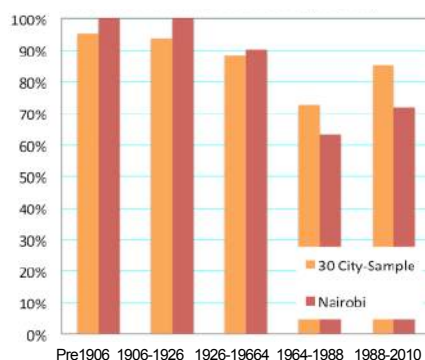


Urban Layout Metrics	Pre-1906	1906 - 1926	1926 - 1964	1964 - 1988	1988 - 2010
<b>Roads</b>					
Share of Built-up Area Occupied by Roads	27%	19%	17%	17%	19%
Share of Built-up Area That Is Gridded	0%	3%	3%	0%	0%
Share of Roads Less Than 4 Meters Wide	5%	5%	4%	13%	34%
Share of Roads More Than 16 Meters Wide	25%	23%	28%	4%	3%
<b>Arterial Roads</b>					
Total Area of Zone (km <sup>2</sup> )	2	22	69	563	788
Total Length of Arterial Roads (km <sup>2</sup> )	9	80	118	426	638
Density of All Arterial Roads (km/km <sup>2</sup> )	5.29	3.62	1.71	0.76	0.81
Average Beeline Distance to All Arterial Roads (meters)	65	109	271	646	521
Share of Area within Walking Distance of All Arterial Roads	100%	100%	90%	63%	72%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>					
Share of Intersections that are 4-Way	28%	10%	6%	4%	6%
Average Block Size (ha)	5.0	7.3	17.5	16.8	9.5
4-Way Intersection Density (number per km <sup>2</sup> )	23	6	3	3	10
Walkability Ratio	2.0	1.6	1.5	1.5	1.6
Average Plot Size in Informal Land Subdivisions				2053	
Average Plot Size in Formal Land Subdivisions	357	402	2600	1005	
<b>Stages in the Evolution of Residential Layouts</b>					
Share of Built-up Area That Is Residential	24%	37%	59%	51%	54%
Share of Residential Areas Not Laid Out Before Development	0%	3%	5%	32%	19%
Share of Residential Areas Laid Out Before Development	100%	97%	95%	68%	81%
Share of Residential Area in Informal Land Subdivisions	15%	16%	25%	57%	68%
Share of Residential Area in Formal Land Subdivisions	70%	57%	32%	8%	10%
Share of Residential Area in Housing Projects	14%	19%	18%	3%	3%

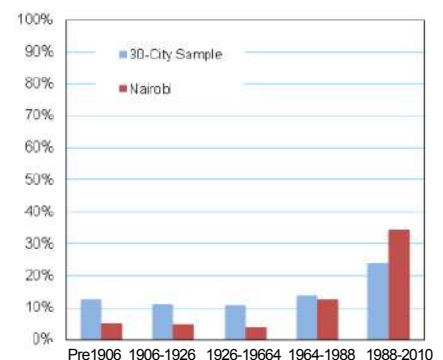
Average Block Size (hectares)



Share of Area Within Walking Distance of Arterial Road (625m)



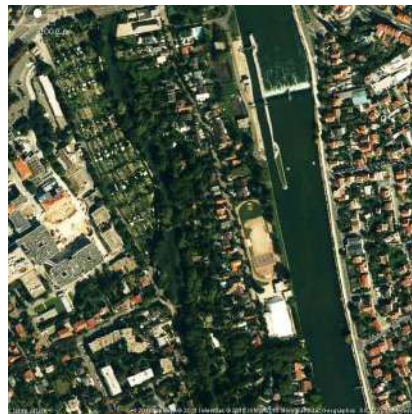
Share of Roads Less Than 4-meters Wide



# Paris, France (Europe & Japan 1900 – 2014)



1900



1928



1955



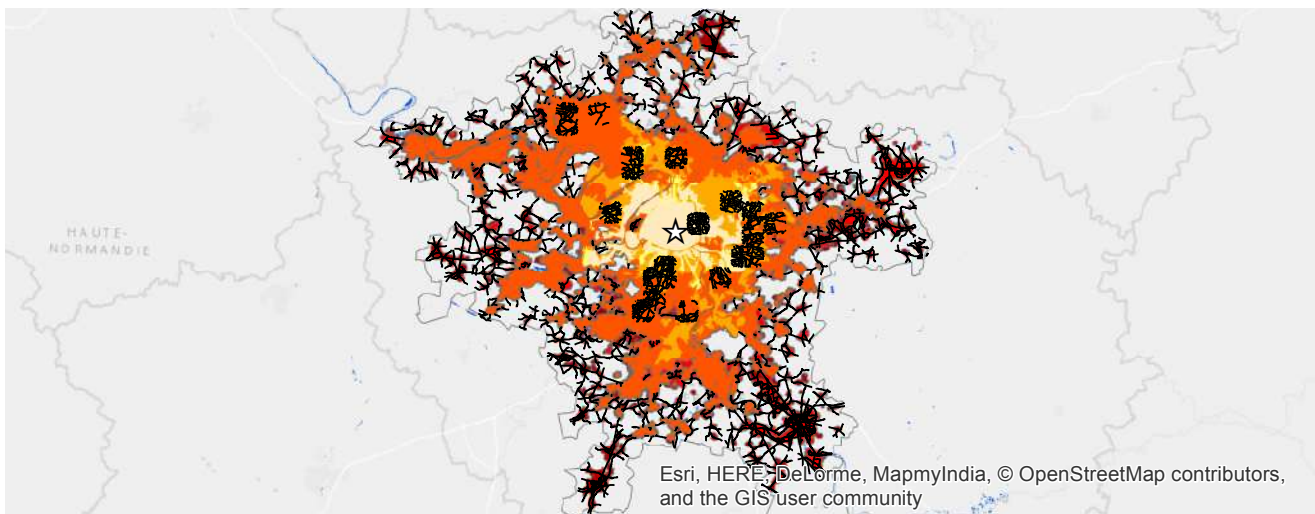
1987



2000



2014



**Paris, France 1900-2014**

0 12.5 25 50 km

N

	1900		1987		CBD
	1928		2000		Study area
	1955		2014		Water
			Arterial Roads		No data

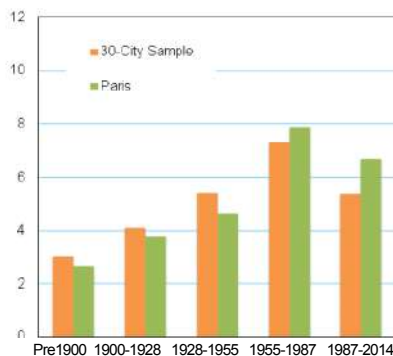


# Paris, France (Europe & Japan 1900 – 2014)

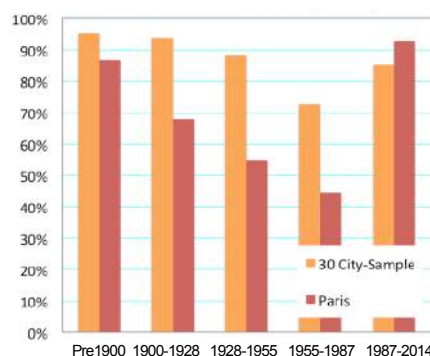


Urban Layout Metrics	Pre-1900	1900 - 1928	1928 - 1955	1955 - 1987	1987 - 2014
<b>Roads</b>					
Share of Built-up Area Occupied by Roads	26%	19%	18%	19%	15%
Share of Built-up Area That Is Gridded	5%	10%	8%	3%	0%
Share of Roads Less Than 4 Meters Wide	7%	12%	8%	12%	28%
Share of Roads More Than 16 Meters Wide	21%	11%	6%	5%	5%
<b>Arterial Roads</b>					
Total Area of Zone (km <sup>2</sup> )	231	92	359	28	1130
Total Length of Arterial Roads (km <sup>2</sup> )	514	95	204	19	2538
Density of All Arterial Roads (km/km <sup>2</sup> )	2.23	1.03	0.57	0.66	1.89
Average Beeline Distance to All Arterial Roads (meters)	276	618	883	1476	206
Share of Area within Walking Distance of All Arterial Roads	87%	68%	55%	44%	93%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>					
Share of Intersections that are 4-Way	27%	32%	17%	7%	10%
Average Block Size (ha)	2.7	3.8	4.7	7.9	6.7
4-Way Intersection Density (number per km <sup>2</sup> )	24	22	14	7	10
Walkability Ratio	1.5	1.6	1.6	1.8	1.6
Average Plot Size in Informal Land Subdivisions					
Average Plot Size in Formal Land Subdivisions	333	469	450	565	545
<b>Stages in the Evolution of Residential Layouts</b>					
Share of Built-up Area That Is Residential	57%	60%	61%	51%	49%
Share of Residential Areas Not Laid Out Before Development	12%	37%	10%	32%	29%
Share of Residential Areas Laid Out Before Development	88%	63%	90%	68%	61%
Share of Residential Area in Informal Land Subdivisions	0%	0%	0%	0%	2%
Share of Residential Area in Formal Land Subdivisions	76%	43%	79%	53%	667%
Share of Residential Area in Housing Projects	12%	21%	16%	15%	1%

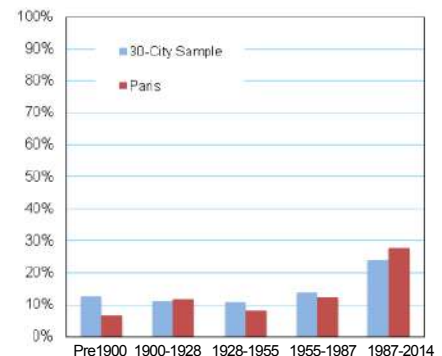
Average Block Size (hectares)



Share of Area Within Walking Distance of Arterial Road (625m)



Share of Roads Less Than 4-meters Wide



# Santiago, Chile (Latin America & the Caribbean 1900 – 2014)



1900



1930



1970



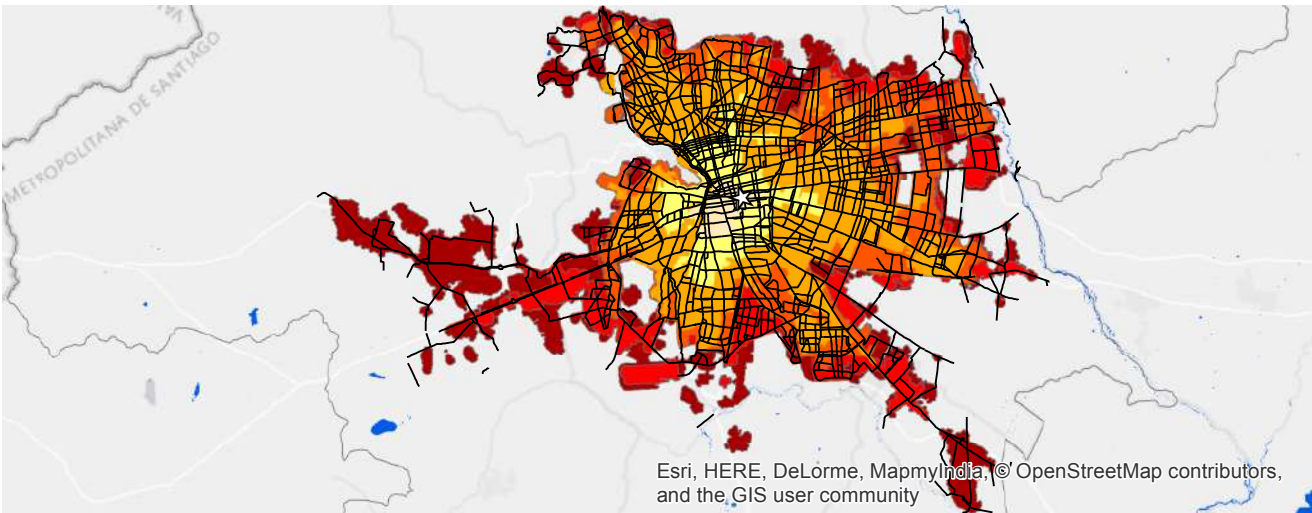
1990



2000



2014



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**Santiago, Chile**  
1900-2014

0 5 10 20 km

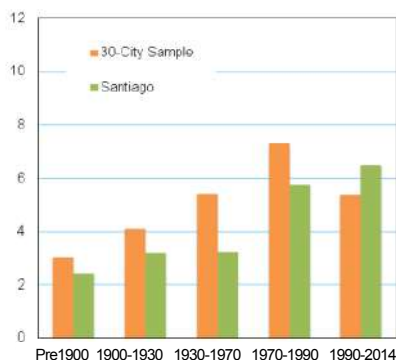
	1900		1990		CBD
	1930		2000		Study area
	1970		2014		Water
			Arterial Roads		No data

# Santiago, Chile (Latin America & the Caribbean 1900 – 2014)

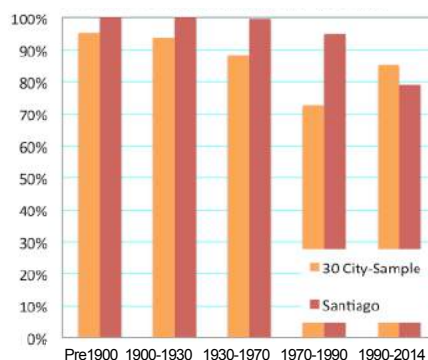


Urban Layout Metrics	Pre-1900	1900 - 1930	1930 - 1970	1970 - 1990	1990 - 2014
<b>Roads</b>					
Share of Built-up Area Occupied by Roads	26%	25%	25%	23%	18%
Share of Built-up Area That Is Gridded	60%	35%	25%	30%	5%
Share of Roads Less Than 4 Meters Wide	4%	3%	3%	6%	16%
Share of Roads More Than 16 Meters Wide	27%	36%	31%	18%	10%
<b>Arterial Roads</b>					
Total Area of Zone (km <sup>2</sup> )	161	48	42	448	761
Total Length of Arterial Roads (km <sup>2</sup> )	54	272	183	1282	1346
Density of All Arterial Roads (km/km <sup>2</sup> )	3.36	5.66	4.39	2.86	1.04
Average Beeline Distance to All Arterial Roads (meters)	108	69	86	195	474
Share of Area within Walking Distance of All Arterial Roads	100%	100%	100%	95%	79%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>					
Share of Intersections that are 4-Way	54%	32%	35%	21%	14%
Average Block Size (ha)	2.4	3.2	3.2	5.7	6.5
4-Way Intersection Density (number per km <sup>2</sup> )	39	26	29	25	20
Walkability Ratio	1.4	1.5	1.5	1.7	2.0
Average Plot Size in Informal Land Subdivisions					
Average Plot Size in Formal Land Subdivisions		273	385	713	282
<b>Stages in the Evolution of Residential Layouts</b>					
Share of Built-up Area That Is Residential	34%	45%	47%	46%	50%
Share of Residential Areas Not Laid Out Before Development	1%	0%	0%	2%	16%
Share of Residential Areas Laid Out Before Development	99%	100%	100%	98%	84%
Share of Residential Area in Informal Land Subdivisions	0%	0%	0%	0%	5%
Share of Residential Area in Formal Land Subdivisions	93%	92%	96%	74%	63%
Share of Residential Area in Housing Projects	6%	8%	4%	18%	15%

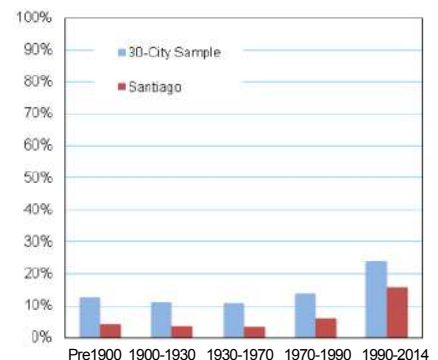
Average Block Size (hectares)



Share of Area Within Walking Distance of Arterial Road (625m)



Share of Roads Less Than 4-meters Wide



# São Paulo, Brazil (Latin America & the Caribbean 1905 – 2014)



1905



1929



1974



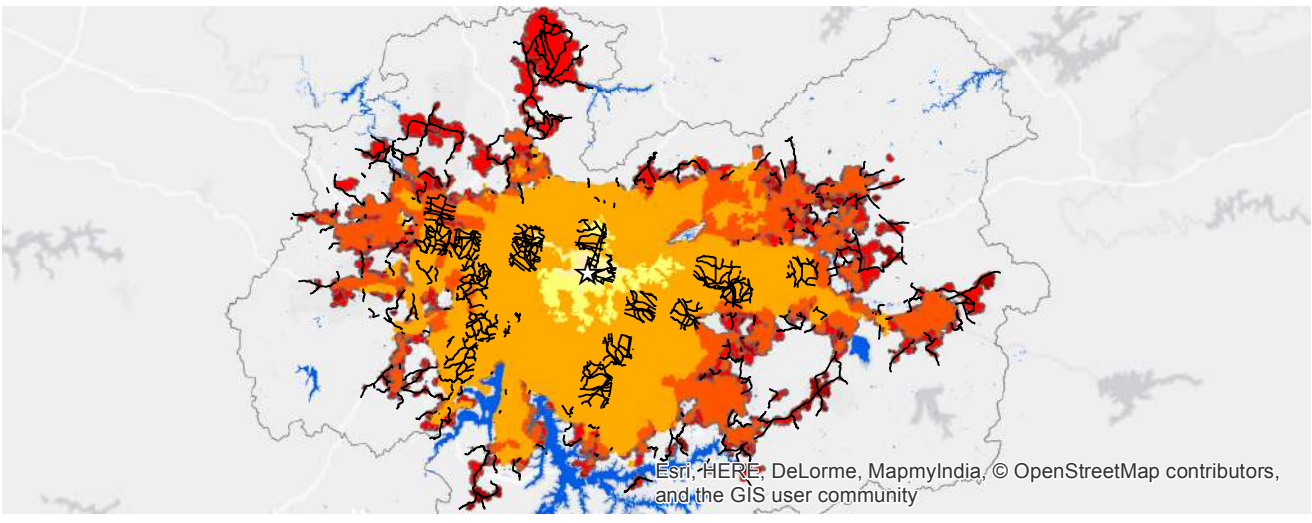
1988



2000



2014



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**Sao Paulo, Brazil**  
**1905-2014**

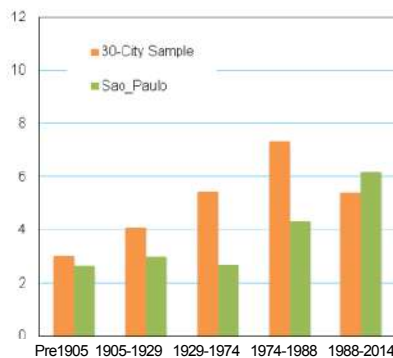
1905	1988	CBD
1929	2000	Study area
1974	2014	Water
	Arterial Roads	No data

São Paulo, Brazil (Latin America & the Caribbean 1905 – 2014)

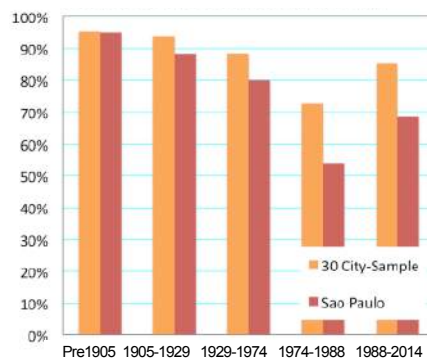


Urban Layout Metrics	Pre-1905	1905 - 1929	1929 - 1974	1974 - 1988	1988 - 2014
<b>Roads</b>					
Share of Built-up Area Occupied by Roads	25%	24%	26%	23%	23%
Share of Built-up Area That Is Gridded	33%	25%	23%	8%	3%
Share of Roads Less Than 4 Meters Wide	3%	4%	5%	4%	10%
Share of Roads More Than 16 Meters Wide	29%	30%	18%	11%	2%
<b>Arterial Roads</b>					
Total Area of Zone (km <sup>2</sup> )	24	80	168	1655	843
Total Length of Arterial Roads (km <sup>2</sup> )	34	87	168	1037	1133
Density of All Arterial Roads (km/km <sup>2</sup> )	1.44	1.10	1.01	0.63	0.84
Average Beeline Distance to All Arterial Roads (meters)	248	310	393	969	539
Share of Area within Walking Distance of All Arterial Roads	95%	88%	80%	54%	68%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>					
Share of Intersections that are 4-Way	37%	40%	22%	18%	7%
Average Block Size (ha)	2.7	3.0	2.7	4.3	6.2
4-Way Intersection Density (number per km <sup>2</sup> )	25	27	20	18	6
Walkability Ratio	1.5	1.6	1.7	1.7	1.7
Average Plot Size in Informal Land Subdivisions					
Average Plot Size in Formal Land Subdivisions	223	213	399	279	
<b>Stages in the Evolution of Residential Layouts</b>					
Share of Built-up Area That Is Residential	38%	50%	53%	47%	53%
Share of Residential Areas Not Laid Out Before Development	0%	0%	1%	3%	21%
Share of Residential Areas Laid Out Before Development	100%	100%	99%	97%	79%
Share of Residential Area in Informal Land Subdivisions	0%	0%	0%	7%	24%
Share of Residential Area in Formal Land Subdivisions	97%	96%	96%	88%	49%
Share of Residential Area in Housing Projects	3%	4%	3%	2%	6%

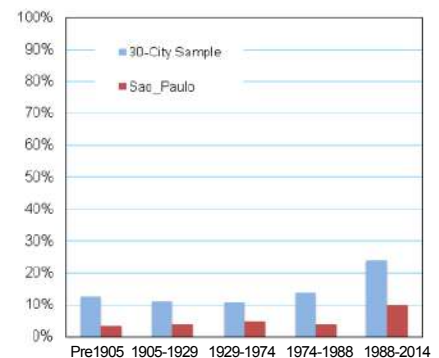
Average Block Size (hectares)



Share of Area Within Walking Distance of Arterial Road (625m)



Share of Roads Less Than 4-meters Wide



# Shanghai, China (Eastern Asia & the Pacific 1902 – 2015)



1902



1944



1973



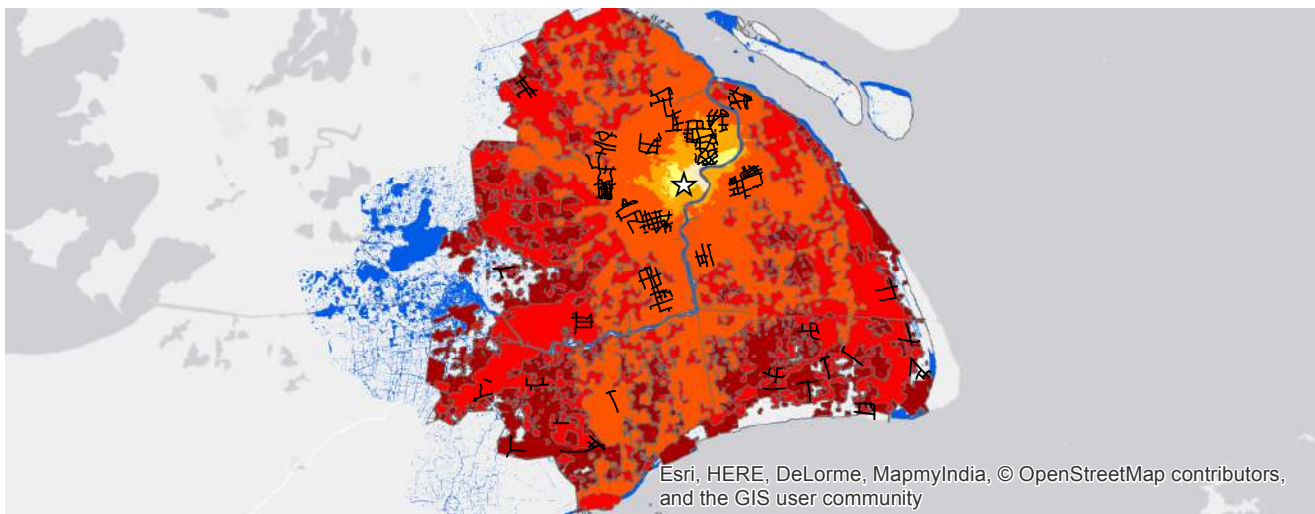
1991



2000



2015



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## Shanghai, China

### 1902-2015

**Legend**

<span style="display: inline-block; width: 15px; height: 15px; background-color: yellow; border: 1px solid black;"></span> 1902	<span style="display: inline-block; width: 15px; height: 15px; background-color: orange; border: 1px solid black;"></span> 1991	<span style="display: inline-block; width: 15px; height: 15px; background-color: lightblue; border: 1px solid black;"></span> CBD
<span style="display: inline-block; width: 15px; height: 15px; background-color: yellow; border: 1px solid black;"></span> 1944	<span style="display: inline-block; width: 15px; height: 15px; background-color: red; border: 1px solid black;"></span> 2000	<span style="display: inline-block; width: 15px; height: 15px; border: 1px solid blue;"></span> Study area
<span style="display: inline-block; width: 15px; height: 15px; background-color: orange; border: 1px solid black;"></span> 1973	<span style="display: inline-block; width: 15px; height: 15px; background-color: darkred; border: 1px solid black;"></span> 2015	<span style="display: inline-block; width: 15px; height: 15px; background-color: blue; border: 1px solid blue;"></span> Water
	<span style="display: inline-block; width: 15px; border-bottom: 1px solid black;"></span> Arterial Roads	<span style="display: inline-block; width: 15px; height: 15px; background-color: gray; border: 1px solid gray;"></span> No data

**Map Symbols**

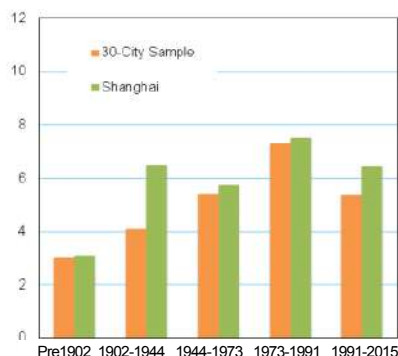
- ★ CBD
- Study area
- Water
- No data

# Shanghai, China (Eastern Asia & the Pacific 1902 – 2015)

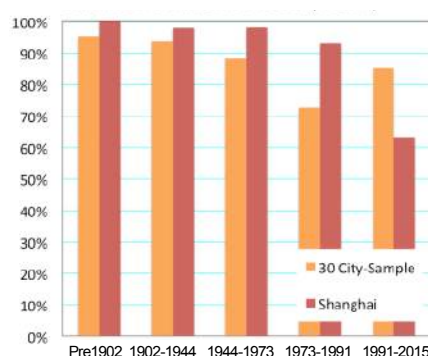


Urban Layout Metrics	Pre-1902	1902 - 1944	1944 - 1973	1973 - 1991	1991 - 2015
<b>Roads</b>					
Share of Built-up Area Occupied by Roads	28%	29%	25%	26%	20%
Share of Built-up Area That Is Gridded	5%	0%	8%	0%	8%
Share of Roads Less Than 4 Meters Wide	13%	7%	12%	13%	40%
Share of Roads More Than 16 Meters Wide	27%	38%	22%	23%	18%
<b>Arterial Roads</b>					
Total Area of Zone (km <sup>2</sup> )	19	51	32	1278	600
Total Length of Arterial Roads (km <sup>2</sup> )	65	144	105	3356	700
Density of All Arterial Roads (km/km <sup>2</sup> )	3.47	2.85	3.27	2.63	0.65
Average Beeline Distance to All Arterial Roads (meters)	95	142	131	206	1286
Share of Area within Walking Distance of All Arterial Roads	100%	98%	98%	93%	63%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>					
Share of Intersections that are 4-Way	32%	27%	17%	15%	15%
Average Block Size (ha)	3.1	6.5	5.7	7.5	6.4
4-Way Intersection Density (number per km <sup>2</sup> )	24	22	22	15	8
Walkability Ratio	1.4	1.5	1.4	1.8	1.7
Average Plot Size in Informal Land Subdivisions					
Average Plot Size in Formal Land Subdivisions			379	319	
<b>Stages in the Evolution of Residential Layouts</b>					
Share of Built-up Area That Is Residential	44%	48%	43%	30%	28%
Share of Residential Areas Not Laid Out Before Development	0%	4%	8%	25%	34%
Share of Residential Areas Laid Out Before Development	100%	96%	92%	75%	66%
Share of Residential Area in Informal Land Subdivisions	0%	0%	0%	0%	25%
Share of Residential Area in Formal Land Subdivisions	71%	51%	36%	18%	9%
Share of Residential Area in Housing Projects	29%	44%	56%	57%	31%

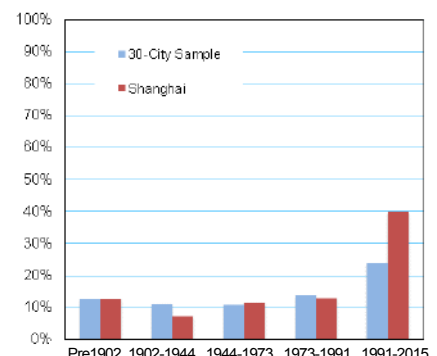
Average Block Size (hectares)



Share of Area Within Walking Distance of Arterial Road (625m)



Share of Roads Less Than 4-meters Wide



# Sydney, Australia (Land-Rich Developed Countries 1895 – 2014)



1895



1945



1975



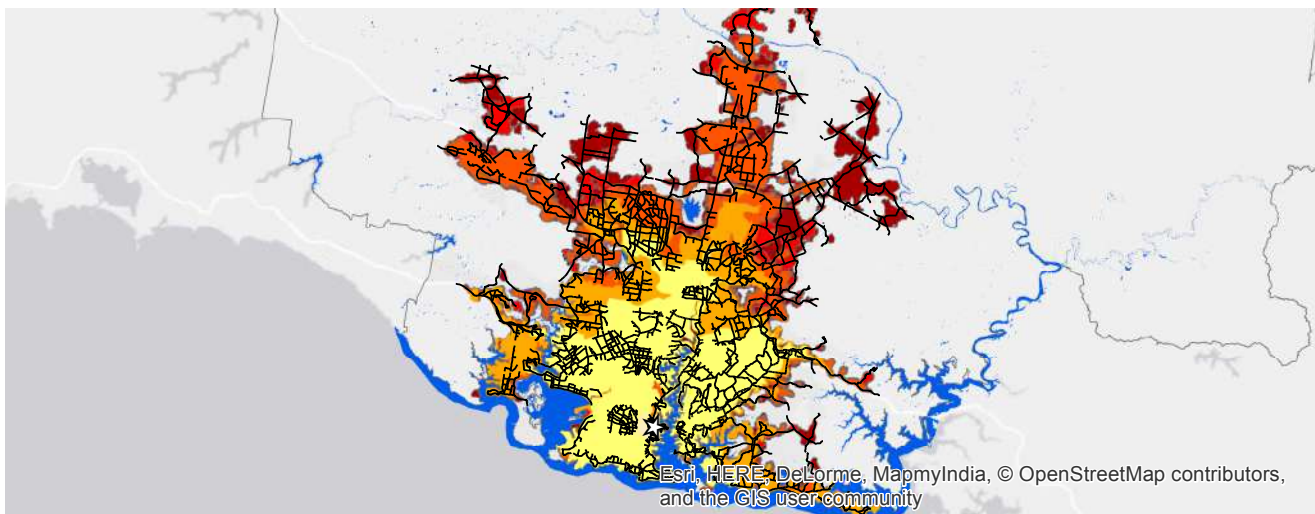
1991



2000



2014



**Sydney, Australia**  
1895-2014

0 10 20 40 km

1895	1991	CBD
1945	2000	Study area
1975	2014	Water
	Arterial Roads	No data

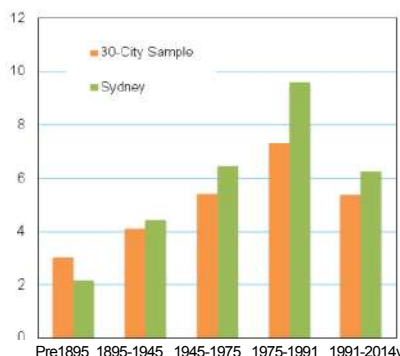


# Sydney, Australia (Land-Rich Developed Countries 1895 – 2014)

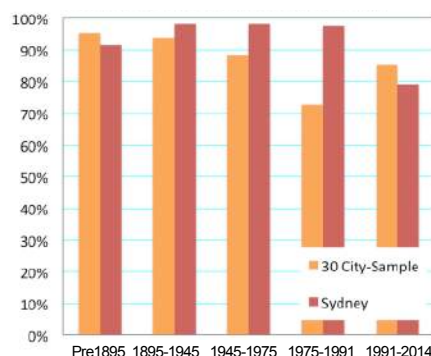


Urban Layout Metrics	Pre-1895	1895 - 1945	1945 - 1975	1975 - 1991	1991 - 2014
<b>Roads</b>					
Share of Built-up Area Occupied by Roads	31%	27%	23%	24%	20%
Share of Built-up Area That Is Gridded	20%	10%	3%	3%	3%
Share of Roads Less Than 4 Meters Wide	5%	3%	4%	8%	8%
Share of Roads More Than 16 Meters Wide	37%	54%	59%	54%	16%
<b>Arterial Roads</b>					
Total Area of Zone (km <sup>2</sup> )	10	201	314	676	1645
Total Length of Arterial Roads (km <sup>2</sup> )	26	1107	1601	2251	2114
Density of All Arterial Roads (km/km <sup>2</sup> )	2.66	5.50	5.09	3.33	0.91
Average Beeline Distance to All Arterial Roads (meters)	203	102	110	155	400
Share of Area within Walking Distance of All Arterial Roads	92%	98%	98%	98%	79%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>					
Share of Intersections that are 4-Way	30%	19%	17%	8%	4%
Average Block Size (ha)	2.2	4.4	6.4	9.6	6.2
4-Way Intersection Density (number per km <sup>2</sup> )	34	13	6	3	3
Walkability Ratio	1.5	1.7	1.8	1.7	1.8
Average Plot Size in Informal Land Subdivisions					
Average Plot Size in Formal Land Subdivisions	331	479	688	694	707
<b>Stages in the Evolution of Residential Layouts</b>					
Share of Built-up Area That Is Residential	39%	52%	60%	62%	61%
Share of Residential Areas Not Laid Out Before Development	0%	0%	0%	0%	13%
Share of Residential Areas Laid Out Before Development	100%	100%	100%	100%	87%
Share of Residential Area in Informal Land Subdivisions	0%	0%	0%	0%	0%
Share of Residential Area in Formal Land Subdivisions	81%	96%	98%	95%	80%
Share of Residential Area in Housing Projects	19%	4%	2%	5%	7%

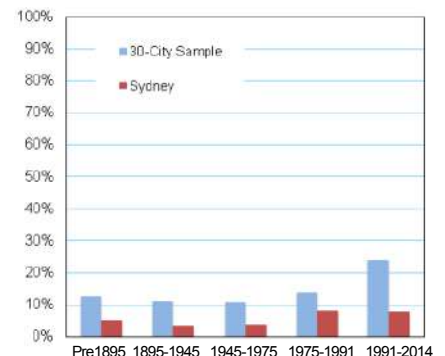
Average Block Size (hectares)



Share of Area Within Walking Distance of Arterial Road (625m)



Share of Roads Less Than 4-meters Wide



# Tehran, Iran (Western Asia and North Africa 1899 – 2010)



1899



1925



1956



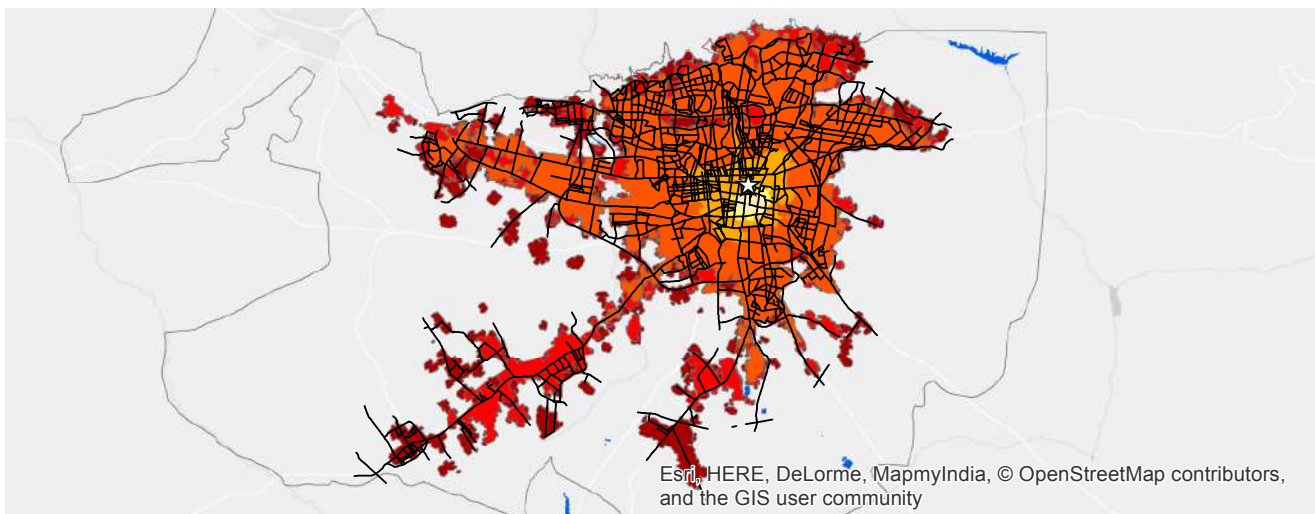
1991



2000



2010



## Tehran, Iran

### 1899-2010

- 1899
- 1925
- 1956

- 1991
- 2000
- 2010

- CBD
- Study area
- Water
- No data

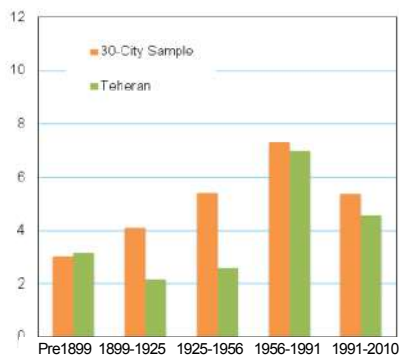
- Arterial Roads

# Tehran, Iran (Western Asia and North Africa 1899 – 2010)

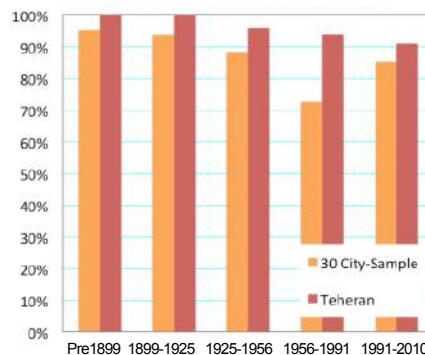


Urban Layout Metrics	Pre-1899	1899-1925	1925 - 1956	1956 - 1991	1991 - 2010
<b>Roads</b>					
Share of Built-up Area Occupied by Roads	13%	20%	22%	28%	25%
Share of Built-up Area That Is Gridded	0%	5%	20%	18%	0%
Share of Roads Less Than 4 Meters Wide	42%	17%	15%	6%	24%
Share of Roads More Than 16 Meters Wide	22%	18%	20%	22%	14%
<b>Arterial Roads</b>					
Total Area of Zone (km <sup>2</sup> )	5	23	27	535	784
Total Length of Arterial Roads (km <sup>2</sup> )	14	61	60	1141	1488
Density of All Arterial Roads (km/km <sup>2</sup> )	2.98	2.63	2.17	2.13	1.90
Average Beeline Distance to All Arterial Roads (meters)	126	125	199	221	255
Share of Area within Walking Distance of All Arterial Roads	100%	100%	96%	94%	91%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>					
Share of Intersections that are 4-Way	8%	18%	25%	22%	11%
Average Block Size (ha)	3.2	2.2	2.6	7.0	4.6
4-Way Intersection Density (number per km <sup>2</sup> )	8	24	32	23	16
Walkability Ratio	1.6	1.5	1.5	1.5	1.9
Average Plot Size in Informal Land Subdivisions					
Average Plot Size in Formal Land Subdivisions			306	222	270
<b>Stages in the Evolution of Residential Layouts</b>					
Share of Built-up Area That Is Residential	70%	59%	57%	40%	33%
Share of Residential Areas Not Laid Out Before Development	92%	12%	7%	10%	11%
Share of Residential Areas Laid Out Before Development	8%	88%	93%	90%	89%
Share of Residential Area in Informal Land Subdivisions	0%	0%	0%	0%	16%
Share of Residential Area in Formal Land Subdivisions	8%	88%	90%	75%	46%
Share of Residential Area in Housing Projects	0%	0%	3%	15%	26%

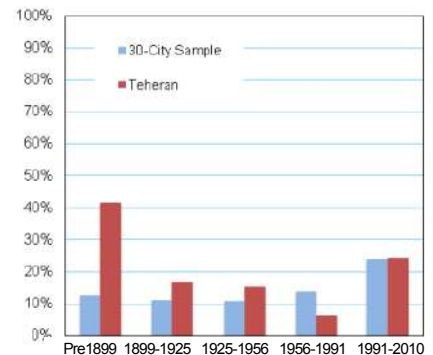
Average Block Size (hectares)



Share of Area Within Walking Distance of Arterial Road (625m)



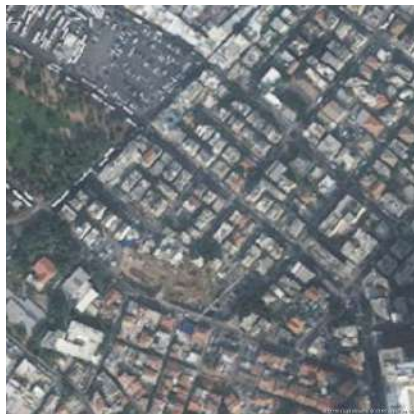
Share of Roads Less Than 4-meters Wide



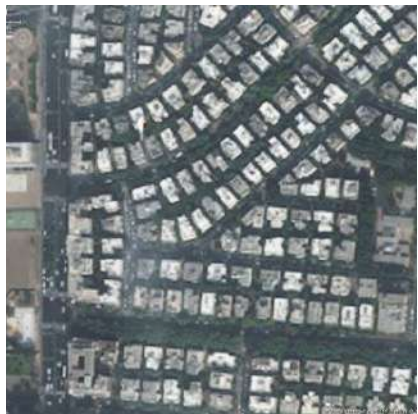
# Tel Aviv, Israel (Western Asia and North Africa 1917 – 2014)



1917



1929



1956



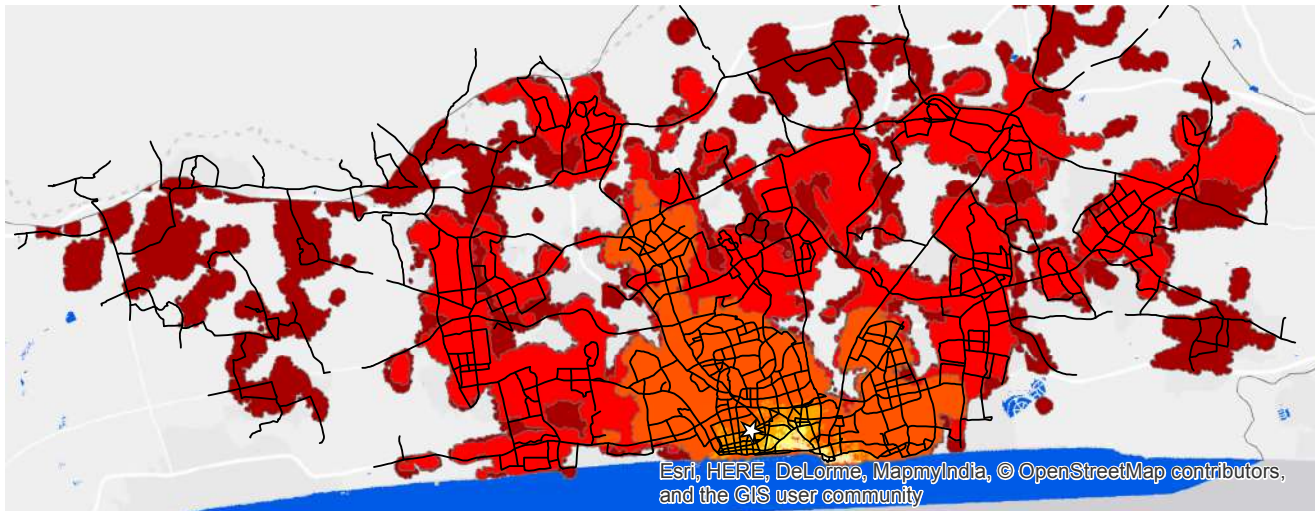
1987



2000



2014



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**Tel Aviv, Israel**  
**1917-2014**

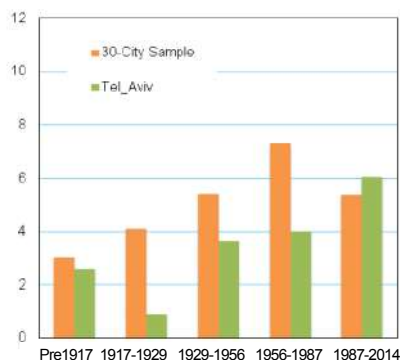
1917	1987	CBD
1929	2000	Study area
1956	2014	Water
	Arterial Roads	No data

# Tel Aviv, Israel (Western Asia and North Africa 1917 – 2014)



Urban Layout Metrics	Pre-1917	1917 - 1929	1929 - 1956	1956 - 1987	1987 - 2014
<b>Roads</b>					
Share of Built-up Area Occupied by Roads	23%	27%	25%	21%	19%
Share of Built-up Area That Is Gridded	0%	0%	0%	3%	0%
Share of Roads Less Than 4 Meters Wide	8%	4%	3%	5%	16%
Share of Roads More Than 16 Meters Wide	9%	8%	23%	16%	15%
<b>Arterial Roads</b>					
Total Area of Zone (km <sup>2</sup> )	1	2	33	316	602
Total Length of Arterial Roads (km <sup>2</sup> )	1	4	58	611	692
Density of All Arterial Roads (km/km <sup>2</sup> )	0.69	1.8	1.77	1.93	0.95
Average Beeline Distance to All Arterial Roads (meters)	389	160	135	381	435
Share of Area within Walking Distance of All Arterial Roads	72%	99%	100%	82%	76%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>					
Share of Intersections that are 4-Way	34%	46%	18%	25%	10%
Average Block Size (ha)	2.6	0.9	3.6	4.0	6.1
4-Way Intersection Density (number per km <sup>2</sup> )	63	87	22	16	8
Walkability Ratio	1.4	1.4	1.5	1.6	2.0
Average Plot Size in Informal Land Subdivisions					554
Average Plot Size in Formal Land Subdivisions	438	413	482	461	844
<b>Stages in the Evolution of Residential Layouts</b>					
Share of Built-up Area That Is Residential	62%	59%	59%	50%	45%
Share of Residential Areas Not Laid Out Before Development	60%	14%	7%	24%	15%
Share of Residential Areas Laid Out Before Development	40%	86%	93%	74%	85%
Share of Residential Area in Informal Land Subdivisions	0%	0%	0%	0%	20%
Share of Residential Area in Formal Land Subdivisions	37%	86%	87%	55%	57%
Share of Residential Area in Housing Projects	3%	0%	6%	21%	7%

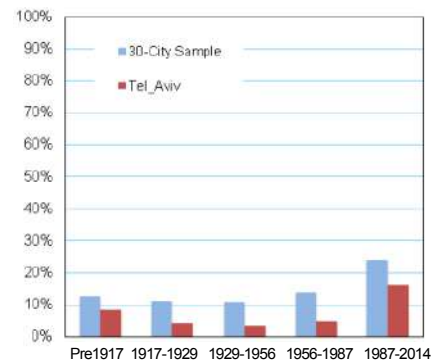
Average Block Size (hectares)



Share of Area Within Walking Distance of Arterial Road (625m)



Share of Roads Less Than 4-meters Wide



# Tokyo, Japan ( Europe & Japan 1892 – 2014)



1892



1929



1954



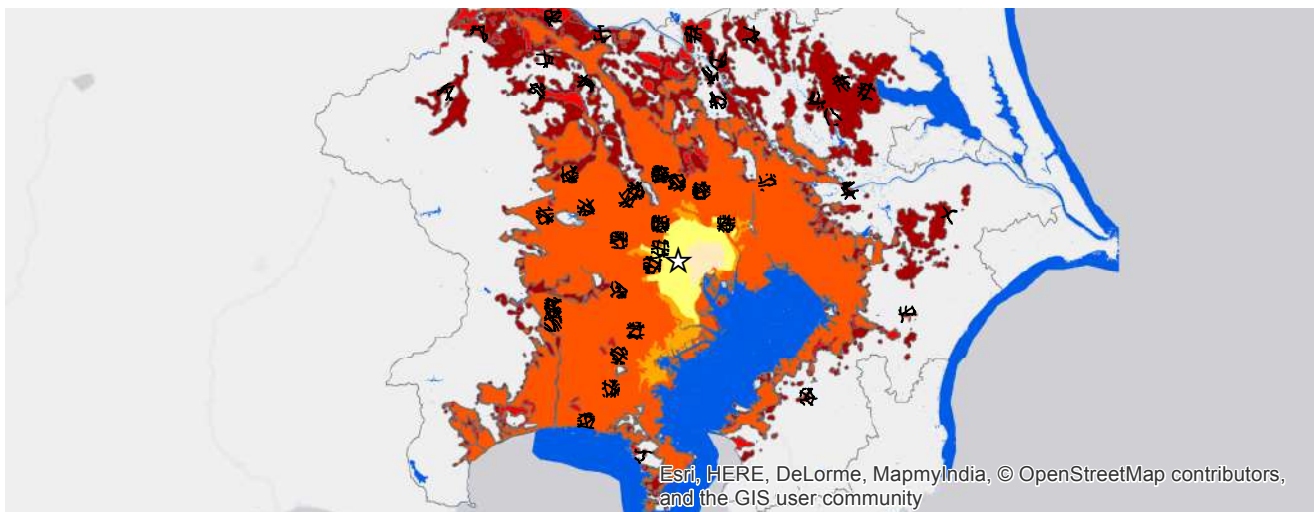
1990



2000



2014



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## Tokyo, Japan 1892-2014



- 1892
- 1929
- 1954

- 1990
- 2000
- 2014

— Arterial Roads

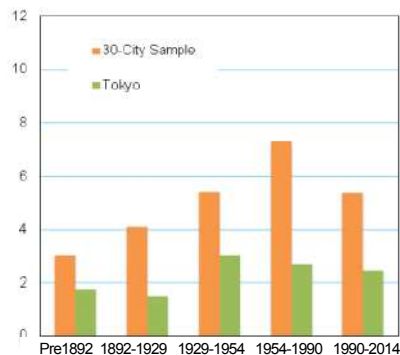
- ★ CBD
- Study area
- Water
- No data

# Tokyo, Japan ( Europe & Japan 1892 – 2014)

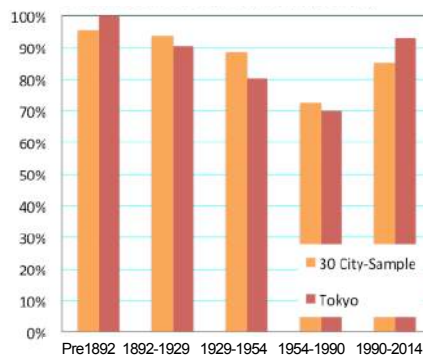


Urban Layout Metrics	Pre-1892	1892 - 1929	1929 - 1954	1954 - 1990	1990 - 2014
<b>Roads</b>					
Share of Built-up Area Occupied by Roads	32%	21%	21%	22%	25%
Share of Built-up Area That Is Gridded	26%	6%	14%	10%	3%
Share of Roads Less Than 4 Meters Wide	26%	48%	35%	44%	51%
Share of Roads More Than 16 Meters Wide	18%	5%	10%	4%	3%
<b>Arterial Roads</b>					
Total Area of Zone (km <sup>2</sup> )	68	314	201	133	632
Total Length of Arterial Roads (km <sup>2</sup> )	296	5690	313	140	1415
Density of All Arterial Roads (km/km <sup>2</sup> )	4.34	1.82	1.56	1.06	1.73
Average Beeline Distance to All Arterial Roads (meters)	91	284	394	543	198
Share of Area within Walking Distance of All Arterial Roads	100%	91%	80%	70%	93%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>					
Share of Intersections that are 4-Way	27%	25%	25%	20%	16%
Average Block Size (ha)	1.8	1.5	3.0	2.7	2.5
4-Way Intersection Density (number per km <sup>2</sup> )	71	70	56	41	47
Walkability Ratio	1.4	1.4	1.5	1.6	1.4
Average Plot Size in Informal Land Subdivisions					
Average Plot Size in Formal Land Subdivisions	289	166	150	224	230
<b>Stages in the Evolution of Residential Layouts</b>					
Share of Built-up Area That Is Residential	34%	53%	48%	53%	35%
Share of Residential Areas Not Laid Out Before Development	24%	63%	56%	52%	47%
Share of Residential Areas Laid Out Before Development	76%	37%	44%	48%	53%
Share of Residential Area in Informal Land Subdivisions	0%	0%	0%	0%	2%
Share of Residential Area in Formal Land Subdivisions	75%	34%	39%	40%	49%
Share of Residential Area in Housing Projects	1%	3%	5%	9%	2%

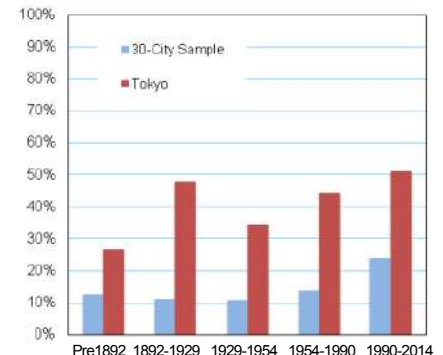
Average Block Size (hectares)



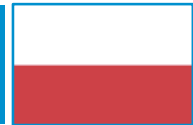
Share of Area Within Walking Distance of Arterial Road (625m)



Share of Roads Less Than 4-meters Wide



# Warsaw, Poland (Europe & Japan 1888 – 2013)



1888



1936



1958



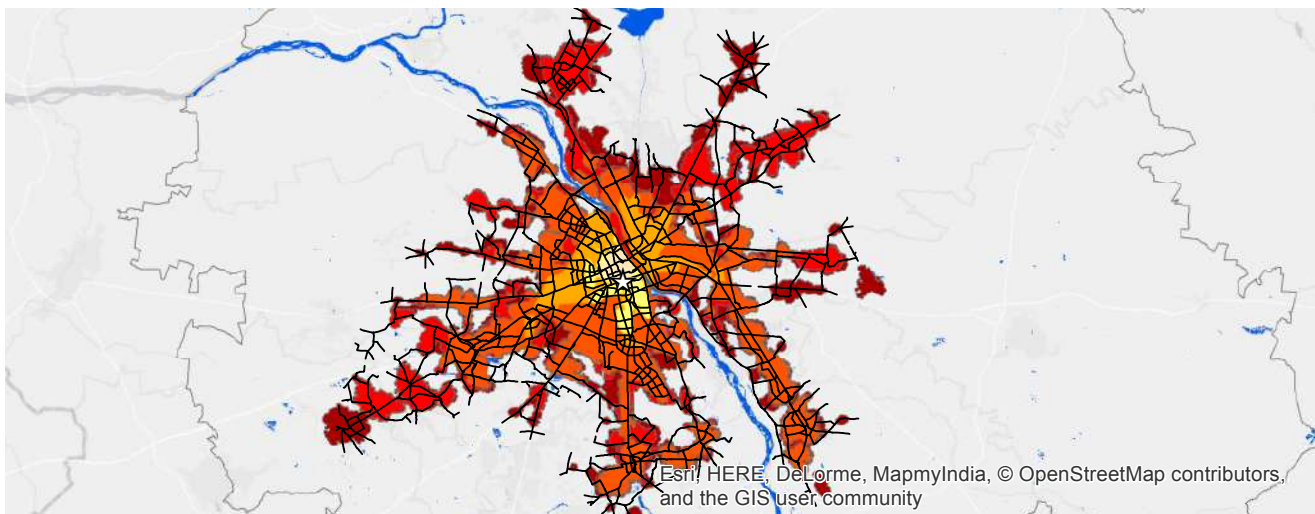
1992



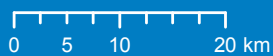
2000



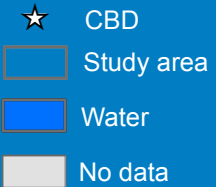
2013



## Warsaw, Poland 1888-2013



Arterial Roads



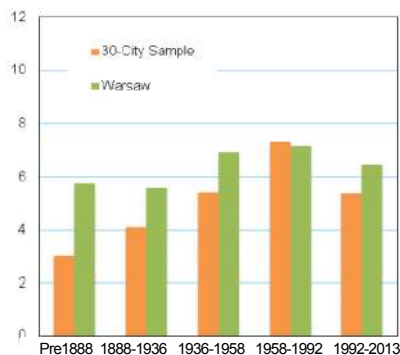


# Warsaw, Poland (Europe & Japan 1888 – 2013)

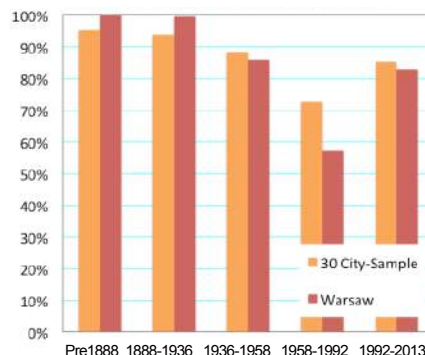


Urban Layout Metrics	Pre-1888	1888 - 1936	1936 - 1958	1958 - 1992	1992 - 2013
<b>Roads</b>					
Share of Built-up Area Occupied by Roads	28%	25%	19%	16%	15%
Share of Built-up Area That Is Gridded	3%	3%	0%	13%	5%
Share of Roads Less Than 4 Meters Wide	4%	6%	7%	11%	28%
Share of Roads More Than 16 Meters Wide	42%	38%	19%	8%	1%
<b>Arterial Roads</b>					
Total Area of Zone (km <sup>2</sup> )	13	24	96	417	746
Total Length of Arterial Roads (km <sup>2</sup> )	46	71	140	361	866
Density of All Arterial Roads (km/km <sup>2</sup> )	3.52	2.91	1.46	0.86	0.86
Average Beeline Distance to All Arterial Roads (meters)	89	125	344	1004	347
Share of Area within Walking Distance of All Arterial Roads	100%	99%	86%	57%	83%
<b>Block Size, Plot Size, Intersection Density, and Walkability</b>					
Share of Intersections that are 4-Way	25%	21%	17%	18%	13%
Average Block Size (ha)	5.7	5.6	6.9	7.1	6.4
4-Way Intersection Density (number per km <sup>2</sup> )	13	10	10	10	8
Walkability Ratio	1.6	1.6	1.6	1.5	1.6
Average Plot Size in Informal Land Subdivisions				798	1401
Average Plot Size in Formal Land Subdivisions			764	774	751
<b>Stages in the Evolution of Residential Layouts</b>					
Share of Built-up Area That Is Residential	31%	42%	45%	52%	62%
Share of Residential Areas Not Laid Out Before Development	5%	2%	0%	14%	18%
Share of Residential Areas Laid Out Before Development	95%	98%	100%	86%	82%
Share of Residential Area in Informal Land Subdivisions	0%	0%	11%	25%	39%
Share of Residential Area in Formal Land Subdivisions	63%	79%	67%	51%	35%
Share of Residential Area in Housing Projects	31%	19%	22%	10%	7%

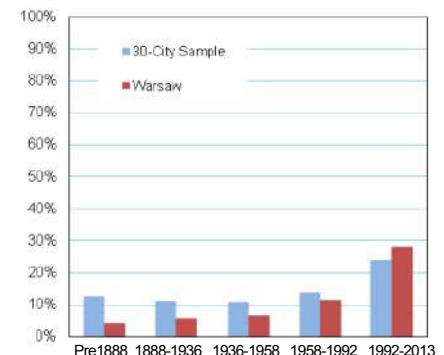
Average Block Size (hectares)



Share of Area Within Walking Distance of Arterial Road (625m)



Share of Roads Less Than 4-meters Wide





# Tables

The tables in this section provide a consolidated report of all the metrics listed in the previous pages for individual cities. Table 1 reports on blocks and roads metrics for 200 cities: pre-1990 and 1990-2014. Table 2: reports on blocks and roads metrics for 30 cities for five periods: from the pre-1900 period to the 1990-2014 period. Cities are listed in alphabetical order in rows and their values for various metrics are listed in columns.

TABLE 1:  
**Blocks and Roads metrics for 200 cities: Pre-1990 and 1990-2014**

City Name	Country	Region	CBD Location		Land Cover Dates		
			Latitude	Longitude	T1	T2	T3
Accra	Ghana	Sub-Saharan Africa	5.615	-0.159	1/1/91	2/1/00	3/1/14
Addis Ababa	Ethiopia	Sub-Saharan Africa	9.001	38.756	1/1/86	12/1/00	12/1/10
Ahmedabad	India	South and Central Asia	23.037	72.589	12/1/89	10/1/00	10/1/13
Ahvaz	Iran	South and Central Asia	31.320	48.665	11/1/91	9/1/00	9/1/13
Alexandria	Egypt	Western Asia and North Africa	31.152	29.884	10/1/87	4/1/99	7/1/13
Algiers	Algeria	Western Asia and North Africa	36.732	3.140	8/1/87	6/1/00	7/1/14
Anqing, Anhui	China	East Asia and the Pacific	30.536	117.050	9/1/90	4/1/00	10/1/13
Antwerp	Belgium	Europe and Japan	51.220	4.403	7/1/90	8/1/00	9/1/13
Arusha	Tanzania	Sub-Saharan Africa	-3.373	36.679	10/1/88	9/1/00	10/1/13
Astrakhan	Russia	Europe and Japan	46.340	48.020	7/1/88	9/1/03	3/1/14
Auckland	New Zealand	Land-Rich Developed Countries	-36.915	174.786	6/1/89	9/1/01	4/1/14
Bacolod	Philippines	Southeast Asia	10.664	122.961	12/1/92	9/1/00	3/1/15
Baghdad	Iraq	Western Asia and North Africa	33.320	44.379	8/1/90	8/1/00	8/1/13
Baku	Azerbaijan	Western Asia and North Africa	40.400	49.881	7/1/89	1/1/00	8/1/14
Bamako	Mali	Sub-Saharan Africa	12.650	-8.000	1/1/90	10/1/00	11/1/13
Bangkok	Thailand	Southeast Asia	13.778	100.538	3/1/88	1/1/02	1/1/15
Beijing, Beijing	China	East Asia and the Pacific	39.920	116.370	12/1/88	7/1/99	10/1/13
Beira	Mozambique	Sub-Saharan Africa	-19.831	34.860	3/1/91	5/1/01	7/1/13
Belgaum	India	South and Central Asia	15.850	74.506	11/1/89	11/1/00	4/1/14
Belgrade	Serbia	Europe and Japan	44.798	20.447	8/1/88	7/1/00	3/1/14
Belo Horizonte	Brazil	Latin America and the Caribbean	-19.904	-44.005	6/1/89	6/1/00	5/1/13
Berezniki	Russia	Europe and Japan	59.415	56.795	7/1/89	5/1/00	7/1/10
Berlin	Germany	Europe and Japan	52.502	13.453	8/1/90	8/1/00	12/1/13
Bicheng, Chongqing	China	East Asia and the Pacific	29.595	106.231	9/1/88	7/1/00	6/1/13
Bogota	Colombia	Latin America and the Caribbean	4.644	-74.129	12/1/89	1/1/01	1/1/10
Budapest	Hungary	Europe and Japan	47.484	19.090	7/1/92	6/1/02	7/1/13
Buenos Aires	Argentina	Latin America and the Caribbean	-34.652	-58.547	5/1/89	12/1/01	3/1/14
Bukhara	Uzbekistan	South and Central Asia	39.763	64.465	4/1/91	7/1/00	8/1/13
Busan	Korea Rep.	East Asia and the Pacific	35.167	129.036	2/1/91	10/1/00	9/1/13
Cabimas	Venezuela	Latin America and the Caribbean	10.284	-71.370	12/1/89	1/1/00	1/1/14
Cairo	Egypt	Western Asia and North Africa	30.034	31.282	8/1/92	4/1/03	5/1/13
Caracas	Venezuela	Latin America and the Caribbean	10.479	-66.897	5/1/91	3/1/01	1/1/14
Cebu City	Philippines	Southeast Asia	10.322	123.907	8/1/93	8/1/00	2/1/14
Changzhi, Hunan	China	East Asia and the Pacific	36.192	113.116	10/1/92	10/1/00	6/1/14
Changzhou, Jingsu	China	East Asia and the Pacific	31.775	119.970	10/1/89	3/1/00	3/1/14
Chengdu, Sichuan	China	East Asia and the Pacific	30.667	104.051	5/1/88	5/1/00	3/1/09
Chengguan, Guizhou	China	East Asia and the Pacific	26.680	105.769	8/1/90	11/1/00	6/1/13
Cheonan	Korea Rep.	East Asia and the Pacific	36.826	127.144	2/1/91	8/1/00	9/1/14
Chicago	United States	Land-Rich Developed Countries	41.860	-87.864	6/1/89	9/1/01	9/1/14
Cirebon	Indonesia	Southeast Asia	-6.702	108.497	10/1/89	10/1/00	6/1/14
Cleveland	United States	Land-Rich Developed Countries	41.470	-81.636	4/1/90	3/1/00	6/1/13
Cochabamba	Bolivia	Latin America and the Caribbean	-17.391	-66.170	7/1/90	6/1/00	7/1/13
Coimbatore	India	South and Central Asia	11.015	76.973	1/1/92	10/1/00	2/1/14
Cordoba	Argentina	Latin America and the Caribbean	-31.381	-64.216	12/1/91	11/1/01	7/1/14
Culiacan	Mexico	Latin America and the Caribbean	24.798	-107.402	1/1/90	1/1/00	3/1/14
Curitiba	Brazil	Latin America and the Caribbean	-25.463	-49.254	9/1/90	7/1/00	1/1/14
Dhaka	Bangladesh	South and Central Asia	23.766	90.418	11/1/89	10/1/99	3/1/14
Dzerzhinsk	Russia	Europe and Japan	56.241	43.455	8/1/89	4/1/00	7/1/10
Florianopolis	Brazil	Latin America and the Caribbean	-27.595	-48.613	5/1/90	5/1/00	1/1/14
Fukuoka	Japan	Europe and Japan	33.598	130.437	5/1/93	5/1/01	4/1/14

## Accra - Fukuoka

City Name	Share of Built-up Area Occupied by Roads		Average Road Width (meters)		Share of Roads Less Than 4 Meters Wide		Share of Roads More Than 16 Meters Wide	
	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014
Accra	16%	14%	9.0	6.6	8%	26%	8%	3%
Addis Ababa	18%	22%	9.0	8.1	13%	15%	13%	8%
Ahmedabad	23%	24%	7.2	8.4	37%	18%	9%	9%
Ahvaz	27%	23%	10.9	8.5	12%	20%	18%	10%
Alexandria	16%	23%	7.5	9.1	21%	27%	8%	14%
Algiers	23%	25%	9.5	6.6	13%	19%	14%	3%
Anqing, Anhui	24%	25%	8.3	9.3	24%	35%	14%	14%
Antwerp	14%	13%	7.9	7.1	22%	21%	6%	2%
Arusha	21%	10%	8.7	4.7	21%	65%	11%	5%
Astrakhan	23%	20%	7.4	5.3	8%	29%	4%	1%
Auckland	18%	19%	14.2	10.3	8%	20%	43%	19%
Bacolod	26%	21%	8.9	5.7	23%	28%	27%	1%
Baghdad	24%	24%	9.3	6.4	10%	26%	11%	3%
Baku	19%	18%	8.3	6.7	17%	18%	12%	5%
Bamako	19%	20%	8.5	6.5	8%	19%	5%	3%
Bangkok	18%	22%	9.5	7.0	16%	23%	13%	5%
Beijing, Beijing	25%	26%	10.4	7.3	27%	43%	20%	11%
Beira	14%	11%	7.6	6.5	26%	29%	9%	5%
Belgaum	22%	23%	9.2	8.0	8%	9%	13%	6%
Belgrade	23%	14%	8.5	5.7	22%	37%	10%	4%
Belo Horizonte	23%	20%	9.5	7.3	11%	17%	9%	3%
Berezniki	23%	32%	7.8	6.0	17%	36%	5%	2%
Berlin	25%	18%	10.7	8.8	13%	17%	17%	11%
Bicheng, Chongqing	33%	28%	8.7	10.2	21%	20%	13%	18%
Bogota	25%	23%	10.9	8.8	14%	16%	17%	11%
Budapest	20%	16%	9.1	7.7	7%	15%	6%	3%
Buenos Aires	26%	15%	11.9	5.9	3%	13%	18%	1%
Bukhara	19%	15%	10.3	8.6	11%	15%	15%	10%
Busan	22%	29%	6.5	6.9	37%	39%	7%	9%
Cabimas	16%	21%	8.7	7.1	4%	14%	5%	5%
Cairo	26%	24%	10.2	9.5	19%	25%	21%	16%
Caracas	20%	21%	11.4	6.5	9%	25%	19%	3%
Cebu City	13%	14%	9.0	5.2	21%	43%	9%	3%
Changzhi, Hunan	24%	23%	9.1	6.8	38%	51%	17%	10%
Changzhou, Jingsu	22%	27%	9.6	10.4	32%	32%	20%	18%
Chengdu, Sichuan	25%	21%	8.9	9.4	29%	31%	16%	17%
Chengguan, Guizhou	16%	12%	8.9	7.9	22%	28%	17%	4%
Cheonan	23%	26%	7.0	6.7	25%	37%	7%	8%
Chicago	27%	25%	11.6	10.0	8%	27%	42%	30%
Cirebon	13%	14%	5.4	5.8	40%	32%	2%	4%
Cleveland	19%	16%	10.8	21.8	18%	13%	26%	26%
Cochabamba	24%	19%	10.4	8.5	7%	25%	17%	2%
Coimbatore	18%	24%	8.1	6.5	11%	17%	9%	6%
Cordoba	23%	21%	10.2	7.5	5%	15%	8%	5%
Culiacan	23%	29%	10.1	7.0	10%	26%	12%	6%
Curitiba	26%	16%	12.5	6.6	7%	17%	27%	2%
Dhaka	15%	12%	6.8	4.3	40%	56%	10%	2%
Dzerzhinsk	21%	17%	6.5	5.2	27%	31%	6%	2%
Florianopolis	23%	19%	9.3	6.3	6%	18%	6%	0%
Fukuoka	25%	29%	5.4	5.1	48%	46%	4%	2%

City Name	Density of All Arterial Roads (km/km <sup>2</sup> )		Average Beeline Distance to All Arterial Roads (meters)		Share of Area within Walking Distance of All Arterial Roads		Share of Area within Walking Distance of Wide Arterial Roads	
	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014
Accra	1.90	0.82	199	575	96%	68%	77%	49%
Addis Ababa	2.68	1.65	123	257	99%	90%	94%	84%
Ahmedabad	1.86	1.61	185	218	97%	95%	93%	90%
Ahvaz	2.03	1.64	197	253	96%	91%	95%	87%
Alexandria	2.71	1.45	162	356	97%	81%	83%	70%
Algiers	1.68	1.09	267	376	89%	80%	87%	68%
Anqing, Anhui	1.57	1.23	251	336	92%	85%	91%	86%
Antwerp	1.65	1.40	228	248	93%	91%	61%	49%
Arusha	2.86	0.99	104	219	100%	95%	100%	84%
Astrakhan	1.16	0.84	334	371	84%	80%	69%	63%
Auckland	1.62	1.52	233	244	93%	92%	92%	91%
Bacolod	2.35	1.36	160	264	98%	90%	89%	83%
Baghdad	1.69	1.49	313	349	86%	84%	79%	74%
Baku	1.80	1.37	251	317	90%	84%	81%	68%
Bamako	1.87	1.02	178	376	98%	80%	87%	65%
Bangkok	1.07	0.78	353	520	83%	70%	77%	62%
Beijing, Beijing	1.63	0.67	271	573	89%	71%	87%	58%
Beira	1.15	0.62	336	803	83%	58%	77%	55%
Belgaum	2.62	1.50	138	307	100%	87%	97%	74%
Belgrade	2.02	1.64	182	245	97%	93%	83%	77%
Belo Horizonte	2.00	1.74	204	242	95%	92%	83%	76%
Berezniki	0.25	0.30	1,129	1,000	30%	37%	32%	30%
Berlin	2.21	1.72	150	207	98%	95%	95%	73%
Bicheng, Chongqing	2.38	1.15	148	229	100%	93%	100%	92%
Bogota	2.69	2.37	145	176	98%	96%	87%	84%
Budapest	1.80	1.38	205	267	96%	90%	69%	53%
Buenos Aires	2.57	2.14	147	194	98%	95%	78%	71%
Bukhara	1.58	0.84	291	579	89%	69%	87%	64%
Busan	2.91	2.07	213	289	91%	87%	87%	82%
Cabimas	1.80	1.43	179	241	97%	92%	83%	75%
Cairo	1.53	1.51	328	406	83%	78%	81%	70%
Caracas	2.12	1.87	227	255	92%	90%	82%	78%
Cebu City	1.71	1.34	237	295	91%	86%	78%	63%
Changzhi, Hunan	2.11	1.34	178	317	98%	86%	98%	74%
Changzhou, Jingsu	2.24	1.41	154	313	99%	86%	99%	84%
Chengdu, Sichuan	2.46	0.44	151	3,004	98%	31%	98%	31%
Chengguan, Guizhou	1.98	1.85	114	139	100%	100%	96%	95%
Cheonan	3.29	0.50	94	331	100%	82%	100%	82%
Chicago	1.41	1.41	241	258	93%	92%	80%	79%
Cirebon	1.72	0.91	229	435	97%	77%	95%	66%
Cleveland	1.63	1.21	225	258	95%	91%	90%	51%
Cochabamba	2.42	1.24	164	378	97%	82%	96%	72%
Coimbatore	1.77	1.42	196	238	96%	93%	79%	65%
Cordoba	2.30	1.81	190	235	95%	92%	86%	82%
Culiacan	2.20	1.54	159	297	98%	86%	88%	79%
Curitiba	2.22	1.59	173	262	98%	90%	96%	81%
Dhaka	2.27	1.50	162	261	97%	90%	88%	68%
Dzerzhinsk	1.46	1.30	471	494	75%	73%	83%	82%
Florianopolis	1.99	1.40	206	344	96%	85%	73%	61%
Fukuoka	2.31	2.09	174	185	97%	97%	76%	70%

## Accra - Fukuoka

City Name	Average Block Size (ha)		3-Way Intersection Density (number per km <sup>2</sup> )		4-Way Intersection Density (number per km <sup>2</sup> )		Share of Intersections that are 4-Way		Walkability Ratio	
	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014
Accra	6.2	3.9	47.3	117.3	14.3	8.9	19%	5%	1.8	1.7
Addis Ababa	3.1	3.2	104.4	176.3	10.1	28.2	8%	13%	1.8	1.6
Ahmedabad	2.4	4.2	297.5	139.4	35.1	27.9	9%	17%	1.8	1.6
Ahvaz	2.2	3.5	96.8	106.4	23.6	19.1	17%	14%	1.6	2.0
Alexandria	1.9	5.2	120.4	198.5	22.3	26.4	10%	9%	1.8	2.0
Algiers	4.5	6.7	61.8	140.0	16.2	14.1	9%	6%	1.9	1.8
Anqing, Anhui	3.8	4.8	191.0	121.2	23.8	14.6	9%	8%	1.8	1.5
Antwerp	7.1	14.7	62.3	55.2	5.1	6.4	8%	9%	1.8	1.4
Arusha	4.8	5.0	111.4	127.6	17.8	11.4	14%	5%	1.6	1.6
Astrakhan	2.0	2.8	159.7	195.8	21.3	27.1	11%	13%	1.8	1.6
Auckland	9.3	8.1	32.9	54.2	3.1	5.8	7%	9%	1.6	1.6
Bacolod	4.2	2.9	96.2	158.6	43.9	19.4	42%	11%	2.1	2.2
Baghdad	3.1	4.1	129.8	203.9	17.6	17.3	11%	4%	1.7	1.9
Baku	3.1	3.9	107.3	117.3	13.4	6.7	10%	5%	1.9	1.7
Bamako	2.2	1.6	111.5	184.3	43.8	45.6	28%	20%	1.6	1.5
Bangkok	5.8	5.4	60.3	91.1	10.3	9.5	11%	6%	1.7	2.2
Beijing, Beijing	6.2	4.5	105.9	147.0	15.3	34.6	10%	11%	1.6	1.8
Beira	5.2	10.4	57.6	42.0	17.4	7.6	15%	11%	1.6	1.5
Belgaum	2.6	2.7	112.7	152.1	11.9	21.9	8%	10%	1.7	1.6
Belgrade	3.1	7.1	120.0	69.2	17.3	6.9	12%	7%	1.8	1.6
Belo Horizonte	3.0	5.9	94.5	77.8	23.5	8.7	21%	14%	1.7	1.8
Berezniki	4.4	1.2	114.9	327.6	10.5	30.8	6%	6%	1.9	1.7
Berlin	3.4	5.6	97.3	83.8	23.5	14.4	23%	17%	1.9	1.9
Bicheng, Chongqing	0.9	6.3	248.0	105.3	86.0	11.1	26%	7%	1.4	1.9
Bogota	1.9	4.2	167.1	154.6	38.4	39.8	18%	13%	1.7	1.9
Budapest	3.5	5.3	92.8	71.1	19.1	14.3	20%	26%	1.7	1.5
Buenos Aires	2.4	3.5	83.1	68.1	29.2	41.5	58%	38%	1.4	1.6
Bukhara	4.0	10.0	72.9	55.4	6.2	3.2	8%	5%	1.6	1.7
Busan	2.5	2.8	161.8	185.4	32.8	18.3	14%	10%	1.7	1.7
Cabimas	3.7	4.4	81.5	105.6	12.5	22.3	15%	17%	1.6	1.7
Cairo	2.5	4.1	101.7	144.4	31.6	30.5	20%	12%	1.6	1.8
Caracas	4.6	6.3	39.8	47.7	8.3	2.8	13%	2%	1.9	1.8
Cebu City	6.5	4.4	79.4	114.9	7.4	1.0	8%	1%	2.1	2.2
Changzhi, Hunan	4.4	5.7	153.0	139.5	38.1	22.1	14%	11%	1.8	1.7
Changzhou, Jingsu	4.3	5.7	96.4	131.3	14.4	14.4	9%	11%	1.5	1.8
Chengdu, Sichuan	3.4	8.0	173.6	64.1	21.2	10.7	12%	8%	1.8	1.9
Chengguan, Guizhou	5.5	15.9	67.2	20.3	12.3	2.7	11%	4%	1.8	1.6
Cheonan	1.7	4.4	172.1	149.4	59.1	15.2	22%	6%	1.3	1.5
Chicago	7.4	3.9	61.2	73.9	37.6	11.8	33%	9%	1.5	1.7
Cirebon	2.0	6.7	178.6	122.6	29.0	11.4	12%	5%	1.7	1.8
Cleveland	5.3	7.7	82.0	99.3	10.5	10.9	11%	9%	1.7	1.7
Cochabamba	2.1	5.6	125.8	133.2	26.5	26.4	19%	17%	1.7	1.6
Coimbatore	4.5	3.9	130.1	182.4	12.6	19.1	9%	8%	2.0	1.9
Cordoba	2.3	5.7	70.5	80.0	55.3	25.2	42%	21%	1.4	1.7
Culiacan	2.8	2.8	77.3	183.1	51.0	35.4	37%	15%	1.8	2.0
Curitiba	4.1	5.3	57.3	70.2	26.1	19.6	37%	18%	1.5	1.7
Dhaka	3.3	5.8	131.0	149.4	15.3	7.6	10%	6%	1.6	1.5
Dzerzhinsk	4.0	8.7	155.5	83.1	20.2	9.5	9%	9%	2.0	2.1
Florianopolis	3.6	5.7	73.5	54.2	18.0	11.7	19%	11%	1.8	1.9
Fukuoka	1.6	1.9	254.5	288.2	56.8	54.9	17%	15%	1.5	1.5

City Name	Share of Built-up Area That Is Residential		Share of Residential Areas Laid Out Before Development		Share of Residential Areas Not Laid Out Before Development		Share of Built-up Area That Is Gridded	
	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014
Accra	70%	79%	51%	52%	43%	48%	24%	10%
Addis Ababa	56%	73%	35%	58%	65%	42%	3%	30%
Ahmedabad	72%	74%	80%	86%	20%	14%	0%	0%
Ahvaz	78%	61%	100%	92%	0%	8%	15%	0%
Alexandria	64%	82%	95%	80%	5%	20%	15%	0%
Algiers	62%	60%	35%	67%	60%	33%	2%	8%
Anqing, Anhui	47%	60%	61%	65%	39%	35%	0%	3%
Antwerp	65%	71%	84%	14%	16%	86%		0%
Arusha	58%	79%	65%	15%	35%	85%	18%	0%
Astrakhan	60%	73%	98%	80%	2%	20%	3%	5%
Auckland	82%	79%	100%	93%	0%	7%	0%	0%
Bacolod	98%	70%	78%	67%	43%	33%	10%	8%
Baghdad	79%	80%	88%	45%	12%	55%	5%	0%
Baku	57%	78%	68%	56%	32%	44%	4%	3%
Bamako	66%	84%	100%	78%	0%	22%	33%	18%
Bangkok	56%	54%	23%	60%	73%	40%	4%	3%
Beijing, Beijing	51%	54%	65%	89%	19%	11%	3%	3%
Beira	78%	76%	33%	17%	67%	83%	14%	8%
Belgaum	72%	79%	49%	77%	51%	23%	0%	3%
Belgrade	52%	82%	81%	64%	19%	36%	3%	3%
Belo Horizonte	81%	85%	85%	89%	15%	11%	10%	3%
Berezniki	64%	72%	97%	100%	3%	0%	3%	0%
Berlin	74%	77%	100%	97%	0%	3%	13%	0%
Bicheng, Chongqing	93%	38%	99%	74%	1%	26%	0%	0%
Bogota	64%	76%	99%	95%	1%	5%	23%	10%
Budapest	80%	90%	97%	89%	3%	11%	8%	15%
Buenos Aires	81%	83%	93%	97%	2%	3%	88%	73%
Bukhara	73%	78%	83%	93%	17%	7%	0%	0%
Busan	60%	40%	73%	49%	27%	51%	8%	0%
Cabimas	79%	83%	100%	72%	0%	28%	3%	8%
Cairo	70%	75%	69%	57%	22%	43%	13%	8%
Caracas	73%	74%	64%	48%	36%	52%	3%	0%
Cebu City	62%	78%	37%	20%	63%	80%	0%	0%
Changzhi, Hunan	52%	46%	94%	100%	6%	0%	3%	3%
Changzhou, Jingsu	45%	43%	76%	32%	24%	68%	0%	0%
Chengdu, Sichuan	47%	51%	93%	60%	7%	40%	3%	3%
Chengguan, Guizhou	78%	70%	26%	21%	75%	79%	0%	0%
Cheonan	69%	51%	64%	44%	36%	56%	18%	0%
Chicago	80%	83%	82%	81%	2%	19%	57%	0%
Cirebon	75%	82%	52%	39%	48%	61%	0%	0%
Cleveland	67%	78%	92%	85%	8%	15%	5%	0%
Cochabamba	67%	63%	99%	70%	1%	30%	18%	0%
Coimbatore	59%	58%	80%	76%	20%	24%	3%	0%
Cordoba	79%	76%	97%	90%	3%	10%	48%	15%
Culiacan	66%	66%	97%	96%	3%	4%	35%	8%
Curitiba	70%	72%	99%	82%	1%	18%	45%	18%
Dhaka	75%	71%	30%	9%	68%	91%	0%	0%
Dzerzhinsk	49%	94%	96%	99%	4%	1%		0%
Florianopolis	61%	88%	96%	85%	4%	15%	8%	0%
Fukuoka	64%	59%	81%	69%	19%	31%	0%	0%



## Accra - Fukuoka

City Name	Share of Residential Area in Informal Land Subdivisions		Share of Residential Area in Formal Land Subdivisions		Share of Residential Area in Housing Projects		Average Plot Size in Informal Land Subdivisions		Average Plot Size in Formal Land Subdivisions	
	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014
Accra	34%	47%	13%	5%	10%	0%	22	949	555	636
Addis Ababa	15%	44%	18%	2%	1%	13%		244	675	187
Ahmedabad	31%	31%	36%	10%	14%	44%	342	100	389	120
Ahvaz	16%	29%	75%	42%	9%	21%	181	295	207	217
Alexandria	15%	55%	73%	3%	7%	22%			354	
Algiers	3%	16%	23%	25%	14%	26%			356	225
Anqing, Anhui	5%	14%	23%	7%	33%	45%				
Antwerp	0%	0%	81%	14%	3%	0%				1,448
Arusha	35%	12%	29%	2%	2%	1%	553	369	456	654
Astrakhan	59%	80%	19%	0%	19%	0%	473	991		
Auckland	0%	0%	96%	85%	4%	7%			580	454
Bacolod	6%	44%	64%	20%	8%	2%	23	383	363	409
Baghdad	31%	39%	53%	5%	5%	1%	125		300	
Baku	23%	48%	27%	5%	18%	3%		637	728	
Bamako	99%	78%	0%	0%	0%	1%	651	467		
Bangkok	2%	15%	20%	9%	5%	36%		279	224	196
Beijing, Beijing	9%	40%	13%	20%	59%	30%	21		421	
Beira	16%	17%	10%	0%	7%	0%	420		778	
Belgaum	38%	51%	4%	26%	7%	0%		177		405
Belgrade	0%	27%	60%	33%	21%	4%				
Belo Horizonte	9%	18%	74%	70%	2%	1%	182		388	194
Berezniki	60%	50%	29%	0%	8%	50%	796	365	1,040	
Berlin	7%	11%	72%	71%	21%	14%	309	278	454	909
Bicheng, Chongqing	0%	3%	83%	33%	16%	38%				
Bogota	9%	26%	63%	18%	27%	51%			130	
Budapest	6%	26%	84%	62%	6%	0%		868	644	719
Buenos Aires	28%	87%	69%	4%	1%	5%	168	372	254	484
Bukhara	40%	57%	41%	23%	2%	12%	1,499		565	2,653
Busan	1%	0%	45%	24%	27%	25%			166	228
Cabimas	16%	44%	82%	19%	3%	9%			906	456
Cairo	17%	18%	58%	13%	3%	26%	82	595	525	473
Caracas	6%	4%	52%	24%	6%	20%			550	
Cebu City	25%	16%	11%	0%	0%	4%			243	
Changzhi, Hunan	5%	27%	77%	59%	13%	13%		561	269	394
Changzhou, Jingsu	1%	5%	40%	1%	35%	25%				
Chengdu, Sichuan	0%	9%	71%	23%	22%	28%				
Chengguan, Guizhou	0%	1%	24%	4%	1%	17%				
Cheonan	0%	8%	54%	11%	10%	25%			170	
Chicago	2%	0%	89%	64%	8%	17%			637	1,795
Cirebon	0%	16%	51%	22%	2%	0%				270
Cleveland	0%	3%	85%	75%	7%	6%			840	1,381
Cochabamba	33%	55%	66%	14%	1%	1%		319	356	347
Coimbatore	45%	70%	32%	2%	3%	5%	209	174	315	220
Cordoba	16%	54%	80%	24%	1%	13%	344	789	326	768
Culiacan	36%	24%	62%	67%	0%	5%	265	152	161	132
Curitiba	0%	30%	97%	48%	2%	4%		370	325	376
Dhaka	18%	5%	8%	0%	6%	3%	270	349	379	
Dzerzhinsk	61%	94%	28%	4%	7%	0%	683			
Florianopolis	5%	23%	82%	60%	9%	2%	345	233	326	241
Fukuoka	4%	9%	76%	59%	1%	1%	230	229	248	257

City Name	Country	Region	CBD Location		Land Cover Dates		
			Latitude	Longitude	T1	T2	T3
Gainesville, FL	United States	Land-Rich Developed Countries	29.661	-82.377	7/1/90	10/1/00	10/1/13
Gaoyou, Jiangsu	China	East Asia and the Pacific	32.792	119.430	10/1/90	1/1/00	4/1/16
Gombe	Nigeria	Sub-Saharan Africa	10.290	11.167	12/1/90	4/1/00	5/1/13
Gomel	Belarus	Europe and Japan	52.432	30.972	5/1/90	9/1/00	5/1/13
Gorgan	Iran	South and Central Asia	36.843	54.436	6/1/91	10/1/00	9/1/14
Guadalajara	Mexico	Latin America and the Caribbean	20.660	-103.357	3/1/90	11/1/99	4/1/14
Guangzhou, Guangdong	China	East Asia and the Pacific	22.936	113.608	2/1/91	9/1/00	10/1/14
Guatemala City	Guatemala	Latin America and the Caribbean	14.605	-90.542	1/1/90	1/1/01	11/1/13
Guixi, Chongqing	China	East Asia and the Pacific	30.332	107.348	6/1/88	7/1/01	6/1/16
Gwangju	Korea Rep.	East Asia and the Pacific	35.146	126.919	10/1/89	3/1/00	5/1/15
Haikou, Hainan	China	East Asia and the Pacific	20.028	110.329	10/1/91	7/1/01	12/1/13
Halle	Germany	Europe and Japan	51.487	11.970	8/1/90	9/1/99	7/1/10
Hangzhou, Zhejiang	China	East Asia and the Pacific	30.305	120.168	10/1/90	5/1/00	4/1/13
Hindupur	India	South and Central Asia	13.838	77.488	2/1/89	3/1/00	3/1/14
Ho Chi Minh City	Vietnam	Southeast Asia	10.830	106.713	1/1/89	12/1/99	1/1/15
Holguin	Cuba	Latin America and the Caribbean	20.883	-76.263	7/1/87	5/1/01	1/1/14
Hong Kong, Hong Kong	China	East Asia and the Pacific	22.346	114.183	11/1/89	1/1/00	10/1/13
Houston	United States	Land-Rich Developed Countries	29.780	-95.386	11/1/90	9/1/00	5/1/14
Hyderabad	India	South and Central Asia	17.422	78.484	3/1/90	7/1/99	5/1/14
Ibadan	Nigeria	Sub-Saharan Africa	7.388	3.896	12/1/84	2/1/00	12/1/13
Ilheus	Brazil	Latin America and the Caribbean	-14.803	-39.045	7/1/93	5/1/01	12/1/13
Ipoh	Malaysia	Southeast Asia	4.590	101.077	12/1/90	3/1/03	2/1/15
Istanbul	Turkey	Western Asia and North Africa	40.981	29.065	11/1/90	6/1/02	7/1/13
Jaipur	India	South and Central Asia	26.911	75.787	10/1/89	10/1/00	9/1/14
Jalna	India	South and Central Asia	19.851	75.878	10/1/89	10/1/00	10/1/14
Jequie	Brazil	Latin America and the Caribbean	-13.862	-40.085	8/1/92	4/1/01	4/1/14
Jinan, Shandong	China	East Asia and the Pacific	36.682	117.020	9/1/91	9/1/00	7/1/13
Jinju	Korea Rep.	East Asia and the Pacific	35.187	128.107	4/1/88	4/1/00	5/1/14
Johannesburg	South Africa	Sub-Saharan Africa	6.842	3.634	3/1/90	7/1/98	6/1/13
Kabul	Afghanistan	South and Central Asia	34.529	69.172	11/1/87	8/1/00	9/1/14
Kaiping, Guangdong	China	East Asia and the Pacific	22.380	112.688	4/1/90	9/1/00	11/1/14
Kairouan	Tunisia	Western Asia and North Africa	35.673	10.096	5/1/92	5/1/00	6/1/10
Kampala	Uganda	Sub-Saharan Africa	0.315	32.585	3/1/88	2/1/03	2/1/15
Kanpur	India	South and Central Asia	26.457	80.310	12/1/91	2/1/99	9/1/14
Karachi	Pakistan	South and Central Asia	24.900	67.075	2/1/91	10/1/00	10/1/13
Kaunas	Lithuania	Europe and Japan	54.903	23.925	8/1/90	9/1/00	3/1/14
Kayseri	Turkey	Western Asia and North Africa	38.724	35.480	10/1/87	6/1/00	8/1/13
Khartoum	Sudan	Western Asia and North Africa	15.552	32.532	12/1/88	4/1/00	3/1/14
Kigali	Rwanda	Sub-Saharan Africa	9.927	8.880	2/1/87	7/1/99	10/1/14
Killeen	United States	Land-Rich Developed Countries	31.112	-97.732	8/1/90	5/1/00	8/1/13
Kinshasa	Congo Dem. Rep.	Sub-Saharan Africa	-4.374	15.320	8/1/94	9/1/00	7/1/13
Kolkata	India	South and Central Asia	22.533	88.356	11/1/90	11/1/03	4/1/14
Kozhikode	India	South and Central Asia	11.254	75.803	2/1/91	3/1/01	2/1/14
Lagos	Nigeria	Sub-Saharan Africa	6.210	7.063	12/1/84	2/1/00	12/1/13
Lahore	Pakistan	South and Central Asia	31.514	74.314	11/1/91	10/1/00	10/1/13
Lausanne	Switzerland	Europe and Japan	46.516	6.633	4/1/87	3/1/01	8/1/15
Le Mans	France	Europe and Japan	47.989	0.199	5/1/92	8/1/99	7/1/13
Leon	Nicaragua	Latin America and the Caribbean	12.438	-86.878	7/1/93	4/1/00	1/1/10
Leshan, Sichuan	China	East Asia and the Pacific	29.591	103.754	7/1/90	7/1/01	8/1/14
London	United Kingdom	Europe and Japan	51.506	-0.139	5/1/89	6/1/00	7/1/13

## Gainsville - London

City Name	Share of Built-up Area Occupied by Roads		Average Street Width (meters)		Share of Roads Less Than 4m. Wide		Share of Roads More Than 16m. Wide	
	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014
Gainesville, FL	19%	18%	8.5	9.9	18%	13%	14%	14%
Gaoyou, Jiangsu	13%	23%	7.0	8.6	33%	25%	9%	16%
Gombe	21%	21%	7.5	8.2	17%	23%	7%	6%
Gomel	20%	16%	6.9	6.5	23%	26%	8%	5%
Gorgan	23%	24%	8.6	8.6	15%	20%	10%	9%
Guadalajara	27%	27%	12.4	9.3	6%	10%	18%	10%
Guangzhou, Guangdong	19%	19%	8.6	7.9	27%	34%	12%	12%
Guatemala City	20%	20%	8.3	6.9	12%	12%	10%	3%
Guixi, Chongqing	18%	18%	10.2	9.5	17%	38%	19%	18%
Gwangju	23%	25%	7.6	6.7	30%	43%	11%	7%
Haikou, Hainan	23%	21%	11.7	7.9	19%	24%	22%	9%
Halle	18%	15%	6.4	5.0	37%	40%	6%	0%
Hangzhou, Zhejiang	32%	27%	9.9	8.1	25%	38%	16%	13%
Hindupur	18%	20%	6.5	5.1	26%	39%	3%	2%
Ho Chi Minh City	18%	15%	9.0	7.2	23%	34%	13%	7%
Holguin	16%	21%	6.2	7.0	18%	19%	3%	9%
Hong Kong, Hong Kong	25%	20%	11.3	9.4	14%	25%	23%	16%
Houston	21%	20%	10.6	10.0	11%	12%	20%	14%
Hyderabad	19%	21%	6.8	6.2	19%	23%	4%	3%
Ibadan	12%	12%	6.0	3.2	22%	69%	2%	0%
Ilheus	23%	21%	9.0	8.7	13%	7%	10%	5%
Ipoh	32%	30%	10.8	8.6	5%	9%	15%	6%
Istanbul	27%	28%	9.2	7.8	9%	14%	10%	6%
Jaipur	22%	27%	8.0	7.4	19%	18%	10%	8%
Jalna	19%	18%	6.3	7.2	21%	29%	1%	6%
Jequeie	24%	26%	7.6	5.6	21%	29%	4%	1%
Jinan, Shandong	25%	22%	9.5	9.5	35%	42%	15%	17%
Jinju	24%	17%	7.5	4.8	31%	54%	10%	2%
Johannesburg	25%	18%	13.2	7.4	6%	22%	32%	7%
Kabul	17%	20%	8.2	6.3	35%	30%	10%	3%
Kaiping, Guangdong	18%	24%	5.1	8.4	52%	33%	6%	13%
Kairouan	26%	25%	7.7	5.8	14%	35%	8%	3%
Kampala	13%	12%	6.7	4.5	20%	42%	4%	1%
Kanpur	20%	23%	6.8	5.7	24%	38%	5%	4%
Karachi	22%	23%	8.3	7.4	30%	30%	12%	9%
Kaunas	17%	12%	7.9	5.4	26%	31%	10%	1%
Kayseri	31%	27%	9.4	9.1	17%	28%	13%	17%
Khartoum	24%	23%	9.3	7.3	5%	21%	9%	6%
Kigali	17%	14%	7.9	5.5	18%	32%	7%	1%
Killeen	24%	23%	10.6	18.8	12%	13%	24%	31%
Kinshasa	14%	13%	9.5	5.2	28%	37%	4%	3%
Kolkata	13%	10%	5.8	4.0	38%	60%	5%	2%
Kozhikode	15%	8%	6.3	4.8	26%	44%	3%	3%
Lagos	17%	16%	10.1	7.1	6%	20%	10%	3%
Lahore	20%	24%	7.3	6.4	32%	32%	9%	6%
Lausanne	21%	24%	18.3	6.2	17%	21%	14%	1%
Le Mans	21%	21%	6.7	5.5	25%	34%	4%	2%
Leon	18%	19%	7.8	5.5	9%	19%	2%	1%
Leshan, Sichuan	27%	18%	10.8	7.6	10%	27%	18%	8%
London	19%	10%	9.5	7.5	9%	18%	9%	4%

City Name	Density of All Arterial Roads (km/km <sup>2</sup> )		Average Beeline Distance to All Arterial Roads (meters)		Share of Area within Walking Distance of All Arterial Roads		Share of Area within Walking Distance of Wide Arterial Roads	
	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014
Gainesville, FL	1.71	1.45	197	233	97%	93%	96%	93%
Gaoyou, Jiangsu	1.47	1.47	334	310	83%	91%	83%	91%
Gombe	2.19	1.22	170	336	97%	81%	89%	67%
Gomel	0.77	0.72	448	475	72%	71%	72%	70%
Gorgan	1.90	1.50	169	236	99%	93%	98%	90%
Guadalajara	2.28	1.59	165	298	97%	86%	93%	78%
Guangzhou, Guangdong	2.19	0.59	175	912	97%	70%	97%	69%
Guatemala City	2.03	1.53	187	250	95%	90%	81%	68%
Guixi, Chongqing	0.95	1.05	214	264	100%	89%	100%	96%
Gwangju	4.63	2.77	69	199	100%	92%	100%	90%
Haikou, Hainan	2.04	1.60	192	249	96%	92%	96%	92%
Halle	2.17	1.87	155	187	98%	96%	90%	76%
Hangzhou, Zhejiang	2.97	0.74	129	1,556	99%	66%	99%	63%
Hindupur	2.35	1.28	115	219	100%	95%	92%	95%
Ho Chi Minh City	2.57	1.17	146	362	97%	82%	95%	64%
Holguin	1.65	1.50	235	250	92%	92%	69%	67%
Hong Kong, Hong Kong	3.88	3.22	105	132	99%	97%	98%	94%
Houston	1.99	0.83	181	396	97%	80%	95%	73%
Hyderabad	1.92	1.31	184	279	98%	90%	77%	63%
Ibadan	1.04	0.71	353	596	82%	65%	49%	34%
Ilheus	2.34	1.71	156	264	98%	88%	95%	78%
Ipoh	1.05	0.81	387	479	79%	71%	68%	58%
Istanbul	3.30	2.25	115	202	99%	94%	93%	82%
Jaipur	1.95	1.38	185	272	96%	90%	94%	88%
Jalna	1.65	1.50	190	241	96%	93%	63%	66%
Jequie	1.20	1.02	332	383	83%	79%	68%	65%
Jinan, Shandong	1.45	1.15	332	500	86%	76%	86%	76%
Jinju	2.35	1.27	172	404	97%	80%	94%	51%
Johannesburg	1.51	0.52	238	835	93%	49%	93%	46%
Kabul	1.60	1.25	301	346	85%	82%	68%	63%
Kaiping, Guangdong	1.97	1.35	161	235	100%	92%	100%	89%
Kairouan	2.25	1.95	156	196	99%	96%	99%	96%
Kampala	2.05	1.10	157	346	98%	84%	58%	37%
Kanpur	1.81	1.47	187	261	97%	91%	94%	84%
Karachi	3.11	2.59	130	158	99%	98%	94%	89%
Kaunas	1.28	1.21	275	281	90%	90%	81%	78%
Kayseri	2.93	1.81	125	218	99%	93%	99%	89%
Khartoum	1.76	1.18	281	516	89%	74%	88%	72%
Kigali	2.22	1.17	179	318	95%	86%	72%	58%
Killeen	1.11	0.95	470	472	76%	75%	75%	73%
Kinshasa	1.26	0.84	327	709	84%	65%	41%	35%
Kolkata	1.63	1.11	245	335	92%	84%	62%	54%
Kozhikode	2.16	0.74	189	314	98%	88%	100%	67%
Lagos	1.25	0.76	336	543	85%	70%	73%	50%
Lahore	3.21	2.46	119	167	99%	97%	94%	88%
Lausanne	3.10	2.58	95	125	100%	99%	73%	60%
Le Mans	2.87	2.78	117	122	100%	99%	85%	84%
Leon	3.02	2.01	119	188	99%	96%	66%	66%
Leshan, Sichuan	2.44	0.79	166	747	97%	61%	85%	55%
London	2.21	1.39	163	439	98%	78%	75%	37%

## Gainesville - London

City Name	Average Block Size (ha)		3-Way Intersection Density (number per km <sup>2</sup> )		4-Way Intersection Density (number per km <sup>2</sup> )		Share of Intersections that are 4-Way		Walkability Ratio	
	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014
Gainesville, FL	3.8	7.6	91.6	69.3	17.0	4.9	13%	6%	1.8	2.4
Gaoyou, Jiangsu	5.3	8.0	79.9	58.9	11.5	14.5	10%	15%	1.5	1.5
Gombe	1.6	2.5	193.1	248.1	55.2	36.5	22%	10%	1.5	1.7
Gomel	3.4	5.1	163.9	79.4	19.6	16.7	14%	14%	2.0	1.8
Gorgan	2.1	7.0	170.8	109.4	15.8	15.2	8%	7%	1.8	1.7
Guadalajara	3.0	3.2	100.0	142.0	43.6	19.2	28%	11%	1.7	1.8
Guangzhou, Guangdong	3.6	5.2	123.2	123.6	10.3	9.7	6%	6%	1.8	1.8
Guatemala City	2.1	2.0	89.5	97.5	42.0	21.1	31%	10%	1.6	1.8
Guixi, Chongqing	4.1	7.9	68.8	47.4	17.1	5.8	28%	6%	1.4	1.7
Gwangju	2.3	4.3	149.6	188.7	38.0	18.9	18%	11%	1.5	1.7
Haikou, Hainan	3.7	4.6	99.3	136.0	7.4	6.8	11%	5%	1.8	1.7
Halle	2.5	4.3	214.1	154.7	26.8	11.0	9%	3%	1.7	1.6
Hangzhou, Zhejiang	2.4	3.6	258.8	153.9	42.2	23.9	13%	13%	1.7	1.7
Hindupur	1.7	2.5	193.2	279.2	24.8	56.0	13%	16%	1.5	1.7
Ho Chi Minh City	3.0	5.3	117.6	87.5	22.4	6.8	14%	6%	1.7	1.8
Holguin	4.2	8.5	96.3	116.6	32.4	13.6	21%	7%	1.5	1.8
Hong Kong, Hong Kong	4.6	3.7	55.0	26.7	12.3	7.9	11%	18%	1.9	1.7
Houston	5.9	6.7	81.1	53.3	12.7	8.9	14%	12%	1.8	1.9
Hyderabad	2.2	3.0	188.7	204.2	25.0	43.3	10%	15%	1.7	1.5
Ibadan	5.7	4.2	69.8	196.2	5.3	14.0	4%	8%	1.8	1.7
Ilheus	3.3	3.3	107.4	78.6	17.0	17.5	13%	14%	1.6	1.7
Ipoh	2.7	3.2	150.5	146.4	15.6	8.1	8%	3%	2.0	1.6
Istanbul	2.0	4.3	143.4	160.4	30.5	14.8	17%	7%	1.7	2.0
Jaipur	2.4	2.2	197.1	242.1	18.7	17.2	11%	7%	1.7	1.7
Jalna	3.0	5.3	161.7	178.5	15.4	28.2	9%	11%	1.6	1.6
Jequie	2.3	3.1	180.8	254.5	38.3	46.8	19%	18%	1.9	1.6
Jinan, Shandong	3.7	7.2	157.9	110.5	13.5	14.5	5%	14%	2.0	1.6
Jinju	2.4	5.5	159.5	108.5	40.8	20.6	20%	15%	1.4	1.6
Johannesburg	7.6	5.3	47.7	109.0	18.4	14.2	23%	10%	1.6	2.2
Kabul	3.1	2.5	108.1	171.9	11.5	17.8	11%	10%	1.7	1.9
Kaiping, Guangdong	1.0	2.5	311.1	266.8	84.3	49.5	16%	8%	1.5	1.6
Kairouan	1.7	2.9	305.1	348.1	43.9	52.3	11%	9%	1.5	1.7
Kampala	6.0	7.5	74.0	105.1	6.0	5.3	6%	4%	1.8	1.6
Kanpur	3.3	3.4	206.3	289.2	22.4	33.5	9%	9%	1.6	1.6
Karachi	3.2	2.4	220.3	226.1	50.2	74.0	13%	21%	1.7	1.7
Kaunas	4.9	5.5	90.3	79.6	17.0	7.2	14%	9%	2.0	1.5
Kayseri	1.7	3.3	205.0	201.5	26.4	37.2	14%	13%	1.6	1.6
Khartoum	1.4	1.7	167.8	225.6	50.8	60.3	21%	18%	1.5	1.5
Kigali	5.7	4.6	64.9	99.4	7.1	4.7	6%	3%	2.3	1.7
Killeen	2.9	5.4	109.0	51.7	19.8	6.9	19%	9%	1.8	1.7
Kinshasa	2.1	2.7	122.6	115.7	36.1	25.4	22%	12%	1.7	1.7
Kolkata	5.2	4.8	85.5	107.8	9.5	5.7	8%	4%	1.6	1.6
Kozhikode	1.7	7.5	176.0	110.9	8.6	10.0	4%	5%	1.4	1.6
Lagos	5.8	4.8	61.4	82.8	12.0	4.4	10%	4%	1.7	1.7
Lahore	2.3	1.9	207.9	209.2	31.1	23.0	11%	11%	1.5	1.9
Lausanne	4.1	6.6	119.6	106.6	13.7	6.7	14%	5%	1.9	1.6
Le Mans	2.7	6.3	184.4	137.9	22.2	13.9	8%	8%	2.0	1.7
Leon	2.7	5.8	78.8	155.3	34.5	57.0	36%	20%	1.6	1.6
Leshan, Sichuan	3.3	4.9	98.8	78.2	17.1	6.0	16%	3%	1.7	1.4
London	8.4	8.2	50.9	60.8	10.0	10.4	13%	4%	1.7	1.7

City Name	Share of Built-up Area That Is Residential		Share of Residential Areas Laid Out Before Development		Share of Residential Areas Not Laid Out Before Development		Share of Built-up Area That Is Gridded	
	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014
Gainesville, FL	71%	74%	96%	89%	4%	11%	0%	0%
Gaoyou, Jiangsu	70%	51%	60%	56%	40%	44%		
Gombe	77%	74%	91%	58%	9%	42%	8%	0%
Gomel	59%	78%	99%	94%	1%	6%	0%	0%
Gorgan	66%	69%	88%	93%	12%	7%	0%	0%
Guadalajara	61%	76%	100%	98%	0%	2%	28%	8%
Guangzhou, Guangdong	51%	50%	54%	50%	46%	50%		0%
Guatemala City	73%	72%	68%	84%	26%	16%	49%	3%
Guixi, Chongqing	67%	62%	46%	37%	54%	63%	0%	0%
Gwangju	62%	31%	75%	62%	25%	38%	3%	0%
Haikou, Hainan	55%	60%	75%	59%	25%	41%	0%	0%
Halle	57%	69%	96%	77%	4%	23%	0%	0%
Hangzhou, Zhejiang	46%	56%	76%	78%	24%	22%	3%	3%
Hindupur	77%	75%	99%	75%	1%	25%	0%	0%
Ho Chi Minh City	67%	68%	50%	43%	50%	57%	8%	3%
Holguin	73%	69%	68%	44%	32%	56%	13%	0%
Hong Kong, Hong Kong	51%	44%	84%	69%	16%	31%	0%	3%
Houston	65%	83%	96%	87%	4%	13%	5%	0%
Hyderabad	68%	66%	90%	86%	10%	14%	3%	0%
Ibadan	71%	76%	64%	25%	36%	75%	5%	0%
Ilheus	75%	79%	97%	94%	4%	6%	0%	10%
Ipoh	70%	82%	100%	90%	0%	10%	3%	3%
Istanbul	74%	68%	53%	76%	42%	24%	10%	5%
Jaipur	70%	76%	87%	85%	13%	15%	0%	0%
Jalna	55%	55%	50%	70%	50%	30%	0%	0%
Jequie	69%	70%	100%	85%	0%	15%	10%	11%
Jinan, Shandong	38%	48%	93%	87%	7%	13%	0%	0%
Jinju	58%	31%	80%	23%	20%	77%	18%	0%
Johannesburg	85%	83%	93%	86%	1%	14%	25%	3%
Kabul	74%	75%	68%	83%	32%	17%	8%	5%
Kaiping, Guangdong	83%	48%	93%	90%	7%	10%	0%	0%
Kairouan	79%	62%	94%	83%	6%	17%	0%	0%
Kampala	72%	69%	51%	33%	49%	67%	0%	0%
Kanpur	73%	74%	81%	52%	19%	48%	0%	3%
Karachi	71%	71%	75%	72%	25%	28%	5%	13%
Kaunas	61%	73%	75%	75%	25%	25%	0%	0%
Kayseri	49%	68%	90%	77%	10%	23%	5%	0%
Khartoum	75%	87%	97%	94%	3%	6%		8%
Kigali	58%	79%	56%	31%	44%	69%	0%	0%
Killeen	74%	93%	100%	91%	0%	9%	0%	3%
Kinshasa	85%	85%	81%	63%	19%	37%	10%	5%
Kolkata	76%	84%	15%	27%	84%	73%	1%	3%
Kozhikode	44%	87%	0%	45%	100%	55%	0%	0%
Lagos	70%	77%	51%	61%	47%	39%	13%	0%
Lahore	82%	70%	64%	89%	36%	11%	0%	0%
Lausanne	65%	77%	92%	73%	8%	27%	0%	0%
Le Mans	62%	55%	86%	56%	14%	44%	0%	0%
Leon	74%	82%	93%	89%	7%	11%	23%	13%
Leshan, Sichuan	66%	52%	59%	24%	41%	76%	0%	0%
London	73%	72%	95%	87%	2%	13%	0%	0%

## Gainesville - London

City Name	Share of Residential Areas in Informal Land Subdivisions		Share of Residential Areas in Formal Land Subdivisions		Share of Residential Areas in Housing Projects		Average Plot Size in Informal Land Subdivisions		Average Plot Size in Formal Land Subdivisions	
	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014
Gainesville, FL	0%	0%	90%	74%	7%	15%			1,037	1,009
Gaoyou, Jiangsu	1%	0%	35%	39%	23%	17%				674
Gombe	85%	52%	5%	4%	0%	2%		599		806
Gomel	38%	81%	41%	8%	20%	5%		847	731	806
Gorgan	7%	75%	78%	15%	2%	3%			259	
Guadalajara	15%	40%	79%	45%	6%	13%				
Guangzhou, Guangdong	0%	26%	38%	11%	16%	13%		168		
Guatemala City	7%	36%	63%	41%	4%	7%			392	187
Guixi, Chongqing	0%	4%	44%	8%	2%	25%				
Gwangju	0%	4%	41%	33%	33%	25%			189	236
Haikou, Hainan	2%	11%	51%	16%	21%	32%				
Halle	1%	13%	67%	62%	28%	1%		325	405	674
Hangzhou, Zhejiang	1%	38%	23%	18%	52%	22%			162	592
Hindupur	99%	74%	0%	0%	0%	1%	155	141		
Ho Chi Minh City	0%	23%	50%	20%	0%	1%				193
Holguin	44%	42%	15%	0%	9%	2%	134		241	
Hong Kong, Hong Kong	0%	0%	32%	9%	52%	60%			1,098	
Houston	0%	0%	86%	73%	10%	14%			800	852
Hyderabad	3%	65%	83%	20%	3%	2%	95	159	213	190
Ibadan	56%	25%	6%	0%	2%	0%			677	
Ilheus	28%	51%	67%	42%	1%	1%		500		253
Ipoh	5%	5%	68%	29%	27%	56%			358	336
Istanbul	0%	13%	51%	35%	7%	28%			355	318
Jaipur	40%	68%	42%	11%	5%	6%	246	195	233	212
Jalna	32%	62%	17%	7%	1%	0%	145		141	
Jequeie	59%	58%	36%	16%	4%	11%	202	173	132	274
Jinan, Shandong	22%	29%	45%	13%	26%	45%				
Jinju	0%	0%	56%	4%	25%	19%				
Johannesburg	4%	46%	87%	38%	8%	2%	230	290	965	509
Kabul	53%	83%	12%	0%	4%	0%	548	339	366	
Kaiping, Guangdong	31%	57%	50%	11%	12%	23%				
Kairouan	21%	36%	69%	47%	3%	0%			422	168
Kampala	47%	32%	2%	0%	2%	0%				
Kanpur	49%	46%	22%	4%	10%	2%	158		262	169
Karachi	26%	61%	46%	7%	3%	5%	83		464	343
Kaunas	18%	27%	41%	39%	16%	9%	1,567	990	741	784
Kayseri	10%	19%	77%	28%	3%	31%			561	275
Khartoum	88%	94%	5%	0%	4%	0%	534	345		
Kigali	34%	30%	22%	0%	0%	1%		444		
Killeen	0%	0%	68%	85%	32%	6%			742	770
Kinshasa	73%	59%	9%	2%	0%	3%	444	124		
Kolkata	7%	16%	7%	3%	3%	8%		217	271	
Kozhikode	0%	45%	0%	0%	0%	1%				
Lagos	28%	53%	20%	4%	5%	4%	28	669	538	679
Lahore	21%	31%	42%	54%	1%	3%			394	440
Lausanne	0%	0%	78%	68%	14%	5%				1,231
Le Mans	0%	0%	72%	54%	14%	2%			647	720
Leon	15%	63%	78%	24%	0%	2%			143	355
Leshan, Sichuan	4%	7%	30%	11%	24%	7%				
London	0%	0%	45%	87%	53%	0%			550	612

City Name	Country	Region	CBD Location		Land Cover Dates		
			Latitude	Longitude	T1	T2	T3
Los Angeles	United States	Land-Rich Developed Countries	33.971	-117.969	5/1/90	5/1/00	10/1/14
Luanda	Angola	Sub-Saharan Africa	-8.825	13.260	6/1/91	6/1/00	5/1/14
Lubumbashi	Congo Dem. Rep.	Sub-Saharan Africa	-11.677	27.480	7/1/90	9/1/98	8/1/13
Madrid	Spain	Europe and Japan	40.413	-3.707	5/1/91	6/1/02	5/1/10
Malatya	Turkey	Western Asia and North Africa	38.350	38.270	8/1/90	7/1/00	3/1/14
Malegaon	India	South and Central Asia	20.562	74.520	2/1/91	3/1/00	10/1/14
Manchester	United Kingdom	Europe and Japan	53.470	-2.474	5/1/89	9/1/02	10/1/10
Manila	Philippines	Southeast Asia	14.579	121.028	12/1/90	4/1/00	2/1/14
Marrakesh	Morocco	Western Asia and North Africa	31.636	-8.021	3/1/88	6/1/02	8/1/14
Medan	Indonesia	Southeast Asia	3.596	98.651	6/1/89	6/1/01	6/1/13
Mexico City	Mexico	Latin America and the Caribbean	19.446	-99.123	3/1/90	2/1/00	4/1/14
Milan	Italy	Europe and Japan	45.608	9.222	9/1/88	8/1/03	8/1/13
Minneapolis	United States	Land-Rich Developed Countries	44.959	-93.256	5/1/90	4/1/00	10/1/14
Modesto	United States	Land-Rich Developed Countries	37.649	-120.993	7/1/92	7/1/00	8/1/14
Montreal	Canada	Land-Rich Developed Countries	45.534	-73.658	8/1/90	9/1/00	8/1/13
Moscow	Russia	Europe and Japan	55.743	37.645	5/1/91	5/1/01	9/1/14
Mumbai	India	South and Central Asia	19.115	72.913	12/1/91	12/1/01	10/1/14
Myeik	Myanmar	Southeast Asia	12.448	98.618	2/1/91	12/1/03	1/1/14
Nakuru	Kenya	Sub-Saharan Africa	-0.294	36.058	3/1/89	2/1/00	2/1/14
Ndola	Zambia	Sub-Saharan Africa	-12.981	28.634	6/1/89	5/1/02	6/1/14
New York	United States	Land-Rich Developed Countries	40.842	-73.798	5/1/91	10/1/00	5/1/11
Nikolaev	Ukraine	Europe and Japan	46.974	32.029	5/1/89	9/1/00	8/1/13
Okayama	Japan	Europe and Japan	34.657	133.949	5/1/90	5/1/00	5/1/14
Oldenburg	Germany	Europe and Japan	53.148	8.207	8/1/90	8/1/99	10/1/13
Osaka	Japan	Europe and Japan	34.718	135.389	5/1/89	10/1/01	3/1/14
Oyo	Nigeria	Sub-Saharan Africa	6.818	3.916	12/1/90	2/1/00	2/1/14
Palembang	Indonesia	Southeast Asia	-2.958	104.736	4/1/90	7/1/01	6/1/13
Palermo	Italy	Europe and Japan	38.135	13.330	7/1/87	5/1/00	7/1/13
Palmas	Brazil	Latin America and the Caribbean	-10.189	-48.330	4/1/90	6/1/00	8/1/13
Parbhani	India	South and Central Asia	19.280	76.765	3/1/91	10/1/02	12/1/14
Parepare	Indonesia	Southeast Asia	-7.772	112.195	8/1/94	8/1/00	7/1/14
Paris	France	Europe and Japan	48.863	2.315	5/1/87	8/1/00	5/1/14
Pematangiantar	Indonesia	Southeast Asia	2.962	99.074	7/1/94	7/1/01	2/1/14
Philadelphia	United States	Land-Rich Developed Countries	40.015	-75.168	6/1/90	5/1/00	4/1/14
Pingxiang, Jiangxi	China	East Asia and the Pacific	27.643	113.851	2/1/89	12/1/99	9/1/13
Pokhara	Nepal	South and Central Asia	28.220	83.980	4/1/89	1/1/00	5/1/13
Port Elizabeth	South Africa	Sub-Saharan Africa	13.052	5.230	6/1/90	7/1/01	7/1/13
Portland, OR	United States	Land-Rich Developed Countries	45.520	-122.666	9/1/90	9/1/00	8/1/14
Pune	India	South and Central Asia	18.524	73.864	2/1/91	4/1/01	1/1/11
Pyongyang	Korea Dem. Rep.	East Asia and the Pacific	39.045	125.767	3/1/90	5/1/00	3/1/14
Qingdao, Shandong	China	East Asia and the Pacific	36.220	120.403	5/1/90	1/1/00	8/1/13
Qom	Iran	South and Central Asia	34.640	50.876	1/1/90	7/1/01	5/1/10
Quito	Ecuador	Latin America and the Caribbean	-0.135	-78.443	6/1/88	12/1/00	6/1/13
Rajshahi	Bangladesh	South and Central Asia	24.367	88.600	5/1/90	11/1/00	1/1/10
Raleigh	United States	Land-Rich Developed Countries	35.807	-78.675	10/1/90	11/1/00	5/1/13
Rawang	Malaysia	Southeast Asia	3.330	101.577	6/1/89	9/1/01	3/1/14
Reynosa	Mexico	Latin America and the Caribbean	26.063	-98.302	7/1/91	6/1/00	7/1/13
Ribeirao Preto	Brazil	Latin America and the Caribbean	-21.172	-47.798	12/1/90	3/1/01	3/1/14
Riyadh	Saudi Arabia	Western Asia and North Africa	24.686	46.742	8/1/90	8/1/00	8/1/13
Rovno	Ukraine	Europe and Japan	50.624	26.248	5/1/90	5/1/00	5/1/14



## Los Angeles - Rovno

City Name	Share of Built-up Area Occupied by Roads		Average Street Width (meters)		Share of Roads Less Than 4m. Wide		Share of Roads More Than 16m. Wide	
	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014
Los Angeles	25%	26%	15.1	15.8	6%	18%	46%	21%
Luanda	15%	17%	7.9	6.4	17%	31%	7%	5%
Lubumbashi	16%	16%	9.1	5.6	9%	33%	10%	2%
Madrid	28%	29%	13.2	11.3	12%	22%	25%	28%
Malatya	28%	28%	9.2	9.3	11%	20%	12%	15%
Malegaon	20%	27%	5.3	4.6	37%	40%	2%	1%
Manchester	20%	19%	7.4	6.3	25%	35%	4%	3%
Manila	20%	22%	9.2	5.8	11%	23%	11%	1%
Marrakesh	22%	26%	8.5	8.7	27%	20%	14%	12%
Medan	12%	11%	6.5	5.1	25%	37%	5%	0%
Mexico City	26%	23%	12.5	8.0	6%	15%	20%	4%
Milan	21%	18%	8.4	5.0	18%	40%	10%	1%
Minneapolis	23%	21%	9.5	8.8	16%	16%	15%	7%
Modesto	25%	29%	10.6	10.2	18%	22%	18%	19%
Montreal	20%	19%	9.4	16.1	11%	12%	8%	11%
Moscow	20%	15%	9.7	5.6	10%	32%	25%	3%
Mumbai	17%	20%	11.6	8.6	11%	24%	18%	11%
Myeik	15%	13%	5.1	5.3	32%	36%	1%	3%
Nakuru	24%	21%	10.8	5.5	14%	31%	20%	2%
Ndola	17%	13%	8.9	4.9	16%	44%	13%	2%
New York	20%	13%	10.8	8.9	8%	14%	12%	8%
Nikolaev	19%	15%	8.6	5.6	10%	26%	8%	1%
Okayama	26%	23%	5.7	4.4	51%	61%	6%	3%
Oldenburg	18%	18%	7.6	6.6	17%	24%	4%	3%
Osaka	21%	26%	5.7	5.5	47%	40%	6%	3%
Oyo	12%	15%	7.6	6.7	13%	23%	3%	3%
Palembang	13%	14%	5.8	4.4	34%	50%	5%	2%
Palermo	21%	19%	7.2	5.4	29%	39%	8%	1%
Palmas	30%	37%	9.6	8.3	27%	19%	17%	9%
Parbhani	23%	27%	6.5	3.8	16%	47%	3%	0%
Parepare	13%	11%	7.6	6.3	10%	15%	0%	0%
Paris	21%	15%	9.2	6.2	10%	28%	11%	5%
Pematangiantar	11%	14%	6.1	5.0	26%	37%	1%	0%
Philadelphia	22%	15%	17.8	8.1	15%	15%	11%	7%
Pingxiang, Jiangxi	14%	12%	6.5	4.0	39%	64%	8%	2%
Pokhara	16%	17%	6.0	4.8	29%	42%	2%	0%
Port Elizabeth	22%	17%	10.3	7.0	11%	20%	14%	3%
Portland, OR	23%	20%	10.1	10.0	18%	10%	15%	8%
Pune	21%	21%	9.9	7.8	6%	13%	13%	6%
Pyongyang	22%	18%	7.1	4.5	30%	55%	7%	2%
Qingdao, Shandong	27%	24%	10.1	8.3	21%	23%	19%	10%
Qom	26%	29%	9.3	10.5	14%	12%	14%	16%
Quito	23%	22%	12.0	7.8	6%	11%	20%	4%
Rajshahi	9%	12%	4.8	4.9	48%	44%	3%	2%
Raleigh	20%	19%	9.1	9.5	7%	13%	10%	8%
Rawang	24%	29%	7.8	9.2	13%	13%	6%	14%
Reynosa	27%	30%	9.8	8.7	10%	16%	10%	6%
Ribeirao Preto	28%	27%	11.3	8.0	7%	13%	16%	5%
Riyadh	35%	35%	16.3	15.5	4%	6%	37%	38%
Rovno	20%	15%	7.6	5.8	28%	34%	9%	3%

City Name	Density of All Arterial Roads (km/km <sup>2</sup> )		Average Beeline Distance to All Arterial Roads (meters)		Share of Area within Walking Distance of All Arterial Roads		Share of Area within Walking Distance of Wide Arterial Roads	
	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014
Los Angeles	2.05	0.28	187	2,340	96%	21%	96%	20%
Luanda	1.05	0.63	412	698	78%	58%	67%	52%
Lubumbashi	1.64	0.99	259	428	90%	74%	65%	46%
Madrid	1.80	1.36	204	266	96%	90%	94%	80%
Malatya	1.94	1.34	228	354	90%	79%	86%	73%
Malegaon	1.06	0.84	343	391	82%	78%	72%	70%
Manchester	1.80	1.73	187	194	97%	97%	59%	56%
Manila	1.92	1.51	202	265	95%	90%	72%	61%
Marrakesh	2.28	1.44	176	360	97%	85%	92%	80%
Medan	1.33	0.71	284	645	88%	68%	70%	42%
Mexico City	2.37	0.77	162	418	98%	77%	97%	55%
Milan	1.52	1.47	234	244	94%	92%	53%	31%
Minneapolis	1.75	1.48	213	250	95%	92%	92%	88%
Modesto	1.91	1.54	196	242	96%	92%	90%	82%
Montreal	2.30	2.10	165	187	97%	96%	82%	77%
Moscow	1.13	0.33	385	1,191	79%	35%	75%	28%
Mumbai	1.59	1.25	272	347	91%	84%	88%	79%
Myeik	0.35	0.41	422	599	69%	63%	0%	0%
Nakuru	0.96	0.62	546	916	65%	60%	64%	59%
Ndola	1.19	0.97	332	392	85%	79%	85%	79%
New York	1.75	0.74	226	393	93%	78%	62%	41%
Nikolaev	0.90	0.80	481	531	72%	67%	71%	65%
Okayama	1.63	1.57	314	320	89%	89%	53%	50%
Oldenburg	1.45	1.36	239	252	92%	92%	87%	80%
Osaka	1.76	1.07	220	550	95%	69%	75%	46%
Oyo	1.11	0.81	269	428	94%	78%	49%	52%
Palembang	0.90	0.45	400	783	80%	58%	64%	44%
Palermo	2.32	1.86	165	197	97%	95%	85%	64%
Palmas	2.18	1.14	189	590	96%	68%	96%	84%
Parbhani	1.13	0.93	332	376	85%	80%	64%	60%
Parepare	2.44	1.69	142	179	99%	98%	40%	30%
Paris	3.34	0.89	110	973	99%	46%	79%	24%
Pematangiantar	0.70	0.59	529	544	64%	64%	75%	77%
Philadelphia	1.79	0.86	223	394	93%	79%	70%	36%
Pingxiang, Jiangxi	1.09	0.67	510	771	66%	63%	46%	54%
Pokhara	1.99	1.43	190	253	94%	89%	77%	76%
Port Elizabeth	1.06	0.89	370	601	81%	71%	78%	72%
Portland, OR	1.96	1.70	189	218	96%	95%	92%	87%
Pune	2.07	1.36	167	264	98%	91%	90%	73%
Pyongyang	2.15	1.91	172	195	97%	95%	86%	80%
Qingdao, Shandong	2.14	1.18	168	380	98%	83%	97%	80%
Qom	2.79	1.97	127	218	100%	94%	100%	96%
Quito	3.14	1.57	101	367	100%	83%	94%	68%
Rajshahi	4.22	1.60	59	204	100%	94%	100%	72%
Raleigh	1.81	1.19	182	338	97%	85%	90%	59%
Rawang	1.15	0.72	341	558	82%	65%	66%	55%
Reynosa	1.15	0.91	384	478	78%	70%	77%	68%
Ribeirao Preto	2.24	1.80	171	200	99%	96%	93%	90%
Riyadh	2.24	1.57	178	304	96%	87%	96%	87%
Rovno	2.05	1.42	179	313	97%	86%	88%	75%

## Los Angeles - Rovno

City Name	Average Block Size (ha)		3-Way Intersection Density (number per km <sup>2</sup> )		4-Way Intersection Density (number per km <sup>2</sup> )		Share of Intersections that are 4-Way		Walkability Ratio	
	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014
Los Angeles	6.5	6.5	46.8	74.0	19.2	8.2	27%	6%	1.6	2.0
Luanda	3.2	2.4	96.1	139.1	17.3	29.3	15%	15%	1.7	1.7
Lubumbashi	5.7	3.3	60.9	170.4	25.6	30.3	30%	18%	1.6	1.6
Madrid	3.8	5.5	108.2	80.3	34.0	25.9	19%	21%	1.6	1.8
Malatya	1.4	5.9	203.8	120.8	35.3	14.2	15%	8%	1.5	1.8
Malegaon	1.2	1.7	292.2	422.4	52.1	54.9	12%	10%	1.5	1.5
Manchester	5.3	11.1	150.0	75.7	21.7	8.3	10%	6%	2.0	1.8
Manila	3.1	2.7	82.5	189.4	28.5	26.5	20%	10%	1.6	1.8
Marrakesh	2.7	4.8	158.8	171.8	21.0	26.9	12%	14%	1.7	1.5
Medan	5.2	7.6	75.8	54.9	10.3	4.1	9%	5%	1.7	1.5
Mexico City	2.7	3.5	68.3	149.4	37.2	24.8	39%	14%	1.6	1.7
Milan	3.9	7.1	93.4	101.2	12.7	14.0	11%	9%	2.1	2.0
Minneapolis	3.8	10.5	101.8	52.3	17.3	5.4	18%	6%	1.8	1.6
Modesto	2.5	5.1	128.0	139.1	15.6	26.5	13%	14%	1.9	2.1
Montreal	4.1	5.0	84.3	67.0	8.7	6.6	11%	5%	2.5	2.2
Moscow	6.1	4.8	42.9	102.4	8.3	22.0	14%	11%	1.6	2.1
Mumbai	5.8	4.9	61.5	88.9	11.8	13.0	12%	10%	1.6	1.7
Myeik	1.7	6.5	160.8	89.8	57.1	19.8	26%	11%	1.5	1.7
Nakuru	4.4	5.8	102.5	165.5	17.9	16.8	16%	10%	1.6	1.7
Ndola	5.1	3.0	101.8	148.2	13.0	22.3	10%	11%	1.9	1.7
New York	5.1	6.7	45.2	46.8	14.4	1.8	22%	1%	1.6	1.8
Nikolaev	3.7	5.3	101.1	128.5	13.1	15.8	13%	14%	1.9	1.5
Okayama	1.6	2.3	278.3	270.4	58.6	38.2	16%	10%	1.5	1.7
Oldenburg	3.4	4.9	99.0	109.5	8.7	9.9	7%	8%	1.8	1.7
Osaka	1.7	2.4	200.5	195.7	55.1	38.0	22%	18%	1.4	1.6
Oyo	5.6	5.4	53.8	77.4	5.2	5.7	10%	9%	1.7	1.6
Palembang	4.1	6.1	104.1	71.2	16.1	6.9	9%	3%	1.6	1.5
Palermo	3.1	6.3	155.9	105.4	19.5	10.2	7%	7%	1.7	2.0
Palmas	3.4	2.9	89.2	173.9	22.9	43.0	27%	20%	1.5	1.6
Parbhani	1.5	1.2	241.8	500.2	24.4	104.4	9%	17%	1.8	1.7
Parepare	4.9	8.5	65.3	75.0	9.5	19.8	9%	10%	1.7	1.6
Paris	4.5	6.7	71.8	77.7	21.2	9.9	21%	10%	1.6	1.6
Pematangiantar	5.6	7.7	74.2	108.4	16.5	6.8	14%	4%	1.6	1.8
Philadelphia	3.6	9.9	109.7	27.6	16.5	5.2	14%	8%	1.8	1.6
Pingxiang, Jiangxi	6.5	6.6	53.6	101.7	11.5	26.5	9%	9%	1.5	1.3
Pokhara	3.5	5.4	99.7	114.9	9.9	6.9	10%	5%	1.7	1.7
Port Elizabeth	4.8	3.3	89.5	93.4	11.1	16.5	8%	13%	1.8	1.8
Portland, OR	4.3	4.9	97.8	60.3	20.8	4.4	17%	4%	1.6	1.8
Pune	3.1	5.1	113.7	96.2	13.8	4.5	11%	3%	1.6	2.0
Pyongyang	4.2	6.7	130.6	92.0	8.6	3.6	5%	2%	1.8	2.2
Qingdao, Shandong	3.5	4.7	159.6	168.0	32.7	51.0	17%	14%	1.5	1.5
Qom	1.8	4.2	164.4	139.1	26.4	14.5	14%	12%	1.6	1.7
Quito	2.8	3.5	93.5	119.8	24.5	19.8	19%	14%	1.6	1.8
Rajshahi	3.3	11.0	93.0	49.4	16.8	4.0	12%	7%	1.5	1.6
Raleigh	4.9	9.2	82.0	55.9	11.0	5.7	11%	7%	2.0	1.8
Rawang	2.3	3.5	162.5	140.8	16.7	13.8	7%	5%	2.9	2.1
Reynosa	2.7	2.2	113.7	141.2	42.5	50.7	29%	26%	1.9	1.9
Ribeirao Preto	3.7	6.9	94.8	90.7	46.1	16.1	33%	12%	1.8	1.8
Riyadh	3.3	5.8	149.9	111.0	16.3	4.9	9%	4%	1.6	1.8
Rovno	3.9	6.5	132.3	86.2	14.5	11.8	7%	10%	1.7	1.6

City Name	Share of Built-up Area That Is Residential		Share of Residential Areas Laid Out Before Development		Share of Residential Areas Not Laid Out Before Development		Share of Built-up Area That Is Gridded	
	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014
Los Angeles	86%	87%	92%	80%	3%	20%	29%	0%
Luanda	70%	75%	42%	47%	58%	53%	10%	0%
Lubumbashi	84%	84%	92%	70%	8%	30%	23%	0%
Madrid	67%	71%	96%	87%	4%	13%	8%	5%
Malatya	73%	80%	97%	72%	3%	28%	3%	0%
Malegaon	65%	68%	64%	51%	36%	49%	0%	0%
Manchester	64%	59%	98%	79%	2%	21%	0%	0%
Manila	70%	77%	50%	68%	45%	32%	13%	0%
Marrakesh	63%	76%	80%	77%	20%	23%	3%	0%
Medan	70%	76%	90%	30%	10%	70%	0%	0%
Mexico City	66%	64%	91%	74%	5%	26%	54%	8%
Milan	58%	66%	96%	61%	4%	39%	3%	0%
Minneapolis	72%	84%	94%	71%	6%	29%	15%	0%
Modesto	71%	66%	94%	97%	6%	3%	3%	0%
Montreal	75%	79%	99%	93%	1%	7%	0%	0%
Moscow	74%	85%	78%	100%	6%	0%	3%	3%
Mumbai	66%	70%	36%	37%	60%	63%	1%	3%
Myeik	78%	62%	77%	34%	23%	66%	0%	0%
Nakuru	55%	76%	99%	83%	1%	17%	0%	0%
Ndola	84%	73%	95%	81%	5%	19%		0%
New York	82%	83%	97%	88%	3%	12%		0%
Nikolaev	73%	85%	87%	91%	13%	9%	5%	0%
Okayama	58%	54%	74%	68%	26%	32%	0%	0%
Oldenburg	72%	83%	100%	94%	0%	6%	0%	0%
Osaka	52%	61%	70%	59%	30%	41%	15%	0%
Oyo	90%	84%	28%	69%	72%	31%	0%	0%
Palembang	73%	57%	67%	22%	33%	78%	0%	0%
Palermo	56%	59%	84%	63%	16%	37%	5%	0%
Palmas	64%	86%	100%	96%	0%	4%	23%	0%
Parbhani	79%	85%	97%	73%	3%	27%	0%	0%
Parepare	76%	86%	39%	39%	61%	61%	0%	0%
Paris	76%	73%	70%	71%	22%	29%	6%	0%
Pematangiantar	75%	62%	59%	78%	41%	22%	10%	0%
Philadelphia	75%	85%	92%	90%	8%	10%	8%	0%
Pingxiang, Jiangxi	67%	84%	20%	6%	80%	94%	0%	0%
Pokhara	60%	67%	18%	34%	82%	66%	0%	0%
Port Elizabeth	73%	84%	99%	92%	1%	8%	3%	0%
Portland, OR	73%	90%	97%	72%	3%	28%	13%	0%
Pune	71%	56%	77%	72%	23%	28%	0%	0%
Pyongyang	47%	30%	54%	48%	46%	52%	0%	0%
Qingdao, Shandong	50%	57%	95%	100%	5%	0%	0%	0%
Qom	75%	78%	91%	98%	9%	2%	0%	0%
Quito	56%	76%	98%	87%	2%	13%	8%	3%
Rajshahi	85%	84%	0%	15%	100%	85%	0%	0%
Raleigh	83%	89%	93%	96%	7%	4%	3%	0%
Rawang	62%	54%	97%	96%	3%	4%	0%	0%
Reynosa	68%	80%	94%	96%	6%	4%	30%	5%
Ribeirao Preto	77%	82%	97%	92%	3%	8%	43%	5%
Riyadh	76%	54%	98%	95%	2%	5%	0%	0%
Rovno	54%	74%	79%	52%	21%	48%	0%	0%

## Los Angeles - Rovno

City Name	Share of Residential Areas in Informal Land Subdivisions		Share of Residential Areas in Formal Land Subdivisions		Share of Residential Areas in Housing Projects		Average Plot Size in Informal Land Subdivisions		Average Plot Size in Formal Land Subdivisions	
	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014
Los Angeles	0%	3%	90%	62%	7%	15%			752	789
Luanda	33%	37%	9%	3%	0%	7%	255	387	291	
Lubumbashi	88%	67%	5%	2%	0%	2%	611	839	1,452	
Madrid	0%	0%	80%	68%	16%	19%			565	546
Malatya	10%	12%	77%	31%	10%	29%				
Malegaon	38%	48%	25%	1%	1%	2%	170	130		
Manchester	0%	0%	98%	79%	0%	0%			489	321
Manila	2%	27%	53%	34%	1%	7%		94	329	312
Marrakesh	3%	13%	62%	33%	15%	31%	136	1,226	194	478
Medan	38%	25%	51%	5%	1%	0%			483	
Mexico City	4%	27%	90%	42%	2%	5%		132	211	181
Milan	0%	0%	84%	44%	11%	17%				
Minneapolis	0%	0%	80%	61%	14%	10%			925	1,091
Modesto	1%	1%	88%	90%	6%	7%			620	581
Montreal	0%	0%	92%	74%	7%	19%			556	593
Moscow	9%	75%	54%	11%	31%	14%		1,099		962
Mumbai	1%	0%	25%	15%	14%	22%			655	
Myeik	69%	34%	8%	0%	0%	0%	165	182	298	
Nakuru	81%	80%	2%	2%	15%	1%	302	626	2,240	
Ndola	71%	80%	22%	0%	2%	1%	742	373	1,810	424
New York	0%	0%	93%	87%	4%	2%			712	400
Nikolaev	50%	62%	25%	26%	12%	3%	501		484	
Okayama	3%	11%	72%	57%	0%	0%			189	283
Oldenburg	4%	0%	86%	87%	10%	6%				536
Osaka	0%	5%	68%	52%	2%	2%			143	227
Oyo	27%	66%	1%	0%	0%	3%	558	393		
Palembang	27%	12%	37%	3%	3%	6%	189		185	244
Palermo	1%	21%	81%	42%	2%	0%		867	1,119	444
Palmas	8%	41%	89%	55%	2%	0%	395	350	342	306
Parbhani	81%	73%	16%	0%	0%	0%	216		411	
Parepare	2%	13%	37%	25%	0%	1%				
Paris	0%	2%	63%	67%	15%	1%			447	545
Pematangiantar	12%	58%	47%	20%	0%	0%				
Philadelphia	0%	0%	85%	85%	8%	5%			709	986
Pingxiang, Jiangxi	5%	4%	8%	0%	7%	3%			170	
Pokhara	15%	29%	1%	0%	1%	6%				
Port Elizabeth	6%	20%	83%	70%	10%	2%	297	290	646	755
Portland, OR	0%	0%	88%	64%	9%	8%			640	842
Pune	0%	23%	73%	31%	4%	18%			316	270
Pyongyang	9%	45%	32%	0%	13%	2%		289		
Qingdao, Shandong	11%	24%	21%	12%	63%	64%				
Qom	3%	14%	84%	58%	4%	26%				166
Quito	0%	17%	90%	68%	9%	1%		543	336	374
Rajshahi	0%	14%	0%	0%	0%	0%		360		
Raleigh	0%	0%	78%	78%	15%	18%			1,166	521
Rawang	14%	14%	66%	35%	17%	46%	376		319	1,175
Reynosa	31%	31%	56%	14%	7%	51%	377	178	260	157
Ribeirao Preto	0%	17%	90%	71%	6%	5%		3,208	303	513
Riyadh	4%	5%	87%	78%	7%	12%			448	432
Rovno	0%	34%	49%	17%	30%	1%		1,326	776	1,071

City Name	Country	Region	CBD Location		Land Cover Dates		
			Latitude	Longitude	T1	T2	T3
Saidpur	Bangladesh	South and Central Asia	25.802	88.881	11/1/90	11/1/01	4/1/14
Saint Petersburg	Russia	Europe and Japan	59.911	30.348	7/1/90	5/1/00	5/1/14
San Salvador	El Salvador	Latin America and the Caribbean	13.700	-89.201	3/1/91	10/1/99	1/1/14
Sana	Yemen	Western Asia and North Africa	15.363	44.208	9/1/89	5/1/00	11/1/14
Santiago	Chile	Latin America and the Caribbean	-33.491	-70.670	1/1/90	1/1/00	4/1/14
Sao Paulo	Brazil	Latin America and the Caribbean	-23.534	-46.615	9/1/88	4/1/00	7/1/14
Seoul	Korea Rep.	East Asia and the Pacific	37.495	126.939	8/1/91	5/1/00	5/1/14
Shanghai, Shanghai	China	East Asia and the Pacific	31.250	121.440	1/1/91	8/1/00	8/1/15
Sheffield	United Kingdom	Europe and Japan	53.454	-1.356	5/1/92	9/1/02	11/1/13
Shenzhen, Guangdong	China	East Asia and the Pacific	24.316	116.112	10/1/87	1/1/00	10/1/13
Shymkent	Kazakhstan	South and Central Asia	42.315	69.630	8/1/93	9/1/00	10/1/13
Sialkot	Pakistan	South and Central Asia	32.508	74.524	11/1/92	10/1/00	10/1/14
Singapore	Singapore	Southeast Asia	1.290	103.850	4/1/90	10/1/02	4/1/13
Singrauli	India	South and Central Asia	82.671	24.200	1/1/90	2/1/00	2/1/10
Sitapur	India	South and Central Asia	27.568	80.692	2/1/89	4/1/00	3/1/14
Springfield, MA	United States	Land-Rich Developed Countries	37.190	-93.293	9/1/91	9/1/00	10/1/14
Suining, Sichuan	China	East Asia and the Pacific	30.524	105.564	9/1/88	7/1/00	8/1/13
Suva	Fiji	East Asia and the Pacific	-18.142	178.441	8/1/91	10/1/99	5/1/14
Sydney	Australia	Land-Rich Developed Countries	-33.854	150.998	4/1/91	2/1/00	8/1/14
Taipei, Taiwan	China	East Asia and the Pacific	25.047	121.546	7/1/90	3/1/01	1/1/14
Tangshan, Hebei	China	East Asia and the Pacific	39.648	118.190	9/1/90	7/1/00	7/1/13
Tashkent	Uzbekistan	South and Central Asia	41.297	69.233	8/1/90	10/1/99	9/1/13
Tebessa	Algeria	Western Asia and North Africa	35.416	8.108	5/1/88	6/1/01	8/1/14
Tehran	Iran	South and Central Asia	35.705	51.384	6/1/91	7/1/00	6/1/10
Tel Aviv	Israel	Western Asia and North Africa	32.077	34.839	8/1/87	5/1/00	8/1/14
Thessaloniki	Greece	Europe and Japan	40.650	22.916	8/1/90	3/1/00	9/1/11
Tianjin, Tianjin	China	East Asia and the Pacific	39.142	117.189	10/1/90	6/1/00	9/1/13
Tijuana	Mexico	Latin America and the Caribbean	32.499	-116.970	4/1/89	4/1/00	5/1/14
Tokyo	Japan	Europe and Japan	35.682	139.649	12/1/90	9/1/00	5/1/14
Toledo	United States	Land-Rich Developed Countries	41.655	-83.602	8/1/90	9/1/00	6/1/14
Tyumen	Russia	Europe and Japan	57.160	65.551	4/1/90	8/1/99	9/1/11
Ulaanbaatar	Mongolia	East Asia and the Pacific	47.930	106.889	9/1/90	8/1/01	6/1/14
Valledupar	Colombia	Latin America and the Caribbean	10.464	-73.261	12/1/89	10/1/01	2/1/11
Victoria	Canada	Land-Rich Developed Countries	48.456	-123.401	8/1/90	7/1/00	9/1/13
Vienna	Austria	Europe and Japan	48.124	16.346	6/1/91	9/1/00	8/1/13
Vijayawada	India	South and Central Asia	16.515	80.641	11/1/91	10/1/00	6/1/14
Vinh Long	Vietnam	Southeast Asia	10.250	105.967	4/1/89	11/1/00	1/1/14
Warsaw	Poland	Europe and Japan	52.234	21.024	5/1/92	8/1/00	9/1/13
Wuhan, Hubei	China	East Asia and the Pacific	30.576	114.295	9/1/90	9/1/00	9/1/13
Xingping, Shaanxi	China	East Asia and the Pacific	34.308	108.463	7/1/92	6/1/00	6/1/13
Xucheng, Jiangsu	China	East Asia and the Pacific	33.004	118.507	10/1/90	9/1/00	8/1/13
Yamaguchi	Japan	Europe and Japan	34.155	131.458	9/1/90	3/1/99	5/1/14
Yanggu, Shandong	China	East Asia and the Pacific	36.116	115.786	9/1/90	9/1/00	4/1/14
Yiyang, Hunan	China	East Asia and the Pacific	28.587	112.356	7/1/94	9/1/99	10/1/13
Yucheng, Zhejiang	China	East Asia and the Pacific	28.125	121.247	12/1/90	1/1/00	12/1/14
Yulin, Guangxi	China	East Asia and the Pacific	22.611	110.139	10/1/91	10/1/00	1/1/09
Zhengzhou, Henan	China	East Asia and the Pacific	34.756	113.637	10/1/92	8/1/00	9/1/15
Zhuji, Zhejiang	China	East Asia and the Pacific	29.725	120.237	6/1/90	5/1/00	4/1/13
Zunyi, Guizhou	China	East Asia and the Pacific	27.696	106.925	6/1/88	4/1/01	12/1/13
Zwolle	Netherlands	Europe and Japan	52.513	6.090	4/1/90	5/1/00	3/1/14

## Saidpur - Zwolle

City Name	Share of Built-up Area Occupied by Roads		Average Street Width (meters)		Share of Roads Less Than 4m. Wide		Share of Roads More Than 16m. Wide	
	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014
Saidpur	9%	15%	3.6	4.7	65%	46%	0%	0%
Saint Petersburg	26%	21%	9.3	8.1	14%	20%	14%	9%
San Salvador	25%	23%	10.4	8.1	7%	21%	14%	9%
Sana	29%	28%	10.7	7.8	15%	33%	16%	10%
Santiago	25%	18%	12.6	7.9	5%	16%	27%	10%
Sao Paulo	24%	22%	9.9	7.2	5%	11%	19%	1%
Seoul	22%	20%	7.6	5.6	33%	45%	10%	4%
Shanghai, Shanghai	27%	22%	9.7	8.2	16%	41%	25%	14%
Sheffield	19%	17%	8.0	7.5	24%	24%	6%	5%
Shenzhen, Guangdong	27%	25%	10.7	8.4	21%	33%	17%	15%
Shymkent	14%	17%	8.5	7.7	14%	18%	8%	7%
Sialkot	17%	17%	7.1	5.1	46%	45%	12%	4%
Singapore	24%	26%	11.7	9.1	7%	22%	24%	15%
Singrauli	28%	19%	8.5	6.2	7%	28%	7%	5%
Sitapur	17%	25%	5.5	5.0	46%	42%	5%	0%
Springfield, MA	18%	16%	8.1	7.9	19%	13%	9%	3%
Suining, Sichuan	28%	28%	10.8	11.0	7%	9%	20%	19%
Suva	24%	13%	10.9	8.4	7%	19%	17%	9%
Sydney	26%	20%	15.7	9.9	5%	8%	51%	16%
Taipei, Taiwan	22%	18%	8.5	5.3	22%	44%	12%	3%
Tangshan, Hebei	20%	17%	6.7	5.7	33%	43%	7%	5%
Tashkent	16%	12%	8.8	5.6	13%	30%	11%	2%
Tebessa	24%	23%	7.8	6.2	29%	32%	10%	7%
Tehran	22%	28%	11.2	9.5	16%	19%	19%	15%
Tel Aviv	23%	22%	11.8	9.4	7%	19%	19%	14%
Thessaloniki	23%	21%	8.5	7.0	21%	23%	10%	9%
Tianjin, Tianjin	22%	23%	9.2	8.4	24%	30%	12%	13%
Tijuana	23%	26%	11.3	9.3	7%	8%	18%	8%
Tokyo	37%	25%	5.4	5.0	46%	51%	3%	3%
Toledo	21%	18%	8.6	9.3	25%	14%	17%	22%
Tyumen	20%	19%	7.7	6.7	18%	20%	7%	6%
Ulaanbaatar	15%	12%	7.1	4.2	25%	51%	8%	0%
Valledupar	21%	26%	8.9	6.9	8%	15%	9%	2%
Victoria	19%	17%	9.8	7.3	9%	22%	12%	4%
Vienna	22%	18%	7.8	6.6	24%	22%	9%	1%
Vijayawada	20%	18%	7.0	5.8	20%	32%	8%	4%
Vinh Long	16%	10%	7.7	6.1	19%	46%	4%	8%
Warsaw	22%	15%	9.3	6.3	8%	24%	12%	1%
Wuhan, Hubei	21%	23%	10.1	7.3	27%	41%	17%	11%
Xingping, Shaanxi	16%	17%	9.8	7.4	18%	29%	20%	8%
Xucheng, Jiangsu	20%	24%	8.5	9.2	21%	35%	22%	18%
Yamaguchi	27%	29%	5.5	5.8	48%	45%	4%	4%
Yanggu, Shandong	23%	15%	8.6	3.3	32%	75%	17%	3%
Yiyang, Hunan	17%	16%	10.7	6.8	17%	48%	19%	10%
Yucheng, Zhejiang	19%	20%	6.7	6.0	43%	49%	11%	7%
Yulin, Guangxi	17%	15%	8.6	6.9	31%	46%	16%	9%
Zhengzhou, Henan	22%	20%	8.1	8.5	33%	31%	16%	14%
Zhuji, Zhejiang	23%	23%	6.1	6.8	39%	34%	5%	8%
Zunyi, Guizhou	20%	17%	7.6	7.2	28%	32%	11%	10%
Zwolle	22%	26%	4.7	6.6	49%	34%	4%	8%

City Name	Density of All Arterial Roads (km/km <sup>2</sup> )		Average Beeline Distance to All Arterial Roads (meters)		Share of Area within Walking Distance of All Arterial Roads		Share of Area within Walking Distance of Wide Arterial Roads	
	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014
Saidpur	2.81	1.90	98	173	100%	96%	15%	43%
Saint Petersburg	1.19	0.90	433	523	78%	70%	76%	61%
San Salvador	2.84	2.02	155	212	96%	93%	82%	74%
Sana	2.25	0.96	219	767	92%	70%	90%	69%
Santiago	3.01	2.37	126	199	99%	94%	99%	90%
Sao Paulo	2.36	0.53	162	1,268	99%	39%	78%	23%
Seoul	2.51	0.79	177	478	95%	71%	93%	47%
Shanghai, Shanghai	1.72	0.65	229	1,286	93%	63%	93%	60%
Sheffield	1.65	1.54	220	234	94%	93%	46%	44%
Shenzhen, Guangdong	2.75	0.97	148	444	97%	80%	97%	80%
Shymkent	1.18	0.92	461	469	75%	74%	65%	58%
Sialkot	1.76	1.03	181	379	99%	81%	88%	70%
Singapore	1.74	1.42	243	513	93%	83%	92%	83%
Singrauli	0.02	0.62	1,182	678	21%	54%	21%	58%
Sitapur	1.95	1.69	175	251	96%	90%	78%	75%
Springfield, MA	1.94	1.36	246	275	92%	89%	75%	48%
Suining, Sichuan	2.64	1.77	117	190	100%	96%	100%	94%
Suva	2.90	1.39	83	253	100%	90%	100%	90%
Sydney	2.30	1.28	163	357	97%	82%	97%	76%
Taipei, Taiwan	4.62	3.06	83	134	99%	98%	96%	82%
Tangshan, Hebei	1.37	0.76	318	840	86%	63%	84%	59%
Tashkent	1.03	0.90	412	445	79%	76%	77%	72%
Tebessa	1.74	1.24	205	305	95%	85%	86%	81%
Tehran	2.36	1.90	176	255	96%	91%	96%	90%
Tel Aviv	2.03	1.13	178	376	97%	81%	96%	78%
Thessaloniki	2.91	2.09	138	198	98%	94%	89%	78%
Tianjin, Tianjin	2.32	0.77	173	522	97%	69%	96%	61%
Tijuana	1.94	1.55	172	233	98%	93%	81%	73%
Tokyo	2.75	1.73	129	198	99%	93%	84%	58%
Toledo	1.42	1.17	258	340	91%	84%	74%	57%
Tyumen	1.32	1.07	312	392	86%	79%	85%	76%
Ulaanbaatar	1.60	1.18	272	394	89%	78%	81%	67%
Valledupar	3.30	2.36	107	209	99%	90%	97%	86%
Victoria	1.99	1.56	185	260	96%	89%	88%	75%
Vienna	2.01	1.75	169	207	98%	95%	84%	71%
Vijayawada	2.05	1.65	161	221	99%	94%	92%	87%
Vinh Long	3.63	1.03	74	321	100%	84%	90%	67%
Warsaw	1.92	1.58	185	214	96%	94%	79%	65%
Wuhan, Hubei	1.77	0.40	246	994	91%	67%	90%	66%
Xingping, Shaanxi	1.63	0.82	193	453	99%	75%	99%	77%
Xucheng, Jiangsu	1.82	1.31	136	259	100%	92%	100%	91%
Yamaguchi	1.65	1.52	243	241	90%	92%	79%	71%
Yanggu, Shandong	0.92	0.62	451	836	69%	59%	69%	58%
Yiyang, Hunan	1.64	0.83	263	481	91%	77%	91%	71%
Yucheng, Zhejiang	1.78	0.97	324	591	83%	71%	96%	60%
Yulin, Guangxi	1.77	0.98	208	616	97%	72%	97%	66%
Zhengzhou, Henan	1.98	0.77	181	527	98%	80%	98%	76%
Zhuji, Zhejiang	0.68	0.59	662	876	60%	57%	50%	47%
Zunyi, Guizhou	2.17	1.44	163	234	100%	92%	100%	77%
Zwolle	1.66	1.50	214	242	95%	93%	92%	90%



## Saidpur - Zwolle

City Name	Average Block Size (ha)		3-Way Intersection Density (number per km <sup>2</sup> )		4-Way Intersection Density (number per km <sup>2</sup> )		Share of Intersections that are 4-Way		Walkability Ratio	
	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014
Saidpur	2.8	9.7	103.0	77.0	17.3	6.1	8%	6%	1.4	1.5
Saint Petersburg	3.3	5.3	133.0	77.1	19.9	6.1	12%	6%	1.7	1.8
San Salvador	2.1	4.8	93.8	104.0	21.8	28.1	18%	12%	1.6	1.8
Sana	2.3	3.5	171.7	217.5	25.9	15.4	13%	5%	1.7	1.7
Santiago	3.5	6.5	60.7	116.5	26.5	19.9	34%	14%	1.6	2.0
Sao Paulo	3.5	6.7	66.6	82.6	17.8	5.4	26%	6%	1.8	1.7
Seoul	2.4	6.3	131.8	95.6	29.2	14.9	16%	9%	1.8	1.5
Shanghai, Shanghai	6.1	6.8	67.3	80.9	17.8	10.2	20%	13%	1.6	1.7
Sheffield	3.4	6.2	97.6	62.6	10.3	6.4	7%	6%	1.6	1.5
Shenzhen, Guangdong	3.0	3.3	132.3	251.2	11.8	82.4	7%	18%	1.8	1.7
Shymkent	6.4	5.6	43.9	65.2	8.0	13.3	14%	15%	1.7	1.8
Sialkot	2.4	5.1	149.7	153.9	15.6	19.4	9%	6%	1.6	1.8
Singapore	4.5	3.9	78.2	100.3	4.7	16.2	5%	15%	2.2	2.0
Singrauli	3.4	6.0	180.4	137.0	19.8	12.0	8%	5%	1.5	1.7
Sitapur	2.6	4.8	202.8	132.3	26.4	6.8	10%	6%	1.8	1.3
Springfield, MA	3.8	7.2	96.7	45.1	8.5	8.5	8%	5%	1.6	1.6
Suining, Sichuan	2.2	5.6	209.3	139.5	17.9	15.2	7%	6%	1.4	1.9
Suva	5.2	8.4	141.9	31.9	5.0	1.3	1%	2%	1.5	1.6
Sydney	5.8	6.2	61.2	35.9	17.4	3.1	17%	4%	1.7	1.8
Taipei, Taiwan	2.9	7.7	134.9	96.0	24.1	7.9	13%	3%	1.6	1.9
Tangshan, Hebei	3.0	5.5	203.8	151.3	30.7	19.5	10%	9%	1.6	1.6
Tashkent	5.7	5.9	61.2	46.4	7.8	7.3	8%	12%	1.8	1.7
Tebessa	1.4	2.5	249.5	283.2	44.2	57.2	12%	13%	1.7	1.6
Tehran	4.1	4.2	80.5	162.0	27.8	23.5	16%	14%	1.5	2.1
Tel Aviv	4.0	5.7	76.2	64.8	109.8	7.7	21%	10%	1.6	2.1
Thessaloniki	5.1	9.1	159.4	83.9	46.2	9.5	23%	10%	1.7	2.3
Tianjin, Tianjin	3.0	5.7	119.0	99.6	18.3	15.9	12%	14%	1.9	1.9
Tijuana	3.5	3.0	82.7	110.7	17.2	27.9	17%	21%	1.7	1.8
Tokyo	1.6	2.5	169.0	194.1	40.9	47.2	18%	16%	1.5	1.4
Toledo	2.4	6.9	126.3	75.1	25.3	3.3	18%	4%	1.7	1.6
Tyumen	5.2	3.8	109.2	126.4	12.5	18.5	10%	16%	1.8	1.7
Ulaanbaatar	5.6	4.4	84.9	91.4	4.2	9.6	3%	8%	1.8	1.7
Valledupar	1.3	2.2	119.2	182.7	68.4	90.9	38%	33%	1.4	1.7
Victoria	7.5	13.5	68.1	22.2	11.5	3.5	19%	3%	1.8	1.3
Vienna	2.8	4.9	198.2	102.7	40.1	16.5	19%	10%	1.7	2.1
Vijayawada	1.8	6.8	157.7	130.3	34.4	17.2	15%	6%	1.7	1.8
Vinh Long	1.9	14.4	92.4	32.9	23.4	6.3	22%	2%	1.4	1.3
Warsaw	6.0	6.9	29.4	79.2	19.4	17.4	20%	14%	1.6	1.6
Wuhan, Hubei	5.7	5.3	91.9	172.7	8.5	23.6	6%	7%	1.7	1.7
Xingping, Shaanxi	5.5	6.9	63.0	80.3	7.5	15.0	12%	16%	1.5	1.7
Xucheng, Jiangsu	3.7	7.4	52.5	105.5	10.0	12.6	10%	8%	1.4	1.6
Yamaguchi	2.8	2.4	203.8	282.3	30.9	42.0	10%	12%	1.6	1.5
Yanggu, Shandong	3.0	3.8	146.6	177.9	20.9	31.9	10%	17%	1.7	1.5
Yiyang, Hunan	10.4	13.1	40.2	62.8	5.4	5.1	11%	6%	1.7	1.3
Yucheng, Zhejiang	2.7	5.8	187.0	155.6	24.0	18.5	9%	7%	1.6	1.5
Yulin, Guangxi	4.5	5.1	72.8	91.1	9.2	6.3	10%	6%	1.8	1.7
Zhengzhou, Henan	4.1	5.7	141.8	110.6	14.2	16.3	10%	8%	1.9	1.6
Zhuji, Zhejiang	5.3	5.8	144.5	110.3	20.9	17.7	7%	8%	1.5	1.8
Zunyi, Guizhou	7.3	7.2	117.3	67.8	9.0	6.6	5%	5%	2.5	1.9
Zwolle	1.9	4.1	328.9	207.2	42.8	47.0	11%	16%	1.8	1.8

City Name	Share of Residential Areas in Informal Land Subdivisions		Share of Residential Areas in Formal Land Subdivisions		Share of Residential Areas in Housing Projects		Average Plot Size in Informal Land Subdivisions		Average Plot Size in Formal Land Subdivisions	
	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014
Saidpur	10%	3%	0%	0%	0%	12%				
Saint Petersburg	19%	34%	43%	25%	26%	11%				736
San Salvador	17%	25%	62%	40%	2%	8%		77	91	157
Sana	17%	36%	49%	8%	3%	0%		221	193	407
Santiago	0%	5%	90%	63%	8%	15%			493	282
Sao Paulo	4%	24%	92%	50%	4%	5%			286	
Seoul	2%	6%	54%	7%	36%	21%			242	
Shanghai, Shanghai	6%	17%	39%	10%	44%	28%			302	
Sheffield	0%	3%	90%	78%	7%	13%			525	144
Shenzhen, Guangdong	0%	4%	51%	40%	40%	17%		158	302	214
Shymkent	23%	62%	46%	21%	12%	3%	1,144	959	729	879
Sialkot	18%	16%	24%	7%	1%	7%			332	234
Singapore	0%	0%	38%	14%	58%	72%				520
Singrauli	0%	33%	22%	4%	77%	30%		236	226	
Sitapur	70%	79%	3%	0%	0%	20%	108	93	149	
Springfield, MA	0%	0%	86%	66%	4%	2%			950	1,508
Suining, Sichuan	0%	14%	98%	30%	0%	30%				
Suva	0%	15%	69%	42%	2%	3%				
Sydney	0%	0%	93%	80%	7%	7%			575	707
Taipei, Taiwan	0%	1%	70%	36%	7%	8%			209	
Tangshan, Hebei	42%	68%	45%	13%	13%	7%		308		374
Tashkent	37%	89%	37%	0%	10%	3%	962	1,104		
Tebessa	45%	52%	33%	2%	15%	26%	251	178	330	240
Tehran	0%	19%	74%	41%	6%	16%			258	
Tel Aviv	1%	17%	73%	59%	12%	7%		554	487	772
Thessaloniki	1%	31%	91%	54%	3%	6%				
Tianjin, Tianjin	9%	25%	16%	19%	71%	51%				
Tijuana	10%	50%	85%	28%	1%	16%	315		259	155
Tokyo	0%	2%	49%	49%	4%	2%	350		200	230
Toledo	0%	0%	89%	59%	9%	8%			625	1,238
Tyumen	38%	86%	20%	11%	27%	3%	471	900	1,104	1,185
Ulaanbaatar	65%	71%	5%	0%	6%	3%	643	629		
Valledupar	23%	56%	76%	1%	0%	39%		90		
Victoria	0%	6%	84%	57%	8%	3%			778	725
Vienna	1%	0%	83%	81%	15%	7%			575	587
Vijayawada	26%	60%	52%	5%	1%	0%	281	195	233	69
Vinh Long	0%	2%	54%	0%	0%	0%				
Warsaw	8%	37%	67%	41%	20%	7%	22	1,401	772	751
Wuhan, Hubei	1%	12%	18%	0%	41%	48%				
Xingping, Shaanxi	8%	76%	84%	2%	1%	16%				
Xucheng, Jiangsu	0%	38%	0%	1%	11%	16%				
Yamaguchi	0%	25%	30%	30%	1%	0%			293	292
Yanggu, Shandong	51%	98%	26%	0%	23%	2%	440	474	331	
Yiyang, Hunan	7%	24%	24%	3%	6%	2%				
Yucheng, Zhejiang	1%	11%	27%	8%	15%	8%			433	
Yulin, Guangxi	12%	11%	31%	11%	6%	8%		187	305	141
Zhengzhou, Henan	0%	45%	51%	2%	35%	24%		333		357
Zhuji, Zhejiang	10%	12%	11%	12%	9%	17%		206	275	275
Zunyi, Guizhou	3%	12%	39%	11%	30%	23%				
Zwolle	0%	4%	31%	46%	61%	30%			646	1,219

## Saidpur - Zwolle

City Name	Share of Residential Areas in Informal Land Subdivisions		Share of Residential Areas in Formal Land Subdivisions		Share of Residential Areas in Housing Projects		Average Plot Size in Informal Land Subdivisions		Average Plot Size in Formal Land Subdivisions	
	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014	Pre-1990	1990 - 2014
Saidpur	10%	3%	0%	0%	0%	12%				
Saint Petersburg	19%	34%	43%	25%	26%	11%				736
San Salvador	17%	25%	62%	40%	2%	8%		77	91	157
Sana	17%	36%	49%	8%	3%	0%		221	193	407
Santiago	0%	5%	90%	63%	8%	15%			493	282
Sao Paulo	4%	24%	92%	50%	4%	5%			286	
Seoul	2%	6%	54%	7%	36%	21%			242	
Shanghai, Shanghai	6%	17%	39%	10%	44%	28%			302	
Sheffield	0%	3%	90%	78%	7%	13%			525	144
Shenzhen, Guangdong	0%	4%	51%	40%	40%	17%		158	302	214
Shymkent	23%	62%	46%	21%	12%	3%	1,144	959	729	879
Sialkot	18%	16%	24%	7%	1%	7%			332	234
Singapore	0%	0%	38%	14%	58%	72%				520
Singrauli	0%	33%	22%	4%	77%	30%		236	226	
Sitapur	70%	79%	3%	0%	0%	20%	108	93	149	
Springfield, MA	0%	0%	86%	66%	4%	2%			950	1,508
Suining, Sichuan	0%	14%	98%	30%	0%	30%				
Suva	0%	15%	69%	42%	2%	3%				
Sydney	0%	0%	93%	80%	7%	7%			575	707
Taipei, Taiwan	0%	1%	70%	36%	7%	8%			209	
Tangshan, Hebei	42%	68%	45%	13%	13%	7%		308		374
Tashkent	37%	89%	37%	0%	10%	3%	962	1,104		
Tebessa	45%	52%	33%	2%	15%	26%	251	178	330	240
Tehran	0%	19%	74%	41%	6%	16%			258	
Tel Aviv	1%	17%	73%	59%	12%	7%		554	487	772
Thessaloniki	1%	31%	91%	54%	3%	6%				
Tianjin, Tianjin	9%	25%	16%	19%	71%	51%				
Tijuana	10%	50%	85%	28%	1%	16%	315		259	155
Tokyo	0%	2%	49%	49%	4%	2%	350		200	230
Toledo	0%	0%	89%	59%	9%	8%			625	1,238
Tyumen	38%	86%	20%	11%	27%	3%	471	900	1,104	1,185
Ulaanbaatar	65%	71%	5%	0%	6%	3%	643	629		
Valledupar	23%	56%	76%	1%	0%	39%		90		
Victoria	0%	6%	84%	57%	8%	3%			778	725
Vienna	1%	0%	83%	81%	15%	7%			575	587
Vijayawada	26%	60%	52%	5%	1%	0%	281	195	233	69
Vinh Long	0%	2%	54%	0%	0%	0%				
Warsaw	8%	37%	67%	41%	20%	7%	22	1,401	772	751
Wuhan, Hubei	1%	12%	18%	0%	41%	48%				
Xingping, Shaanxi	8%	76%	84%	2%	1%	16%				
Xucheng, Jiangsu	0%	38%	0%	1%	11%	16%				
Yamaguchi	0%	25%	30%	30%	1%	0%			293	292
Yanggu, Shandong	51%	98%	26%	0%	23%	2%	440	474	331	
Yiyang, Hunan	7%	24%	24%	3%	6%	2%				
Yucheng, Zhejiang	1%	11%	27%	8%	15%	8%			433	
Yulin, Guangxi	12%	11%	31%	11%	6%	8%		187	305	141
Zhengzhou, Henan	0%	45%	51%	2%	35%	24%		333		357
Zhuji, Zhejiang	10%	12%	11%	12%	9%	17%		206	275	275
Zunyi, Guizhou	3%	12%	39%	11%	30%	23%				
Zwolle	0%	4%	31%	46%	61%	30%			646	1,219

TABLE 2:

**Blocks and Roads metrics for 30 cities for five periods: From the pre-1900 period to the 1990-2014 period**

City Name	Country	Region	CBD Location	
			Latitude	Longitude
Accra	Ghana	Sub-Saharan Africa	5.615	-0.159
Algiers	Algeria	Western Asia and North Africa	36.732	3.140
Bangkok	Thailand	Southeast Asia	13.778	100.538
Beijing, Beijing	China	East Asia and the Pacific	39.920	116.370
Buenos Aires	Argentina	Latin America and the Caribbean	-34.652	-58.547
Cairo	Egypt	Western Asia and North Africa	30.034	31.282
Chicago	United States	Land-Rich Developed Countries	41.860	-87.864
Guatemala City	Guatemala	Latin America and the Caribbean	14.605	-90.542
Istanbul	Turkey	Western Asia and North Africa	40.981	29.065
Jeddah	Saudi Arabia	Western Asia and North Africa	21.543	39.173
Johannesburg	South Africa	Sub-Saharan Africa	6.842	3.634
Kolkata	India	South and Central Asia	22.533	88.356
Kuwait City	Kuwait	Western Asia and North Africa	29.382	47.977
Lagos	Nigeria	Sub-Saharan Africa	6.210	7.063
London	United Kingdom	Europe and Japan	51.506	-0.139
Los Angeles	United States	Land-Rich Developed Countries	33.971	-117.969
Manila	Philippines	Southeast Asia	14.579	121.028
Mexico City	Mexico	Latin America and the Caribbean	19.446	-99.123
Moscow	Russia	Europe and Japan	55.743	37.645
Mumbai	India	South and Central Asia	19.115	72.913
Nairobi	Kenya	Sub-Saharan Africa	-1.230	36.738
Paris	France	Europe and Japan	48.863	2.315
Santiago	Chile	Latin America and the Caribbean	-33.491	-70.670
Sao Paulo	Brazil	Latin America and the Caribbean	-23.534	-46.615
Shanghai, Shanghai	China	East Asia and the Pacific	31.250	121.440
Sydney	Australia	Land-Rich Developed Countries	-33.854	150.998
Tehran	Iran	South and Central Asia	35.705	51.384
Tel Aviv	Israel	Western Asia and North Africa	32.077	34.839
Tokyo	Japan	Europe and Japan	35.682	139.649
Warsaw	Poland	Europe and Japan	52.234	21.024

## Accra - Warsaw

City Name	Map Periods				
	Period 1	Period 2	Period 3	Period 4	Period 5
Accra	Pre-1903	1903-1929	1929-1966	1966-1991	1991-2014
Algiers	Pre-1903	1903-1929	1929-1972	1972-1987	1987-2014
Bangkok	Pre-1900	1900-1922	1922-1953	1953-1988	1988-2015
Beijing, Beijing	Pre-1900	1900-1929	1929-1959	1959-1988	1988-2013
Buenos Aires	Pre-1887	1887-1918	1918-1964	1964-1989	1989-2014
Cairo	Pre-1897	1897-1927	1927-1960	1960-1992	1992-2013
Chicago	Pre-1893	1893-1945	1945-1967	1967-1989	1989-2014
Guatemala City	Pre-1900	1900-1936	1936-1976	1976-1990	1990-2013
Istanbul	Pre-1899	1899-1934	1934-1960	1960-1990	1990-2013
Jeddah	Pre-1900	1900-1925	1925-1964	1964-1990	1990-2013
Johannesburg	Pre-1900	1900-1938	1938-1957	1957-1990	1990-2013
Kolkata	Pre-1883	1883-1931	1931-1961	1961-1990	1990-2014
Kuwait City	Pre-1900	1900-1922	1922-1963	1963-1990	1990-2013
Lagos	Pre-1900	1900-1920	1920-1962	1962-1984	1984-2013
London	Pre-1880	1880-1929	1929-1955	1955-1989	1989-2013
Los Angeles	Pre-1907	1907-1937	1937-1970	1970-1990	1990-2014
Manila	Pre-1898	1898-1945	1945-1971	1971-1990	1990-2014
Mexico City	Pre-1886	1886-1929	1929-1970	1970-1990	1990-2014
Moscow	Pre-1893	1893-1939	1939-1957	1957-1991	1991-2014
Mumbai	Pre-1909	1909-1931	1931-1968	1968-1991	1991-2014
Nairobi	Pre-1906	1906-1926	1926-1964	1964-1988	1988-2010
Paris	Pre-1900	1900-1928	1928-1955	1955-1987	1987-2014
Santiago	Pre-1900	1900-1930	1930-1970	1970-1990	1990-2014
Sao Paulo	Pre-1905	1905-1929	1929-1974	1974-1988	1988-2014
Shanghai, Shanghai	Pre-1902	1902-1944	1944-1973	1973-1991	1991-2015
Sydney	Pre-1895	1895-1945	1945-1975	1975-1991	1991-2014
Tehran	Pre-1899	1899-1925	1925-1956	1956-1991	1991-2010
Tel Aviv	Pre-1917	1917-1929	1929-1956	1956-1987	1987-2014
Tokyo	Pre-1892	1892-1929	1929-1954	1954-1990	1990-2014
Warsaw	Pre-1888	1888-1936	1936-1958	1958-1992	1992-2013

City Name	Density of All Arterial Roads (km/km <sup>2</sup> )					Average Beeline Distance to All Arterial Roads (meters)				
	Period 1	Period 2	Period 3	Period 4	Period 5	Period 1	Period 2	Period 3	Period 4	Period 5
Accra		0.8	1.0	0.9	0.6		254	364	471	673
Algiers	1.8	1.6	1.1	1.2	0.9	249	288	278	509	431
Bangkok	2.5	2.2	1.4	0.9	0.5	138	221	240	549	921
Beijing, Beijing	3.7	3.9	3.3	1.3	0.7	103	102	123	791	573
Buenos Aires	3.0	1.3	0.9	0.6	1.2	104	352	468	809	349
Cairo	2.9	4.1	4.2	2.4	1.1	137	100	97	488	584
Chicago	9.9	9.1	4.3	2.8	0.8	49	67	241	410	358
Guatemala City	1.9	3.2	1.5	0.8	0.9	323	181	352	504	390
Istanbul	1.6	1.5	1.3	1.3	1.7	256	309	308	592	263
Jeddah	3.7		3.1	4.4	1.2	70		127	124	505
Johannesburg	3.9	2.9	2.6	2.0	0.5	107	187	166	287	582
Kolkata	2.6	1.1	0.6	0.5	0.6	179	466	1,151	1,595	650
Kuwait City	2.8	2.1	2.8	1.9	2.1	113	101	116	542	248
Lagos	0.5	1.7	0.9	1.0	0.4	476	247	472	1,750	787
London	1.5	1.1	0.9	0.4	1.6	281	366	554	1,477	207
Los Angeles	7.9	5.7	4.0	3.8	1.0	72	122	177	120	461
Manila	1.3	1.9	2.1	0.6	1.1	169	219	186	1,014	372
Mexico City	2.6	4.0	3.4	1.5	0.8	155	97	123	480	418
Moscow	4.3	2.7	2.5	1.2	0.5	87	144	152	760	981
Mumbai	2.6	2.6	2.2	1.5	0.9	153	155	225	398	447
Nairobi	5.3	3.6	1.7	0.8	0.8	65	109	271	646	521
Paris	2.2	1.0	0.6	0.7	1.9	276	618	883	1,476	206
Santiago	3.4	5.7	4.4	2.9	1.0	108	69	86	195	474
Sao Paulo	1.4	1.1	1.0	0.6	0.8	248	310	393	968	539
Shanghai, Shanghai	3.5	2.9	3.3	2.6	0.7	95	142	131	206	1,286
Sydney	2.7	5.5	5.1	3.3	0.9	203	102	110	155	400
Tehran	3.0	2.6	2.2	2.1	1.9	126	125	199	221	255
Tel Aviv	0.7	1.8	1.8	1.9	1.0	389	160	135	381	435
Tokyo	4.3	1.8	1.6	1.1	1.7	91	284	394	543	198
Warsaw	3.5	2.9	1.5	0.9	0.9	89	124	344	1,004	347

## Accra - Warsaw

City Name	Share of Area within Walking Distance of All Arterial Roads					Average Block Size (ha)				
	Period 1	Period 2	Period 3	Period 4	Period 5	Period 1	Period 2	Period 3	Period 4	Period 5
Accra		95%	82%	71%	60%		4.0	5.7	7.0	3.5
Algiers	94%	87%	93%	76%	75%	1.1	3.1	4.3	6.8	6.7
Bangkok	99%	94%	95%	69%	49%	4.1	6.4	6.3	9.0	5.8
Beijing, Beijing	100%	100%	99%	67%	71%	4.7	3.7	8.4	9.4	4.3
Buenos Aires	100%	82%	73%	52%	82%	1.8	2.8	1.8	3.5	3.5
Cairo	100%	100%	100%	81%	68%	1.1	1.9	2.6	5.0	4.3
Chicago	100%	100%	90%	77%	81%	3.2	2.5	8.6	20.8	3.9
Guatemala City	82%	94%	80%	69%	78%	1.6	1.9	1.5	2.9	2.3
Istanbul	93%	88%	88%	80%	90%	1.2	2.5	2.6	2.1	4.8
Jeddah	100%		100%	98%	77%	3.2		2.6	3.9	4.0
Johannesburg	100%	95%	98%	89%	64%	4.9	7.4	9.0	10.3	4.9
Kolkata	96%	73%	49%	36%	62%	2.8	3.9	5.0	9.8	4.8
Kuwait City	100%	100%	100%	83%	91%	8.0	9.8	6.3	9.1	3.6
Lagos	68%	93%	72%	59%	52%	1.9	6.5	7.0	5.6	4.7
London	90%	83%	71%	40%	95%	3.3	5.6	8.6	17.2	8.2
Los Angeles	99%	97%	94%	100%	78%	4.4	3.8	9.2	10.6	6.5
Manila	100%	96%	98%	52%	81%	2.0	2.3	4.5	3.5	2.8
Mexico City	99%	100%	99%	77%	77%	1.9	2.6	2.2	4.8	3.1
Moscow	100%	98%	99%	68%	48%	5.0	9.4	6.2	4.5	4.8
Mumbai	99%	99%	92%	83%	75%	3.0	6.0	7.9	7.2	4.4
Nairobi	100%	100%	90%	63%	72%	5.0	7.3	17.4	16.8	9.5
Paris	87%	68%	55%	44%	93%	2.7	3.8	4.7	7.9	6.7
Santiago	100%	100%	100%	95%	79%	2.4	3.2	3.2	5.7	6.5
Sao Paulo	95%	88%	80%	54%	68%	2.7	3.0	2.7	4.3	6.2
Shanghai, Shanghai	100%	98%	98%	93%	63%	3.1	6.5	5.7	7.5	6.4
Sydney	92%	98%	98%	98%	79%	2.2	4.4	6.4	9.6	6.2
Tehran	100%	100%	96%	94%	91%	3.2	2.2	2.6	7.0	4.6
Tel Aviv	72%	99%	100%	82%	76%	2.6	0.9	3.6	4.0	6.1
Tokyo	100%	91%	80%	70%	93%	1.8	1.5	3.0	2.7	2.5
Warsaw	100%	99%	86%	57%	83%	5.7	5.6	6.9	7.1	6.4

City Name	3-Way Intersection Density (number per km2)					4-Way Intersection Density (number per km2 )				
	Period 1	Period 2	Period 3	Period 4	Period 5	Period 1	Period 2	Period 3	Period 4	Period 5
Accra		40	39	63	142		29	15	9	13
Algiers	203	139	74	84	146	49	32	14	13	16
Bangkok	69	59	42	58	70	13	4	5	5	7
Beijing, Beijing	79	110	81	117	148	10	14	6	12	36
Buenos Aires	11	45	51	55	68	58	46	54	37	42
Cairo	248	129	139	96	131	44	46	49	20	36
Chicago	85	68	50	40	74	64	51	15	7	12
Guatemala City	63	73	55	79	90	62	70	48	22	14
Istanbul	199	123	132	170	163	57	26	24	36	15
Jeddah	51		186	104		3		51	21	22
Johannesburg	52	45	40	64	118	42	18	9	6	16
Kolkata	104	80	102	93	108	24	8	8	4	6
Kuwait City	38	8	72	54	151	8	5	6	2	13
Lagos	118	35	62	54	102	49	10	7	5	2
London	86	51	32	62	61	15	10	6	2	10
Los Angeles	37	34	45	25	74	23	29	16	5	8
Manila	124	70	60	98	204	51	34	19	11	29
Mexico City	57	53	59	77	169	45	50	52	29	26
Moscow	41	34	44	69	102	10	6	13	7	22
Mumbai	74	35	45	38	88	17	9	4	4	12
Nairobi	58	46	37	74	118	23	6	3	3	10
Paris	68	53	60	70	78	24	22	14	7	10
Santiago	39	59	54	83	117	39	26	29	25	20
Sao Paulo	49	48	74	72		25	27	20	18	6
Shanghai, Shanghai	71	59	108	83		24	22	22	15	8
Sydney	74	57	29	44	36	34	12	6	3	3
Tehran	76	105	105	90	124	8	24	32	23	16
Tel Aviv	129	104	86	43	62	63	87	22	16	8
Tokyo	156	209	147	152	194	71	70	56	41	47
Warsaw	43	44	47	45	85	13	10	10	10	8



## Accra - Warsaw

City Name	Share of Intersections that are 4-Way					Walkability Ratio				
	Period 1	Period 2	Period 3	Period 4	Period 5	Period 1	Period 2	Period 3	Period 4	Period 5
Accra		40%	25%	10%	8%		1.6	1.8	1.5	1.7
Algiers	18%	12%	10%	10%	7%	1.4	1.6	1.9	1.7	1.7
Bangkok	14%	7%	10%	9%	5%	1.5	1.6	1.7	1.5	2.0
Beijing, Beijing	13%	15%	9%	7%	12%	1.5	1.4	1.6	1.7	1.8
Buenos Aires	86%	50%	54%	41%	38%	1.3	1.4	1.4	1.5	1.6
Cairo	14%	25%	26%	14%	13%	1.5	1.6	1.6	1.6	1.7
Chicago	45%	43%	18%	15%	9%	1.5	1.5	1.6	1.4	1.7
Guatemala City	49%	46%	31%	16%	8%	1.5	1.4	1.6	1.7	1.9
Istanbul	21%	17%	16%	17%	6%	1.6	1.8	1.8	1.7	2.0
Jeddah	6%		24%	13%	12%	1.9		1.5	1.6	1.7
Johannesburg	38%	30%	20%	6%	10%	1.5	1.7	1.6	1.7	2.3
Kolkata	19%	8%	7%	4%	4%	1.4	1.7	1.8	1.6	1.6
Kuwait City	26%	38%	14%	5%	7%	1.6	2.1	1.8	2.0	2.1
Lagos	28%	32%	9%	7%	2%	1.4	1.6	1.6	1.8	1.8
London	15%	17%	16%	2%	4%	1.6	1.9	1.6	1.7	1.7
Los Angeles	33%	45%	19%	10%	6%	1.7	1.4	1.7	1.8	2.0
Manila	25%	31%	20%	10%	10%	1.4	1.5	1.7	1.6	1.7
Mexico City	45%	53%	43%	27%	13%	1.4	1.4	1.5	1.7	1.7
Moscow	21%	18%	16%	8%	11%	1.7	1.6	1.6	1.6	2.1
Mumbai	15%	20%	6%	11%	8%	1.5	1.6	1.5	1.5	1.8
Nairobi	28%	10%	6%	4%	6%	2.0	1.6	1.5	1.5	1.6
Paris	27%	32%	17%	7%	10%	1.5	1.6	1.6	1.8	1.6
Santiago	54%	32%	35%	21%	14%	1.4	1.5	1.5	1.7	2.0
Sao Paulo	37%	40%	22%	18%	7%	1.5	1.6	1.7	1.7	1.7
Shanghai, Shanghai	32%	27%	17%	15%	15%	1.4	1.5	1.4	1.8	1.7
Sydney	30%	19%	17%	8%	4%	1.5	1.7	1.8	1.7	1.8
Tehran	8%	18%	25%	22%	11%	1.5	1.4	1.5	1.5	1.9
Tel Aviv	34%	46%	18%	25%	10%	1.4	1.4	1.5	1.6	2.0
Tokyo	27%	25%	25%	20%	16%	1.4	1.4	1.5	1.6	1.4
Warsaw	25%	21%	17%	18%	13%	1.6	1.6	1.6	1.5	1.6

City Name	Share of Built-up Area That Is Residential					Share of Residential Areas Not Laid Out Before Development				
	Period 1	Period 2	Period 3	Period 4	Period 5	Period 1	Period 2	Period 3	Period 4	Period 5
Accra		43%	59%	71%	80%		42%	40%	65%	45%
Algiers	68%	40%	51%	52%	49%	41%	40%	88%	64%	31%
Bangkok	49%	55%	55%	58%	42%	87%	94%	93%	61%	35%
Beijing, Beijing	55%	35%	39%	37%	27%	35%	26%	5%	20%	11%
Buenos Aires	58%	68%	83%	67%	78%	0%	4%	2%	0%	3%
Cairo	75%	59%	64%	50%	58%	58%	7%	4%	35%	41%
Chicago	57%	66%	57%	70%	78%	0%	0%	7%	2%	19%
Guatemala City	50%	36%	57%	71%	68%	11%	24%	46%	28%	16%
Istanbul	62%	62%	61%	64%	47%	59%	42%	28%	39%	25%
Jeddah	35%		53%	50%	27%	67%		44%	8%	11%
Johannesburg	40%	66%	63%	72%	68%	2%	0%	0%	1%	18%
Kolkata	72%	70%	68%	81%	74%	91%	91%	90%	96%	73%
Kuwait City	12%	18%	45%	43%	36%	0%	0%	0%	0%	4%
Lagos	57%	29%	50%	71%	71%	84%	20%	58%	58%	52%
London	72%	79%	73%	64%	49%	0%	0%	0%	9%	13%
Los Angeles	51%	77%	71%	76%	72%	7%	0%	0%	2%	20%
Manila	53%	57%	60%	75%	73%	39%	46%	40%	58%	36%
Mexico City	44%	66%	66%	67%	59%	2%	3%	2%	9%	27%
Moscow	38%	52%	42%	51%	83%	0%	0%	0%	15%	0%
Mumbai	54%	56%	45%	70%	51%	69%	65%	68%	66%	61%
Nairobi	34%	45%	69%	55%	70%	0%	7%	5%	32%	19%
Paris	74%	74%	75%	58%	58%	12%	37%	10%	32%	29%
Santiago	45%	60%	62%	59%	57%	1%	0%	0%	8%	16%
Sao Paulo	51%	66%	69%	60%	53%	0%	0%	1%	3%	21%
Shanghai, Shanghai	58%	65%	54%	40%	28%	0%	4%	8%	25%	34%
Sydney	55%	71%	79%	79%	74%	0%	0%	0%	0%	13%
Tehran	79%	74%	74%	54%	42%	92%	12%	7%	10%	11%
Tel Aviv	70%	85%	80%	59%	50%	60%	14%	7%	24%	15%
Tokyo	47%	67%	60%	64%	49%	24%	63%	56%	52%	47%
Warsaw	42%	54%	56%	62%	72%	5%	2%	0%	14%	18%

## Accra - Warsaw

City Name	Share of Built-up Area That Is Gridded					Share of Residential Area in Informal Land Subdivisions				
	Period 1	Period 2	Period 3	Period 4	Period 5	Period 1	Period 2	Period 3	Period 4	Period 5
Accra		41%	23%	15%	20%		24%	27%	31%	48%
Algiers	6%	0%	0%	3%	15%	0%	0%	0%	1%	15%
Bangkok	8%	0%	3%	8%	5%	0%	0%	0%	0%	13%
Beijing, Beijing	3%	4%	3%	3%	0%	0%	0%	0%	33%	37%
Buenos Aires	100%	90%	90%	70%	80%	0%	6%	45%	65%	87%
Cairo	15%	13%	17%	5%	10%	5%	14%	22%	35%	24%
Chicago	83%	80%	30%	8%	0%	0%	0%	3%	8%	0%
Guatemala City	84%	78%	58%	14%	5%	1%	29%	3%	14%	46%
Istanbul	13%	15%	3%	10%	10%	0%	0%	0%	0%	16%
Jeddah	0%		16%	5%	3%	0%		0%	4%	18%
Johannesburg	52%	30%	10%	3%	5%	0%	6%	0%	11%	41%
Kolkata	0%	3%	0%	3%	5%	0%	0%	0%	0%	16%
Kuwait City	0%	0%	5%	0%	0%	25%	0%	0%	4%	19%
Lagos	0%	43%	20%	5%	0%	3%	16%	9%	23%	41%
London	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Los Angeles	33%	53%	28%	0%	0%	0%	0%	0%	1%	3%
Manila	35%	20%	8%	0%	0%	2%	0%	0%	0%	33%
Mexico City	63%	75%	50%	28%	15%	0%	0%	0%	8%	34%
Moscow	0%	5%	0%	8%	0%	0%	6%	0%	21%	75%
Mumbai	0%	0%	0%	3%	5%	0%	0%	0%	0%	0%
Nairobi	0%	3%	3%	0%	0%	15%	16%	25%	57%	68%
Paris	5%	10%	8%	3%	0%	0%	0%	0%	0%	2%
Santiago	60%	35%	25%	30%	5%	0%	0%	0%	0%	5%
Sao Paulo	33%	25%	23%	8%	3%	0%	0%	0%	7%	24%
Shanghai, Shanghai	5%	0%	8%	0%	8%	0%	0%	0%	0%	25%
Sydney	20%	10%	3%	3%	0%	0%	0%	0%	0%	0%
Tehran	0%	5%	20%	18%	0%	0%	0%	0%	0%	16%
Tel Aviv	0%	0%	0%	3%	0%	0%	0%	0%	0%	20%
Tokyo	26%	6%	14%	10%	5%	0%	0%	0%	0%	2%
Warsaw	3%	3%	0%	13%	10%	0%	0%	11%	25%	39%

City Name	Share of Residential Area in Formal Land Subdivisions					Share of Residential Area in Housing Projects				
	Period 1	Period 2	Period 3	Period 4	Period 5	Period 1	Period 2	Period 3	Period 4	Period 5
Accra		18%	16%	4%	7%		16%	17%	0%	0%
Algiers	58%	53%	6%	14%	28%	2%	7%	6%	20%	25%
Bangkok	13%	6%	5%	27%	9%	0%	1%	2%	11%	43%
Beijing, Beijing	21%	6%	23%	4%	18%	44%	68%	72%	43%	34%
Buenos Aires	100%	89%	51%	34%	4%	0%	1%	2%	1%	5%
Cairo	36%	78%	70%	25%	9%	2%	1%	4%	6%	26%
Chicago	94%	98%	78%	72%	64%	6%	2%	11%	18%	17%
Guatemala City	86%	48%	52%	53%	30%	1%	0%	0%	6%	9%
Istanbul	40%	55%	59%	50%	31%	2%	3%	13%	10%	29%
Jeddah	33%		53%	72%	67%	0%		3%	16%	4%
Johannesburg	98%	88%	89%	74%	38%	0%	6%	11%	14%	3%
Kolkata	9%	4%	5%	3%	3%	1%	5%	5%	1%	8%
Kuwait City	51%	100%	97%	94%	73%	24%	0%	3%	2%	4%
Lagos	13%	43%	29%	13%	0%	0%	21%	4%	6%	6%
London	24%	46%	67%	42%	87%	76%	54%	33%	49%	0%
Los Angeles	89%	95%	92%	88%	62%	4%	5%	8%	9%	15%
Manila	59%	54%	57%	42%	25%	0%	0%	3%	0%	6%
Mexico City	98%	97%	97%	78%	34%	0%	1%	1%	5%	4%
Moscow	89%	56%	48%	28%	11%	11%	38%	52%	36%	14%
Mumbai	29%	18%	16%	17%	14%	2%	17%	16%	17%	25%
Nairobi	70%	57%	52%	8%	10%	14%	19%	18%	3%	3%
Paris	76%	43%	79%	53%	67%	12%	21%	11%	15%	1%
Santiago	93%	92%	96%	74%	63%	6%	8%	4%	18%	15%
Sao Paulo	97%	96%	96%	88%	49%	3%	4%	3%	2%	6%
Shanghai, Shanghai	71%	51%	36%	18%	9%	29%	44%	56%	57%	31%
Sydney	81%	96%	98%	95%	80%	19%	4%	2%	5%	7%
Tehran	8%	88%	90%	75%	46%	0%	0%	3%	15%	26%
Tel Aviv	37%	86%	87%	55%	57%	3%	0%	6%	21%	7%
Tokyo	75%	34%	39%	40%	49%	1%	3%	5%	9%	2%
Warsaw	63%	79%	67%	51%	35%	31%	19%	22%	10%	7%

## Accra - Warsaw

City Name	Average Plot Size in Informal Land Subdivisions					Average Plot Size in Formal Land Subdivisions				
	Period 1	Period 2	Period 3	Period 4	Period 5	Period 1	Period 2	Period 3	Period 4	Period 5
Accra	417	688	757	949		583	528			905
Algiers						469		353	267	225
Bangkok							295	216		
Beijing, Beijing				377					421	
Buenos Aires	332	277			372	168	197	311	324	484
Cairo	128	148	87	77	595	332	665	618	486	418
Chicago						374	463	812	1,348	1,795
Guatemala City									748	143
Istanbul							472	446	235	318
Jeddah								496	583	
Johannesburg				230	205	560	1,034	1,136	960	493
Kolkata					217	142	263	318	351	
Kuwait City								615	639	442
Lagos			648					399	610	
London						404	491	528	698	612
Los Angeles						665	689	780	921	789
Manila					94	308	259	471	247	97
Mexico City					132	109	199	172	247	196
Moscow					1,099					962
Mumbai						716	534	496	779	
Nairobi			2,053			357	402	2,600	1,005	
Paris						333	469	450	565	545
Santiago							273	385	713	282
Sao Paulo						223	213	399	279	
Shanghai, Shanghai								379	319	
Sydney						331	479	688	694	707
Tehran								306	222	270
Tel Aviv					554	438	413	482	460	844
Tokyo						289	166	150	224	230
Warsaw			798	1,401				764	774	751



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## INDEX OF CITIES BY COUNTRY AND REGION

- Afghanistan: Kabul, 200  
 Algeria: Algiers, 52, 446; Tebessa, 386  
 Angola: Luanda, 244  
 Argentina: Buenos Aires, 94, 452;  
     Cordoba, 128  
 Australia: Sydney, 378, 498  
 Austria: Vienna, 410  
 Azerbaijan: Baku, 68  
 Bangladesh: Dhaka, 134; Rajshahi, 328;  
     Saidpur, 342  
 Belarus: Gomel, 148  
 Belgium: Antwerp, 56  
 Bolivia: Cochabamba, 124  
     Brazil: Belo Horizonte, 82; Curitiba, 132;  
     Florianopolis, 138; Ilheus, 182; Jequie, 192;  
     Palmas, 298; Ribeirao Preto, 336;  
     Sao Paulo, 352, 494  
 Canada: Montreal, 270; Victoria, 408  
 Chile: Santiago, 350, 492  
 China: Anqing, Anhui, 54;  
     Beijing, Beijing, 74, 450;  
     Bicheng, Chongqing, 88;  
     Changzhi, Hunan, 108;  
     Changzhou, Jingsu, 110;  
     Chengdu, Sichuan, 112;  
     Chengguan, Guizhou, 114;  
     Gaoyou, Jiangsu, 144;  
     Guangzhou, Guangdong, 154;  
     Guixi, Chongqing, 158;  
     Haikou, Hainan, 162;  
     Hangzhou, Zhejiang, 166;  
     Hong Kong, Hong Kong, 174, 460;  
     Jinan, Shandong, 194;  
     Kaiping, Guangdong, 202;  
     Leshan, Sichuan, 238;  
     Pingxiang, Jiangxi, 310;  
     Qingdao, Shandong, 322;  
     Shanghai, Shanghai, 356, 496;  
     Shenzhen, Guangdong, 360;  
     Suining, Sichuan, 374;  
     Taipei, Taiwan, 380;  
     Tangshan, Hebei, 382;  
     Tianjin, Tianjin, 394;  
     Wuhan, Hubei, 418;  
     Xingping, Shaanxi, 420;  
     Xucheng, Jiangsu, 422;  
     Yanggu, Shandong, 426;  
     Yiyang, Hunan, 428;  
     Yucheng, Zhejiang, 430;  
     Zhengzhou, Henan, 434;  
     Zhuji, Zhejiang, 436;  
     Zunyi, Guizhou, 438  
 Colombia: Bogota, 90; Valledupar, 406  
 Congo Dem. Rep.: Kinshasa, 222;  
     Lubumbashi, 246  
 Cuba: Holguin, 172  
 East Asia and the Pacific:  
     China: Anqing, Anhui, 54;  
     Beijing, Beijing, 74, 450;  
     Bicheng, Chongqing, 88;  
     Changzhi, Hunan, 108;  
     Changzhou, Jingsu, 110;  
     Chengdu, Sichuan, 112;  
     Chengguan, Guizhou, 114;  
     Gaoyou, Jiangsu, 144;  
     Guangzhou, Guangdong, 154;  
     Guixi, Chongqing, 158;  
     Haikou, Hainan, 162;  
     Hangzhou, Zhejiang, 166;  
     Hong Kong, Hong Kong, 174, 460;  
     Jinan, Shandong, 194;  
     Kaiping, Guangdong, 202;  
     Leshan, Sichuan, 238;  
     Pingxiang, Jiangxi, 310;  
     Qingdao, Shandong, 322;  
     Shanghai, Shanghai, 356, 496;  
     Shenzhen, Guangdong, 360;  
     Suining, Sichuan, 374;  
     Taipei, Taiwan, 380;  
     Tangshan, Hebei, 382;  
     Tianjin, Tianjin, 394;  
     Wuhan, Hubei, 418;  
     Xingping, Shaanxi, 420;  
     Xucheng, Jiangsu, 422;  
     Yanggu, Shandong, 426;  
     Yiyang, Hunan, 428;  
     Yucheng, Zhejiang, 430;

- Yulin, Guangxi, 432;  
 Zhengzhou, Henan, 434;  
 Zhuji, Zhejiang, 436;  
 Zunyi, Guizhou, 438;  
 Fiji: Suva, 376;  
 Korea Dem. Rep.: Pyongyang, 320;  
 Korea Rep.: Busan, 98; Cheonan, 116;  
     Gwangju, 160; Jinju, 196; Seoul, 354;  
 Mongolia: Ulaanbaatar, 404  
 Ecuador: Quito, 326  
 Egypt: Alexandria, 50; Cairo, 102, 454  
 El Salvador: San Salvador, 346  
 Ethiopia: Addis Ababa, 44  
 Europe and Japan:  
     Austria: Vienna, 410;  
     Belarus: Gomel, 148;  
     Belgium: Antwerp, 56;  
     France: Le Mans, 234; Paris, 304, 490;  
     Germany: Berlin, 86; Halle, 164;  
         Oldenburg, 288;  
     Greece: Thessaloniki, 392;  
     Hungary: Budapest, 92;  
     Italy: Milan, 264; Palermo, 296;  
     Japan: Fukuoka, 140; Okayama, 286;  
         Osaka, 290; Tokyo, 398, 504;  
         Yamaguchi, 424;  
     Lithuania: Kaunas, 212;  
     Netherlands: Zwolle, 440;  
     Poland: Warsaw, 416, 506;  
     Russia: Astrakhan, 60; Berezniiki, 84;  
         Dzerzhinsk, 136; Moscow, 272, 482;  
         Saint Petersburg, 344; Tyumen, 402;  
     Serbia: Belgrade, 80;  
     Spain: Madrid, 248;  
     Switzerland: Lausanne, 232;  
     Ukraine: Nikolaev, 284; Rovno, 340,  
     United Kingdom: London, 240, 474;  
         Manchester, 254; Sheffield, 358  
 Fiji: Suva, 376  
 France: Le Mans, 234; Paris, 304, 490  
 Germany: Berlin, 86; Halle, 164;  
     Oldenburg, 288  
 Ghana: Accra, 42, 444  
 Greece: Thessaloniki, 392  
 Guatemala: Guatemala City, 156, 458  
 Hungary: Budapest, 92  
 India: Ahmedabad, 46; Belgaum, 78;  
     Coimbatore, 126; Hindupur, 168;  
     Hyderabad, 178; Jaipur, 188; Jalna, 190;  
     Kanpur, 208; Kolkata, 224, 468;  
     Kozhikode, 226; Malegaon, 252;  
     Mumbai, 274, 484; Parbhani, 300;  
     Pune, 318; Singrauli, 368; Sitapur, 370;  
     Vijayawada, 412  
 Indonesia: Cirebon, 120; Medan, 260;  
     Palembang, 294; Parepare, 302;  
     Pematangiantar, 306  
 Iran: Ahvaz, 48; Gorgan, 150; Qom, 324;  
     Tehran, 388, 500  
 Iraq: Baghdad, 66  
 Israel: Tel Aviv, 390, 502  
 Italy: Milan, 264, Palermo, 296  
 Japan: Fukuoka, 140; Okayama, 286;  
     Osaka, 290; Tokyo, 398, 504;  
     Yamaguchi, 424  
 Kazakhstan: Shymkent, 362  
 Kenya: Nairobi, 486; Nakuru, 278  
 Korea Dem. Rep.: Pyongyang, 320  
 Korea Rep.: Busan, 98; Cheonan, 116;  
     Gwangju, 160; Jinju, 196; Seoul, 354  
 Kuwait: Kuwait City, 470  
 Land-Rich Developed Countries:  
     Australia: Sydney, 378, 498;  
     Canada: Montreal, 270; Victoria, 408;  
     New Zealand: Auckland, 62;  
     United States: Chicago, 118, 456;  
         Cleveland, 122; Gainesville, FL, 142;  
         Houston, 176; Killeen, 220;  
         Los Angeles, 242, 476;  
         Minneapolis, 266; Modesto, 268;  
         New York, 282, 488; Philadelphia, 308;  
         Portland, OR, 316; Raleigh, 330;  
         Springfield, MA, 372; Toledo, 400  
 Latin America and the Caribbean:  
     Argentina: Buenos Aires, 94, 452;  
     Cordoba, 128;  
     Bolivia: Cochabamba, 124;  
     Brazil: Belo Horizonte, 82; Curitiba, 132;  
         Florianopolis, 138; Ilheus, 182;  
         Jequie, 192; Palmas, 298;  
         Ribeirao Preto, 336;  
         Sao Paulo, 352, 494;  
     Chile: Santiago, 350, 492;  
     Colombia: Bogota, 90;  
     Valledupar, 406;  
     Cuba: Holguin, 172;

- Ecuador: Quito, 326;  
 El Salvador: San Salvador, 346;  
 Guatemala: Guatemala City, 156, 458;  
 Mexico: Culiacan, 130; Guadalajara, 152;  
     Mexico City, 262, 480; Reynosa, 334;  
     Tijuana, 396;  
 Nicaragua: Leon, 236;  
 Venezuela: Cabimas, 100; Caracas, 104  
 Lithuania: Kaunas, 212  
 Malaysia: Ipoh, 184; Rawang, 332  
 Mali: Bamako, 70  
 Mexico: Culiacan, 130; Guadalajara, 152;  
     Mexico City, 262, 480; Reynosa, 334;  
     Tijuana, 396  
 Mongolia: Ulaanbaatar, 404  
 Morocco: Marrakesh, 258  
 Mozambique: Beira, 76  
 Myanmar: Myeik, 276  
 Nepal: Pokhara, 312  
 Netherlands: Zwolle, 440  
 New Zealand: Auckland, 62  
 Nicaragua: Leon, 236  
 Nigeria: Gombe, 146; Ibadan, 180;  
     Lagos, 228, 472; Oyo, 292  
 Pakistan: Karachi, 210; Lahore, 230;  
     Sialkot, 364  
 Philippines: Bacolod, 64; Cebu City, 106;  
     Manila, 256, 478  
 Poland: Warsaw, 416, 506  
 Russia: Astrakhan, 60; Berezniiki, 84;  
     Dzerzhinsk, 136; Moscow, 272, 482;  
     Saint Petersburg, 344; Tyumen, 402  
 Rwanda: Kigali, 218  
 Saudi Arabia: Jeddah, 464; Riyadh, 338  
 Serbia: Belgrade, 80  
 Singapore: Singapore, 366  
 South Africa: Johannesburg, 198, 466;  
     Port Elizabeth, 314  
 South and Central Asia:  
     Afghanistan: Kabul, 200;  
     Bangladesh: Dhaka, 134; Rajshahi, 328;  
     Saidpur, 342;  
     India: Ahmedabad, 46; Belgaum, 78;  
     Coimbatore, 126; Hindupur, 168;  
     Hyderabad, 178; Jaipur, 188;  
     Jalna, 190; Kanpur, 208;  
     Kolkata, 224, 468; Kozhikode, 226;  
     Malegaon, 252;  
     Mumbai, 274, 484; Parbhani, 300;  
     Pune, 318; Singrauli, 368; Sitapur, 370  
     Vijayawada, 412  
     Iran: Ahvaz, 48; Gorgan, 150; Qom, 324;  
     Tehran, 388, 500;  
     Kazakhstan: Shymkent, 362;  
     Nepal: Pokhara, 312;  
     Pakistan: Karachi, 210; Lahore, 230;  
     Sialkot, 364;  
     Uzbekistan: Bukhara, 96; Tashkent, 384  
 Southeast Asia:  
     Indonesia: Cirebon, 120; Medan, 260;  
     Palembang, 294; Parepare, 302;  
     Pematangiantar, 306;  
     Malaysia: Ipoh, 184; Rawang, 332;  
     Myanmar: Myeik, 276;  
     Philippines: Bacolod, 64; Cebu City, 106;  
     Manila, 256, 478;  
     Singapore: Singapore, 366;  
     Thailand: Bangkok, 72, 448;  
     Vietnam: Ho Chi Minh City, 170;  
     Vinh Long, 414  
 Spain: Madrid, 248  
 Sub-Saharan Africa:  
     Angola: Luanda, 244;  
     Congo Dem. Rep.: Kinshasa, 222;  
     Lubumbashi, 246;  
     Ethiopia: Addis Ababa, 44;  
     Ghana: Accra, 42, 444;  
     Kenya: Nairobi, 486; Nakuru, 278;  
     Mali: Bamako, 70;  
     Mozambique: Beira, 76;  
     Nigeria: Gombe, 146; Ibadan, 180;  
     Lagos, 228, 472; Oyo, 292;  
     Rwanda: Kigali, 218;  
     South Africa: Johannesburg, 198, 466;  
     Port Elizabeth, 314;  
     Tanzania: Arusha, 58;  
     Uganda: Kampala, 206;  
     Zambia: Ndola, 280  
 Sudan: Khartoum, 216  
 Switzerland: Lausanne, 232  
 Tanzania: Arusha, 58  
 Thailand: Bangkok, 72, 448  
 Tunisia: Kairouan, 204  
 Turkey: Istanbul, 186, 462; Kayseri, 214;  
     Malatya, 250  
 Uganda: Kampala, 206

- Ukraine: Nikolaev, 284; Rovno, 340
- United Kingdom: London, 240, 474;  
Manchester, 254; Sheffield, 358
- United States: Chicago, 118, 456;  
Cleveland, 122; Gainesville, FL, 142;  
Houston, 176; Killeen, 220; Los Angeles,  
242, 476; Minneapolis, 266; Modesto, 268;  
New York, 282, 488; Philadelphia, 308;  
Portland, OR, 316; Raleigh, 330;  
Springfield, MA, 372; Toledo, 400
- Uzbekistan: Bukhara, 96, Tashkent, 384
- Venezuela: Cabimas, 100, Caracas, 104
- Vietnam: Ho Chi Minh City, 170;  
Vinh Long, 414
- Western Asia and North Africa:
- Algeria: Algiers, 52, 446; Tebessa, 386;
- Azerbaijan: Baku, 68;
- Egypt: Alexandria, 50; Cairo, 102, 454;
- Iraq: Baghdad, 66;
- Israel: Tel Aviv, 390, 502;
- Kuwait: Kuwait City, 470;
- Morocco: Marrakesh, 258;
- Saudi Arabia: Jeddah, 464; Riyadh, 338;
- Sudan: Khartoum, 216;
- Tunisia: Kairouan, 204;
- Turkey: Istanbul, 186, 462; Kayseri, 214;  
Malatya, 250;
- Yemen: Sana, 348
- Yemen: Sana, 348
- Zambia: Ndola, 280



## ABOUT THE RESEARCH PARTNERSHIP

The Atlas of Urban Expansion—2016 Edition is the product of a collaboration between three partners: The NYU Urban Expansion Program at New York University, the United Nations Human Settlements Programme (UN-Habitat), and the Lincoln Institute of Land Policy. All three institutional partners contributed funds and expertise to the creation of the Atlas and all its associated products. They share the rights to these products, and are all committed to keeping these results in the public realm for all to use with proper citation, without requiring permission.

The NYU Urban Expansion Program is a research and action program based at the Marron Institute of Urban Management and the Stern School of Business at New York University. The program was initiated in 2012 with the primary mission of lending direct assistance to municipalities of rapidly growing cities so that they can make room, using four practical steps, for their expansion. Direct assistance is provided in partnership with municipalities, focused on capacity building, empowerment, training, and regular review, rather than on providing consultancy services. The program has active urban expansion initiatives in Ethiopia and Colombia, begun as pilot projects, and now extends to a national scale. The secondary mission of the program is to monitor the quantity and quality of global urban expansion on a regular basis, focused on a stratified global sample of 200 cities. A primer describing it may be found at <http://urbanizationproject.org/uploads/blog/UEPrimer2014.pdf>.

UN-Habitat, the United Nations Human Settlements Programme, is working toward a better urban future. Its mission is to promote socially and environmentally sustainable human settlements development and achievement of adequate shelter for all. Mandated by the UN General Assembly in 1978 to address the issues of urban growth, it is a knowledgeable institution on urban development processes and understands the aspirations of cities and their residents. For close to forty years, UN Habitat has been working in human settlements throughout the world, focusing on building a brighter future for villages, towns, and cities of all sizes. Because of these four decades of extensive experience, from the highest levels of policy to a range of specific technical issues, UN-Habitat has gained a unique and a universally acknowledged expertise in all things urban. This has placed UN-Habitat in the best position to provide answers and achievable solutions to the current challenges faced by our cities. UN-Habitat is capitalizing on its experience and position to work with partners in order to formulate the urban vision of tomorrow. It works to ensure that cities become inclusive and affordable drivers of economic growth and social

development. UN-Habitat and its projects and programs is described in detail at [www.unhabitat.org](http://www.unhabitat.org).

The Lincoln Institute of Land Policy is an independent, nonpartisan organization whose mission is to help solve global economic, social, and environmental challenges to improve the quality of life through creative approaches to the use, taxation, and stewardship of land. As a private operating foundation whose origins date to 1946, the Lincoln Institute seeks to inform public dialogue and decisions about land policy through research, training, and effective communication. By bringing together scholars, practitioners, public officials, policy makers, journalists, and involved citizens, the Lincoln Institute integrates theory and practice and provides a forum for multidisciplinary perspectives on public policy concerning land, both in the United States and internationally. The Institute, its education and research projects, databases and publications are described in detail at <http://www.lincolnst.edu>.



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