Synthesis Paper

Introducing the Mind-the-Gap Index:

A tool to understand urban spatial inequality

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Prepared for the Grand Challenge on Inequality and Exclusion, an initiative of the Pathfinders for Peaceful, Just and Inclusive Societies.

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The synthesis draws on and summarises several research papers led by Jeni Klugman, working with the team highlighted above. These provide more background information, fuller literature reviews and present the methods and data in greater detail. Each of the papers is available by request:

1. The Importance of Spatial Inequality – A review of the literature and evidence
2. Mind-the-Gap (MTG) Index: Possible Approach and Options
3. COVID-19 Has a Postcode: How Urban Housing and Spatial Inequality Are Shaping the COVID-19 Crisis, and Policy Responses
4. Spatial Inequality in Addis Ababa, Ethiopia: Piloting the Mind-the-Gap Index
5. Spatial Inequality in Jakarta: Piloting the Mind-the-Gap Index
6. Measuring Spatial Inequality and Exclusion in Mexican Cities

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1. Introduction and Motivation

Where people live exerts a strong influence on multiple aspects of their well-being, including their access to economic opportunities, education, health and other services and to their security, as well as other goals envisioned in the 2030 Agenda.

It is well known that inequalities related to location – also known as "spatial inequalities" – can be extreme between rural and urban areas, and this has been a focus of much attention in development over recent decades. On average, people in rural areas continue to have worse job opportunities and less access to education, safe drinking water, health services and high-quality infrastructure than urban residents. The World Bank and UN estimate that at least 80 per cent of people living in income poverty are found in rural areas.[1] A strong focus on easing the rural-urban divide is needed to ensure that no one is left behind.

At the same time, today most people live in cities – and urbanization is a "megatrend" shaping global prospects. About 55 percent of the world's population presently lives in cities, a share projected to rise to 68 percent by 2050, as shown in Figure 1. And twenty-six of the world's thirty three megacities are in developing countries; nineteen in Asia Pacific. Developing countries are expected to add five or six new megacities through 2030, including Dar es Salaam and Luanda.

Cities provide immense benefits and, on average, are more productive and have better access to services and infrastructure than rural areas. As documented in a number of World Bank and other reports, high-skilled workers are in turn attracted to urban areas, which offer lucrative job opportunities and amenities. The density and large population size of cities facilitates opportunities for collaboration and the spillover of ideas between workers. Cities benefit from market access – including access to a large consumer market and to links with international trade and neighboring localities.

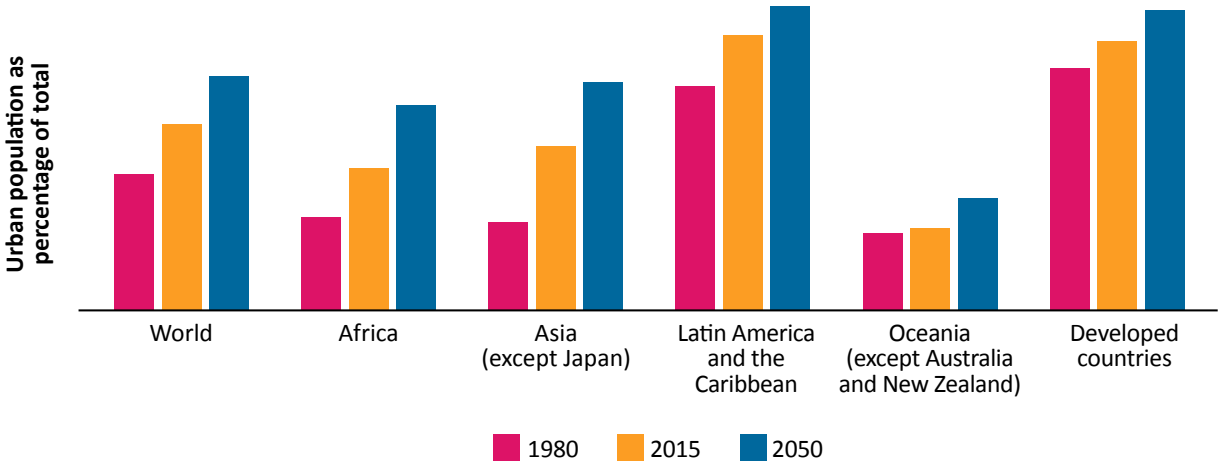
However, urbanization's benefits have not accrued equally. As described in this note, income inequality is greatest in cities. More than one billion people worldwide live in slums or informal settlements lacking access to basic services. A global crisis in affordable housing, which afflicts many of the world's most prosperous cities, pushes poor and even middle-class people to the periphery of urban centers. The urban advantage in terms of innovation and opportunities for social mobility may not be sustained if development and urban planning policies neglect equity concerns.

Spatial inequality's impact on urban residents has been put into stark relief by the COVID-19 pandemic. Whether in developed or developing countries, place-based disparities mean the poorest and most marginalized bear the brunt of the pandemic and face crowded housing, lack of medical care, and shortage of access to water and sanitation. In many cities, the spread of COVID-19 has been most severe in places already experiencing poverty. In Barcelona Besòs and Llobregat historically among the city's poorest neighborhoods have been hardest hit by COVID-19.[2] Accumulating evidence suggests that economically disadvantaged areas in New York City have also been disproportionately impacted by COVID-19.[3] The COVID-19 pandemic also shows how spatial inequality overlaps with and reinforces other types of inequality, including racial disparities.

In a world with high and growing levels of urbanization, policy makers are increasingly aware that the future of inequality depends largely on what happens in cities. There is also concern that rising spatial inequality can lead to social unrest, rioting, increased crime, and erode trust among separated societal groups.[4]

The World Bank estimates that half of the area that will be urbanized by 2050 has not yet been built, which implies major opportunities for the policies and decisions affecting cities to shape the world we live in.

Figure 1: Levels of urbanization in 1980, 2015 and projections to 2050



Source: United Nations (2018), World Urbanization Prospects: The 2018 Revision

This paper is a synthesis of several research papers which provide more detail on the evidence, data and methods, which are available on request.[5] The synthesis outlines what we know–drawing on recent research from UNDESA[6] and others–to outline the extent of spatial disparities and the ways that spatial inequality shapes today's cities and the key factors driving spatial disparities. *(A separate note discusses how the COVID-19 pandemic is worsened by spatial disparities.)* Section 3 introduces a new index designed to capture key dimensions of spatial inequality. Section 4 presents results from three pilot applications in Addis Ababa, Jakarta, and Mexico City drawing on existing neighborhood and sub-district data. The work highlights the importance of granular and up-to-date data, as well as the accumulating nature of disadvantage in poor neighborhoods. Section 5 provides the conclusion.

2. Context and what we know

While urban areas are often the most prosperous parts of a country, high levels of inequality are also found within cities–indeed "in most cities, high levels of wealth and modern infrastructure coexist with areas characterized by deprivation and a dearth of services. Underinvestment in infrastructure and public transportation prevents some urban residents from accessing good jobs, education and services. Furthermore, the concentration of poverty in underserved neighborhoods reinforces the mechanisms that perpetuate disadvantage."[7]

Here we define spatial inequality as the residential segregation of groups of people based on income, occupation, education and other characteristics. Income inequality is the major source of spatial inequality, although the extent of spatial inequality is strongly related to welfare and housing policies, that is post tax and transfer policies.

The links with income often arise because low-income people are spatially concentrated in neighborhoods with affordable housing. Because most children attend the school closest to their home, residential segregation is often reproduced in school segregation, which in turn can lead to labor market segregation–as has been found in the UK, for instance.[8]

2.1 The extent of spatial disparities in cities

The literature on spatial segregation is deeply relevant to understanding spatial disparities. The spatial separation of two or more groups can happen in different overlapping domains of daily life, including residential neighborhoods, schools and workplaces.[9]

The residential to school and work trajectory can be seen as cumulative, translating into socio-spatial structures that are inherited from one generation to the next. The important temporal dimension has been captured by various longitudinal studies. Nieuwenhuis found that "the combination of high levels of social inequalities and high levels of spatial segregation tend to lead to a vicious circle of segregation for low-income groups, where it is difficult to undertake both upward social mobility and upward spatial mobility."[10]

- A comparative study of Estonia, the Netherlands, Sweden and the United Kingdom suggested that where income inequalities are the smallest (Netherlands and Sweden), it is the easiest to move from the most deprived to less deprived neighborhoods. "The conclusion is that the combination of high levels of income inequalities and high levels of spatial segregation tend to lead to a vicious circle of segregation for low-income groups, where it is difficult to undertake upward socio-spatial mobility." The analysis suggests that socio-spatial structures start to petrify once high levels of segregation have emerged, making it more difficult for people to move to a better neighborhood.[11]
- Even in countries like Sweden, which are relatively more equitable, residential segregation was found to be strongly related to workplace segregation.[12]

For the US, Raj Chetty has shown that every extra year that a child spends in a better neighborhood environment improves their adult prospects in terms of income, college attendance, and avoiding teenage pregnancy.

- The assessment of effects of moving households from high poverty neighborhoods to low poverty neighborhoods–through the Moving to Opportunity program–found that children who moved from a high poverty neighborhood to a low poverty neighborhood before the age of thirteen earned 31% more as adults compared to those who did not move to a better neighborhood. There was no effect for children who moved after the age of thirteen.[13]

The accumulating empirical evidence about neighborhood effects poses major challenges. It is also true that socioeconomic and ethnic segregation are often strongly connected.

The density of modern cities enables the production and concentration of great wealth in urban centers, which benefit from links to trade, large consumer markets, and knowledge economies allowing rapid exchange of ideas and innovation.[14] However, in both developing and developed countries, the gains from urban productivity and livability have accrued unevenly.

- A 2019 study mapping adults with tertiary education in Jakarta found that the city was "highly-segregated," with the most skilled residents clustered in central neighborhoods closest to high-paying jobs, services, and other urban amenities.[15]
- In the United States, Joseph Gyourko describe "superstar cities," such as San Francisco, where land scarcity and high housing prices lead to "income-based spatial sorting."[16] In London, Paris, New York, and San Francisco, housing is a key factor reinforcing this type of inequality.[17]

Inequality within cities has multiple dimensions–here we highlight some key facts to illustrate the nature and extent of inequalities on various fronts:

- **Income.** Income inequality is generally greater within urban than in rural areas: according to UN estimates, the Gini coefficient of income inequality is higher in urban areas in thirty-six out of forty-two countries with data (China is one of the exceptions).[18]
    - With a Gini coefficient of 67.2, Brasilia is the most unequal capital city in Latin America and the Caribbean, and the income of the richest decile averaged eighty-seven times that of the poorest decile[19]. This urban space is also highly segregated with working-class neighborhoods in satellite towns having Brazil's highest homicide rates, separated from wealthy households living in the core of the city as well as in gated communities.[20]
- **Housing.** Worldwide about 330 million urban households live in crowded, inadequate, and unsafe housing–or are financially stretched by housing costs–projected by McKinsey to increase to 440 million by 2025.[21] Where people live is shaped by the spatial concentration of affordable housing. The more clustered affordable housing is in a city, the more rapidly segregation levels rise.[22] In the United States, EU, Japan, and Australia, more than sixty million households are financially stretched by housing costs.
- **Health.** There are also repercussions for health: in Baltimore and London, there is a twenty-year difference in life expectancy across neighborhoods.[23] In London, each tube stop east from Westminster loses nearly one year of life expectancy.[24]
- **Education.** Income segregation and educational segregation often accompany and reinforce each other. School districts and neighborhoods with a large population of high-income earners may be better able to fund educational institutions.
    - In the United States, between-district income segregation of families with children enrolled in public school increased by over 15% from 1990 to 2010. Within large districts, between-school segregation of students who are eligible and ineligible for free lunch increased by over 40% from 1991 to 2012.[25]
- **Security.** Crime tends to cluster in areas already suffering from other forms of disadvantage, including unequal health outcomes.[26]
    - A study by the Inter-American Development Bank found that crime in Latin America is "highly concentrated in a small proportion of blocks: 50 percent of crimes are concentrated in 3 to 7.5 percent of street segments, and 25 percent of crimes are concentrated in 0.5 to 2.9 percent of street segments."[27]
    - In large cities in the United States and Israel, including New York and Tel Aviv, about 50 percent of crime is concentrated at five percent of the addresses and 25 percent of crime at just one percent of addresses.[28]

2.2 Drivers of spatial disparities and policy levers

Evidence suggests that **city size** matters–studies have found that income inequality is worse in larger cities in a range of contexts, from Latin America, to China to the US.[29]

The way that cities are managed and governed can contribute to segregation and disparities. **Urban planning** not only shapes the location of different types of dwellings in different parts of the city, but also the location of workplaces, schools and other amenities.

Access to **public infrastructure, particularly public transport**, matters. The OECD has estimated the number of jobs that a person can reach within a certain commuting threshold, to capture how unequally distributed economic opportunities are within cities.

- The level of accessibility to jobs depends on both the relative distribution of jobs–that is, how concentrated or dispersed they are spatially–and also on the level of provision of public transit options across neighborhoods.
- On average residents from New York City have high access to jobs by public transit (compared to say San Jose California), although accessibility from individual neighborhoods varies considerably within the city. "In the United States, lack of transit connections between minority neighborhoods and jobs seems to hinder job opportunities for residents of certain neighborhoods, leading to more inequality in job outcomes. In fact, there is a strong association of workplace segregation along racial lines with inequality in job accessibility by transit."[30]

Spending on education and social programs may be biased towards already affluent areas–widening rather than reducing intra-urban inequalities.

- In the United States, to the extent that high-poverty areas have less taxable wealth–in the form of income or property–tend to raise less money for education than wealthier districts.[31] This can contribute to the under-resourcing of school in low-income neighborhoods and unequal academic achievement. A study of US metropolitan areas in 2013-2014 found that "high-income neighborhoods are served by schools with greater social, financial, and instructional resources and greater student achievement than schools serving low-income neighborhoods," and that these inequalities are worsened in neighborhoods segregated by income.[32]
- In Buenos Aires, some districts received more than thirty times the level of investment in public infrastructure, such as roads, sidewalks, parks, playgrounds, and streetlights, as other districts.[33] An analysis of ninety-six administrative districts in São Paulo found that wealthy central districts benefited more from public investment than peripheral districts, reinforcing existing spatial disparities.[34]

Transfer and tax policies can ameliorate the effects of inequality by raising revenue to improve public services and strengthen the social safety net. On the other hand, regressive transfer and tax policies may worsen inequality by facilitating the intergenerational transfer of wealth.

- In both Europe (London and Paris) and the United States (San Francisco and New York), existing spatial inequalities have been exacerbated by the recent erosion of inheritance tax laws, which has made it easier for wealthy homeowners to pass on assets to their heirs.[35]

Housing policies can offset or increase how income inequality affects the spatial mobility of different socioeconomic groups–relevant aspects include the share of homeownership, the tenure structure, rental regimes, the allocation of social housing, and housing subsidies to low-income groups.[36]

Zoning the division of land under the jurisdiction of a local authority into different sections with particular land uses shapes spatial inequality by controlling the supply of available housing. Zoning and other land use regulations "reduce the elasticity of housing supply, [resulting] in a smaller stock of housing, higher house prices, greater volatility of house prices, and less volatility of new construction."[37]

- In the United States, rising housing costs due to strict zoning rules have been found to deter migration to wealthy urban enclaves such as the San Francisco Bay Area.[38] This in turn reinforces inequality by making it prohibitively costly for people to move to places where the prospects for income mobility are greatest.

Gated communities also contribute to spatial segregation and the widening of urban divides.

- In Buenos Aires, 10% of the land that is zoned for urban use is used for gated communities, rising as high as 34 percent in municipalities like Tigre.[39]

Spatial inequalities in cities lead to the **expansion of slums**. People living in slums suffer from one or more of the following five deprivations, lack of access to (1) improved water sources, (2) improved sanitation facilities, (3) sufficient living area, (4) housing durability and/or (5) tenure security.

UN Habitat tracks the number of slum dwellers–the most recent statistics are that one in four urban residents (over 1 billion people) live in slums.[40] Although the proportion of the urban population living in slums has fallen–from 46 percent in 1990 to 23 percent today–the absolute numbers have risen over time due to urban population growth. Sub-Saharan Africa has the highest incidence of slums in the world, with 56 per cent of the region's urban population living in informal settlements in 2014, half of whom have at least two of the above noted deprivations. In some countries slums are located close to the center of the city, and elsewhere on the periphery–either way, people living in slums can be caught in "spatial poverty traps" due to their social, economic and political exclusion.

3. Where Do We Stand on the Data and Measurement Fronts

As underlined by UNDESA in the recent Social Development Report, many cities are stymied in their efforts to analyze and formulate urban policies to reduce inequalities due to lack of relevant information. “Official reporting on housing, basic services, and health vectors relies, for the most part, on urban averages that obscure the challenges in informal settlements."[41]

There is a variety of indicators being published that cast light on key aspects of urban spatial inequality. Here we review a range of initiatives, data and methods in the measurement of spatial disparities in developing and developed country settings. Most of these initiatives have focused on specific indicators of interest – related to sustainability, housing, homelessness, access to services, health status and so on. There are also several examples of composite indices to assess spatial inequality.

3.1 Tracking Indicators

To address the need for high-quality urban information, UN-Habitat works with partners around the globe to monitor, collect, and assess data. This approach relies on a network of **Global Urban Observatories**, operated by local think tanks and institutions, trained to collect data relevant to cities and Sustainable Development Goal 11. As of 2018, a UN report indicated that 374 urban observatories had been established throughout Africa, Asia, and Latin America.[42] An example is the Regional Vancouver Urban Observatory, which worked to develop and publicize a sustainability-focused indicator framework for the greater Vancouver region.[43] However limited information is available from UN-Habitat on the current activities of this network, which represents a promising approach to strengthening the capacity of local actors to gather rich urban data.

The **Urban Spatial Observatory Project**, operated by researchers at Georgetown University, Brown University, and the Center for Policy Research draws on satellite images, artificial intelligence and ethnographic research, to track the spatial exclusion and unequal delivery of services to people living in informal settlements in Delhi.[44] The dataset on public services and informal settlements has reportedly been used by the government during the COVID-19 pandemic crisis (Figure 2).[45]

The **Voluntary Local Review** (VLR) is an effort to “localize the SDGs” through assessments by city governments to track progress. New York City conducted the first VLR in 2018 and VLRs have since been committed to by Accra, Mexico City, Los Angeles, Stockholm, and Taipei, among others. Spatial data has been used by cities in their VLRs to illustrate disparities among local administrative areas along key indicators – as shown for child poverty in Bristol in Figure 3.[46]

The **Sustainable Urban Systems Initiative** at Stanford University worked with municipal governments in Palo Alto, San Francisco and San Jose to create a standardized platform of local SDG indicators. In its preliminary design, the SUS identified indicators from survey sources, such as the US Census, as well as “hyper-local” indicators available at the block group level or lower. These “hyper-local” indicators, for example, on carbon emissions and vehicle-miles traveled during work commute, offer a granular view of local sustainability, although they rely on resource intensive data collection methods.[47]

Figure 2: Delhi Hunger Relief Centre Map

Source: Urban Spatial Observatory Project

Figure 3: Child Poverty Map, Bristol, UK

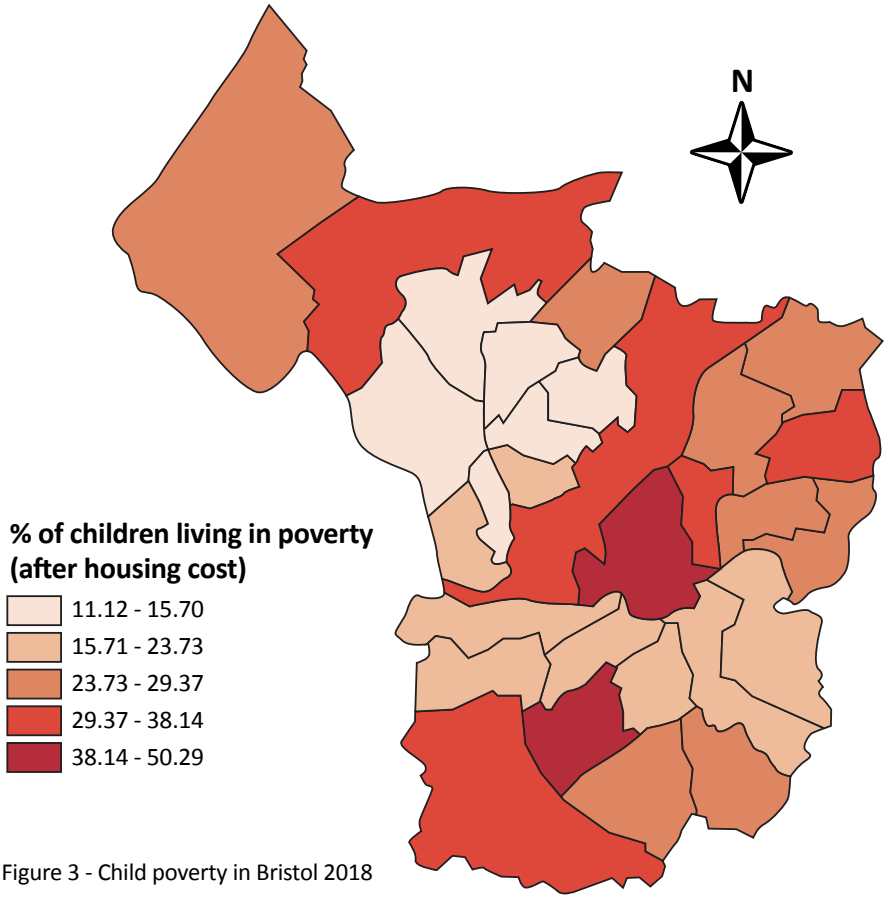


Figure 3 - Child poverty in Bristol 2018

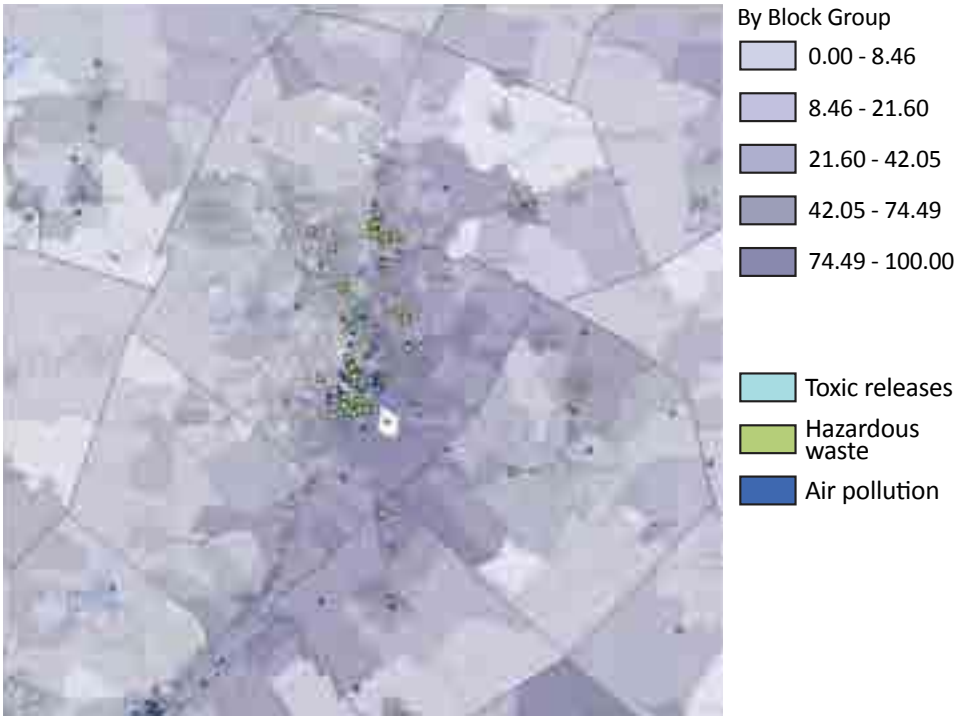
Source: Pipa and Bouchet (2020)

The **Austin Indicators Project** is an ongoing initiative of the University of Texas, which measures quality of life and sustainability in the Austin metropolitan area. Now in its second decade, the project draws on diverse data sources to document trends in housing, health, education, the environment, and social equity in Austin's urban areas. Spatial analysis is a key component of the most recent Austin Indicators report, which uses, for example, a US Environmental Protection Agency mapping tool[48] to illustrate minority community exposure to environmental hazards at the census block level (Figure 4).

A recent initiative focused on spatial data for a single country is the **Afghanistan Spatial Database**. Drawing on the Afghanistan Living Conditions Survey, geospatial data from OpenStreetMap and NASA, and conflict data from Uppsala University, the database features 170 indicators for Afghanistan's thirty-four provinces and fifty-three indicators for 401 districts.[49] The data measures spatial disparities at two administrative levels and contains detailed visualizations depicting relative achievements for indicators in housing, infrastructure, and security, among others. However, the database does not currently allow for analysis of disparities within cities.[50]

Initiatives to measure disparities in housing have focused on such dimensions as affordability, gentrification, and homelessness, as well as land use and zoning laws.

Figure 4: Toxic release, hazardous waste, and air pollution by percent minority census block in Austin, Texas



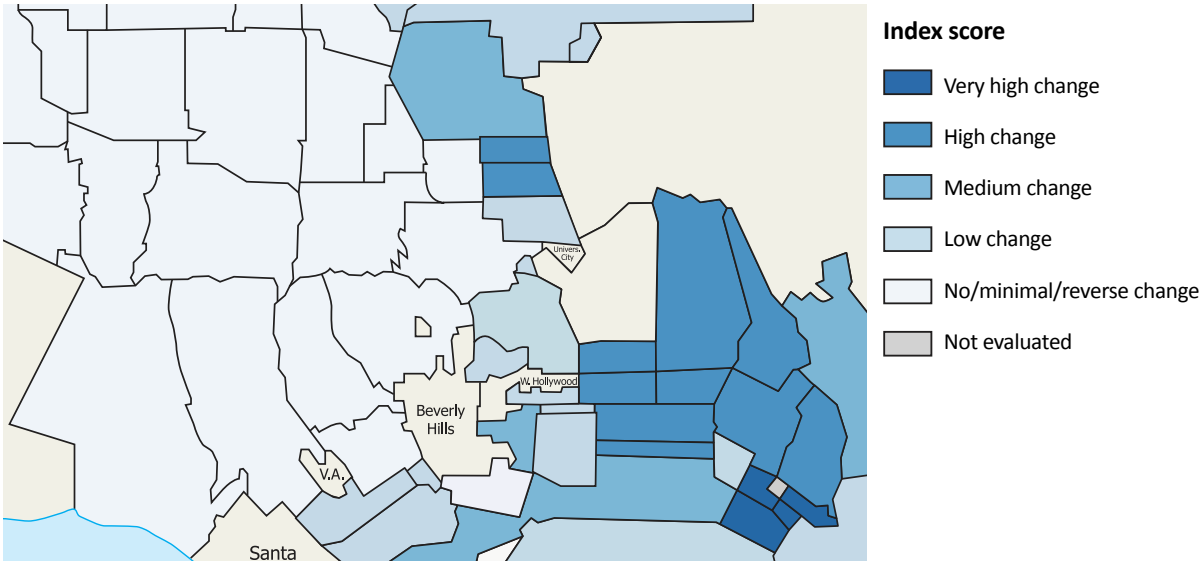
Source: Austin Indicators Project (2019)

The **OECD Housing Database** is a repository of housing data for all thirty-six OECD member countries across twenty-five indicators.[51] Data sources include the 2016 OECD Questionnaire on Social and Affordable Housing, as well as regional surveys such as the European Survey on Income and Living Conditions and national surveys such as the American Community Survey. A major advantage is its broad focus, tracking indicators on the housing market (price and tenure), housing conditions and affordability (housing expenditures, overcrowding, sanitation, and homelessness), as well as public policy (public spending, tax relief, and rental regulation). However, analysis based on the OECD Housing Database is limited to between country comparisons, as indicators are measured at a national level.

A key aspect of housing inequality is gentrification and displacement. Cities in the United States – including Boston, San Francisco, and Seattle -- have developed data and mapping techniques to track trends at a granular level. This shows neighborhood transformation and where residents are at risk of displacement. For example in 2016, the municipal government of Los Angeles created the **Los Angeles Index of Neighborhood**

Change, a map to enable users to visualize demographic changes – including gentrification – at the postcode level.[52] Drawing on public data from the US Census and American Community Surveys, the Los Angeles Index tracked changes in income, education, race, rent, and household size for each postcode, giving a granular portrait of neighborhood transformation in the city (Figure 5).[53] Drawing on the same data, the **Los Angeles Index of Displacement Pressure** was created to predict displacement hotspots and assess postcode-level risk factors such as transportation investment and percent of rent-burdened households.[54]

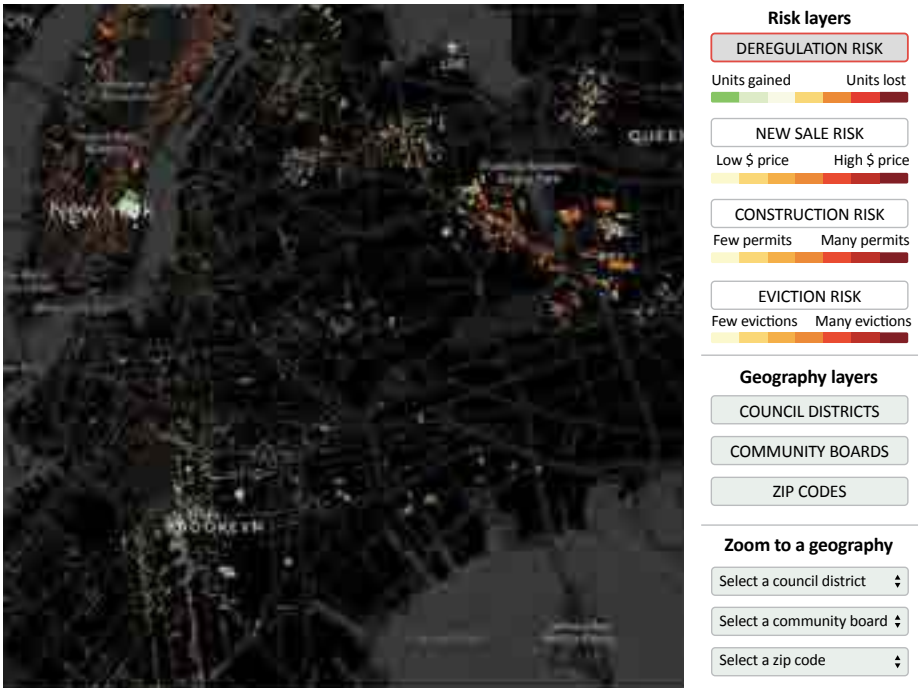
Figure 5: Los Angeles Index of Neighborhood Change



Map adapted from Bousquet (2017)

The **Displacement Alert Project** (DAP), an initiative of the Association for Neighborhood & Housing Development, maps displacement vulnerability in New York City. Drawing on abundant housing data from city agencies and nonprofits, the DAP measures displacement risk at an extremely granular level: building-by-building. Building scores are assigned based on four risk factors, such as deregulation (percentage change of rent stabilized units), new sale (high sale price indicating new owner intends to raise rent), construction (permit applications), and eviction rate.[55] The DAP map illustrates a powerful use of fine-grained data to measure housing inequality in way that is actionable for both policymakers and city residents (Figure 6).

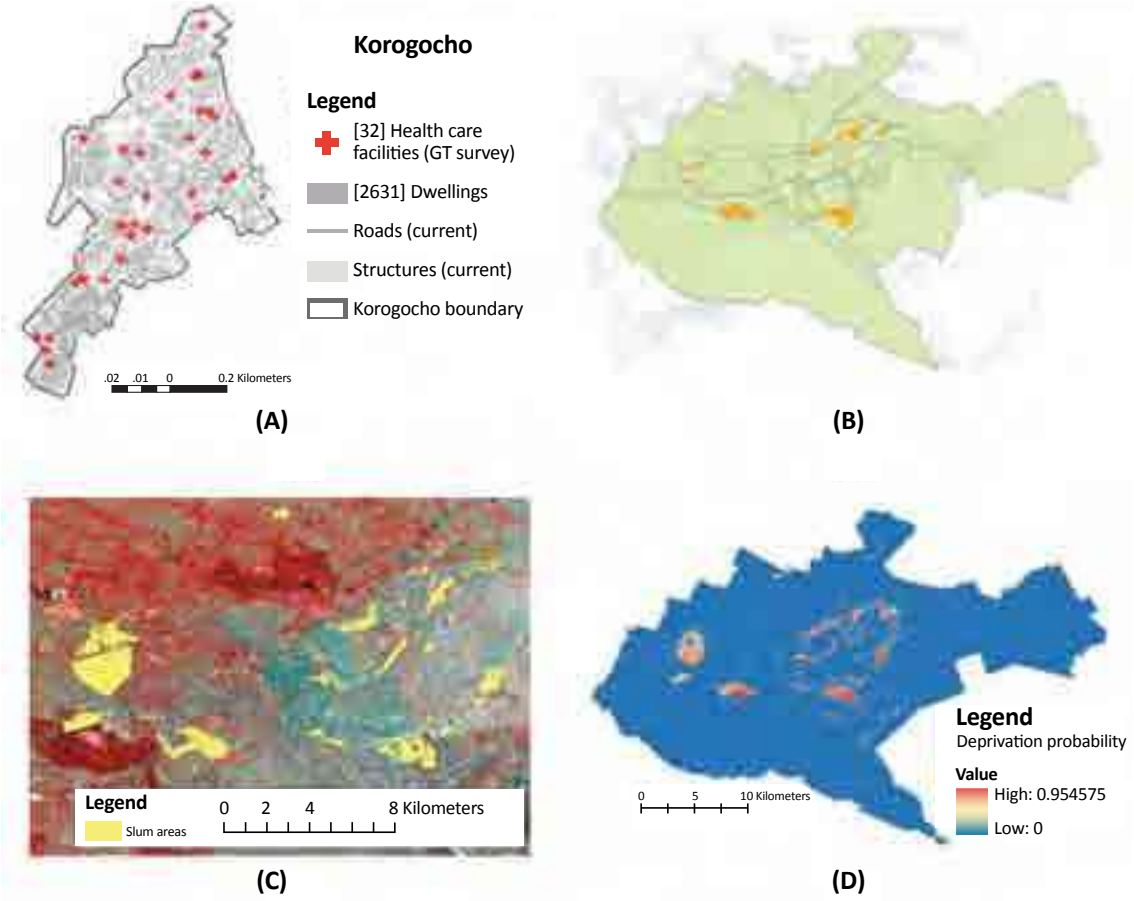
Figure 6: Displacement Alert Project Map, New York City



Source: Displacement Alert Project

Worldwide, one in four urban residents–one billion people–live in informal settlements or slums.[56] Identifying and obtaining data on conditions in and location of informal settlements is critical to effectively measuring spatial housing disparities. However, data on informal settlements, which by definition may be missed by formal censuses and other surveys, is a major gap. Emerging approaches to mapping informal settlements include the aggregation of survey and census data, community-based mapping, and the analysis of satellite or drone imagery. A recent study by Kuffer et al. outlines these approaches and offers maps using each to identify deprived areas in Nairobi (Figure 7).[57]

Figure 7: Nairobi Slum Areas Maps From – (A) Census and Survey Data; (B) Community-Based Mapping; (C) Satellite Imagery Human Analysis; (4) Machine Learning Analysis



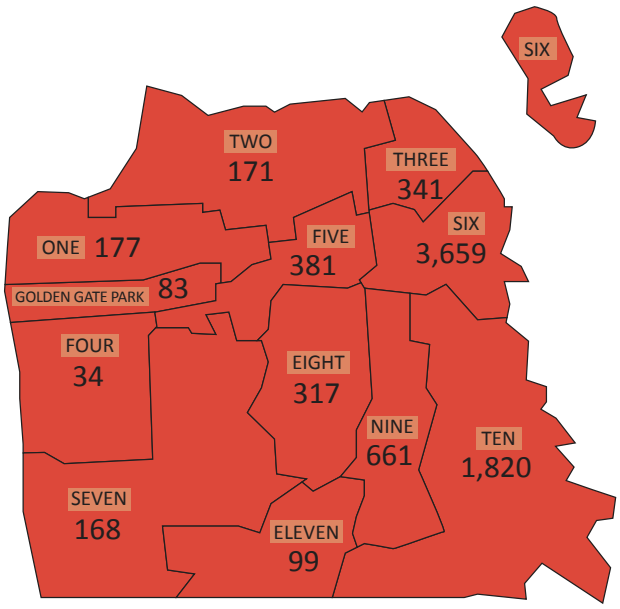
Source: Kuffer et al. (2020)

Drawing on census and survey data, researchers use the UN-Habitat "slum household" definition and classify any area as deprived in which a particular threshold (often 50 percent) of households meets the definition. An advantage of this approach is the reliance on census and survey data, as opposed to resource-intensive image analysis. A drawback is that it is possible to miss "areas within larger non-deprived areas or small remote settlements."[58]

The most extreme form of housing deprivation is homelessness. In the United States, nearly 570,000 people experience homelessness on a single night.[59] Homelessness also has an important within city dimension: prosperous cities such as San Francisco and Los Angeles have large homeless populations, and granular data at the neighborhood level enables governments and service providers to identify individuals and areas most in need.

The United States Department of Housing and Urban Development (HUD) collects data from three thousand cities and counties to produce an annual snapshot of the homeless population and demographics at the national, state, and "continuum of care" levels.[60] These levels are too large to enable analysis within cities and neighborhoods, but promising examples have emerged of municipalities using data collected for the HUD count to measure disparities within the city. San Francisco, for example, used this data to measure disparities in the homeless population between the city's eleven political sub-districts (Figure 8).[61]

Figure 8: Homeless Count, San Francisco Districts



Source: San Francisco Homeless Count & Survey (2020)

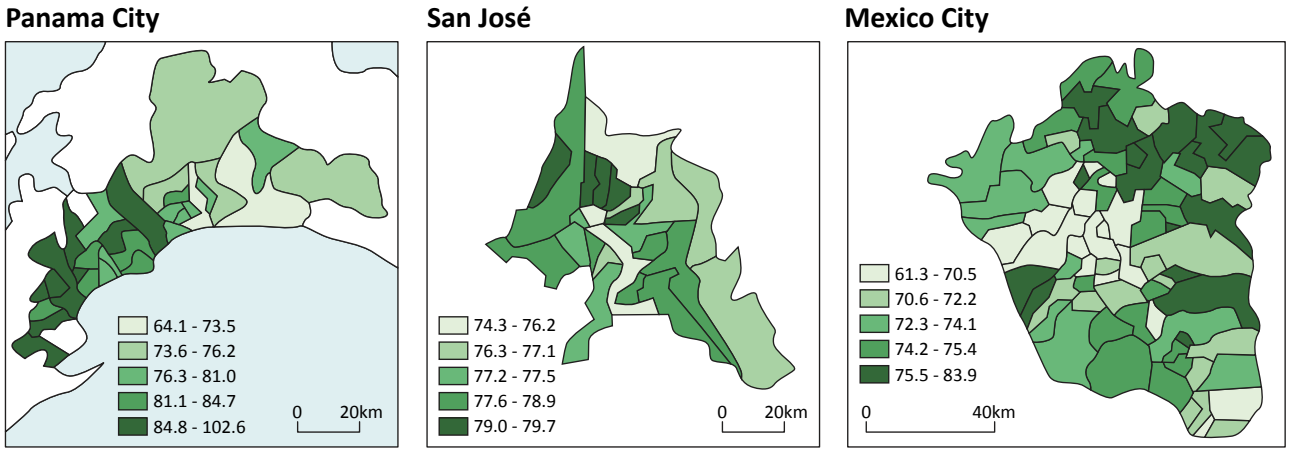
Disparities in access to basic services in areas such as water, sanitation, health, and education are an important facet of spatial inequality for urban populations. Among databases that focus on services are the World Bank's **Service Delivery Indicators (SDI)** in Africa, and the **Viet Nam Provincial Governance and Public Administration Performance Index (PAPI)**. The SDI assess performance in health and education service delivery in Kenya, Madagascar, Mozambique, Niger, Nigeria, and Senegal.[62] PAPI monitors 120 indicators for Vietnam's sixty-three provinces across dimensions such as political participation, local government transparency, public service delivery, and environmental governance, among others.[63] Both initiatives enable tracking of important service delivery data, but they are not available at the within-city level. The SDI only disaggregates its data to distinguish between urban and rural areas, for example, while PAPI uses province-level data enabling comparison between (not within) provinces.

National surveys and administrative data can yield useful insights on services. In Brazil, Haddad and Nedovic-Budic conducted a fine-grained spatial analysis of public service delivery and human development in ninety-six municipal districts within the São Paulo metropolitan area. Drawing on diverse data sources including the Ministry of Education, Bureau of Statistics, and national census, as well as data from specific governmental initiatives like the school lunch program, the study found "public investments in education and social programs are allocated differentially among the central and peripheral districts, with central districts on average benefiting more from those investments."[64]

A promising innovation measuring spatial health disparities in the United States **is the 500 Cities Project**, which tracks city and census tract-level data, obtained using small area estimation methods, for twenty-seven chronic disease measures. For the five hundred largest American cities, data on various health outcomes (arthritis, asthma, cancer, diabetes, heart disease, and mental health, among others), prevention metrics (lack of health insurance, recent visit to doctor, use of screening measures), and unhealthy behaviors (binge drinking, smoking, lack of physical activity) are provided and mapped.[65]

In Latin America, data from the **Salud Urbana en America Latina study** was used to measure inequalities in life expectancy in six large cities (Figure 9).[66] The study obtained data on population and socioeconomic indicators from national censuses, and mortality data from national registries. Large spatial differences in average life expectancy at birth were documented for Latin American cities, especially in Panama City, Santiago, and Mexico City. Higher area-level socioeconomic status was associated with higher life expectancy.

Figure 9: Spatial Distribution of Life Expectancy in Panama City, San Jose, and Mexico City



Source: Bilal et al. (2019)

In sum, there are many different initiatives to track specific aspects of well-being and opportunities in cities around the world, some using sophisticated estimation techniques but these are typically somewhat narrowly focused on particular measures and outcomes. Efforts looking at broader sets of measures typically look at differences across larger geographical areas, such as across provinces or providing rural-urban comparisons.

3.2 Composite Indices

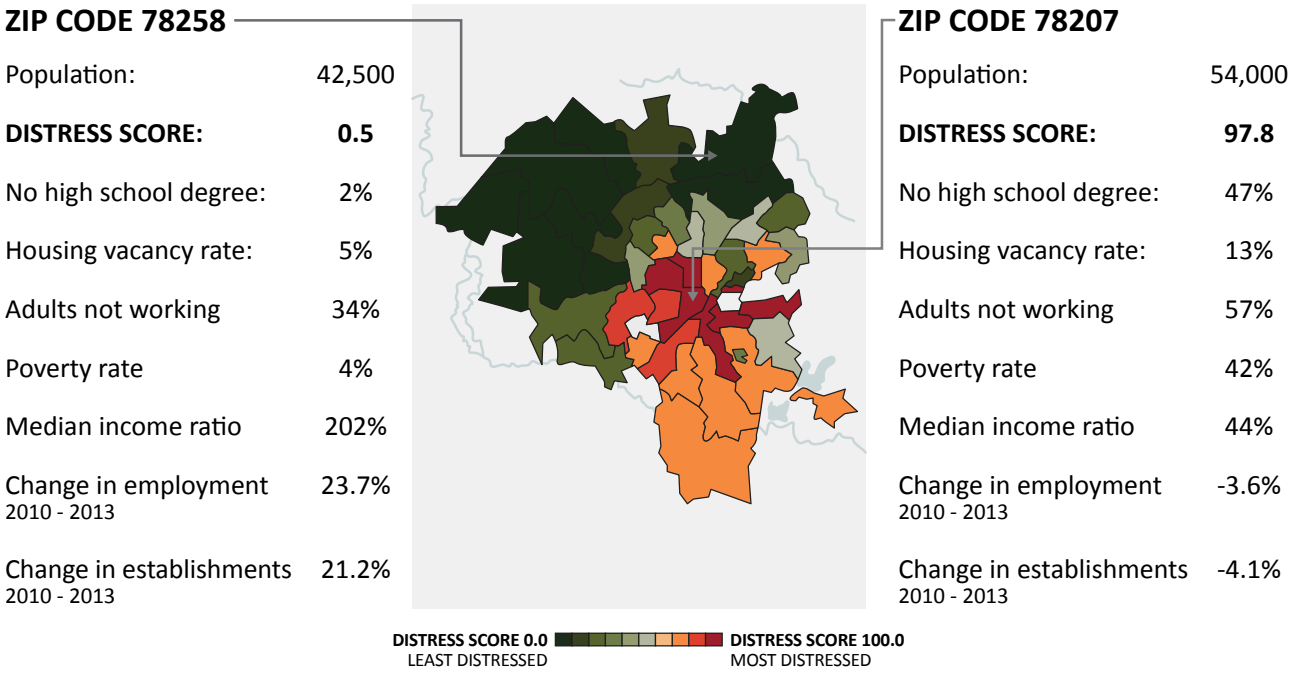
Composite indices–which aggregate multiple dimensions of an issue–have become increasingly popular since the Human Development Index was first published in 1990.

Composite indices have several advantages in bringing together multidimensional aspects that matter by providing a simple number and ranking. The results can be used to spotlight overall gains and gaps and demonstrate the feasibility of progress through comparisons with peers and neighbors. Indices can be unbundled to identify the aspects on which performance is relatively good or weak. Indices can be a tool to both inform and inspire action.

The same general advantages of a composite index apply in the context of spatial inequality – especially since we know that the challenges are multidimensional it is valuable to go beyond specific indicators to obtain a broader view.

The **Distressed Communities Index (DCI)**, which has been developed and applied to the United States at the level of postcodes, is a useful example.[67] The DCI measures seven indicators, such as the housing vacancy rate and the poverty rate, to score community economic well-being along a continuum from "distressed" to "prosperous." Figure 10 below provides an illustration of the dimensions covered.

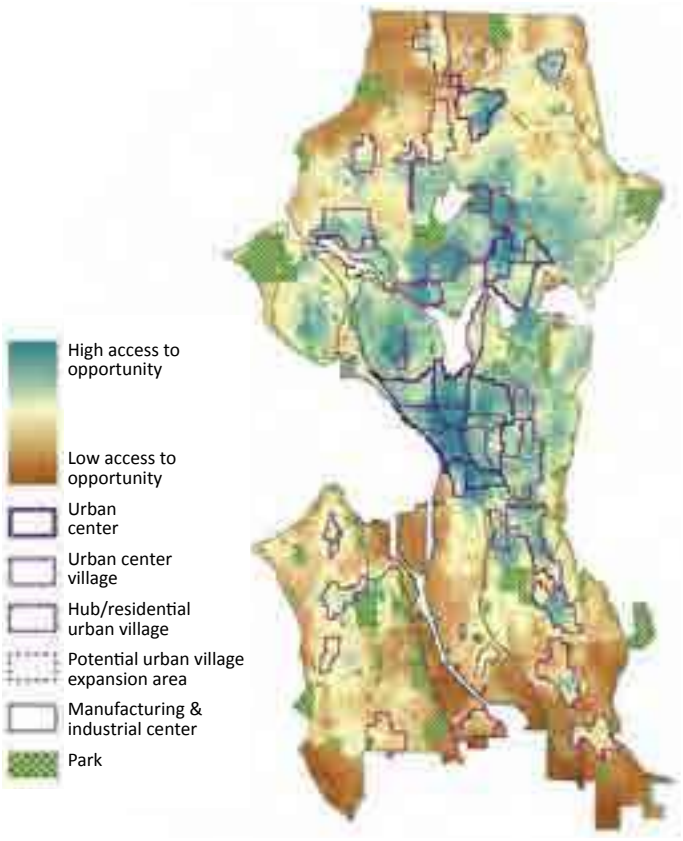
Figure 10: San Antonio's Most Distressed and Prosperous Zip Codes



Source: Distressed Communities Index

Some city governments have used administrative and survey data to measure spatial disparities in access to educational and economic opportunities. The **Access to Opportunity Index**, for example, uses data from the US census, as well as municipal agencies, to assess differences in economic opportunities across neighborhoods in Seattle. Indicators include access to jobs, as well proximity to public transit, libraries, educational facilities, and healthy food (Figure 11).[68]

Figure 11: Seattle Access to Opportunity Index



Source: Seattle Office of Planning & Community Development (2016)

A relevant example at the global level is the **City Prosperity Index (CPI)**, which was developed by UN-Habitat in 2012 to assist cities measure progress in achieving key sustainability and development goals. The CPI has been described as a major advance in the global monitoring of urban data. It assesses six dimensions: infrastructure, productivity, quality of life, equity, environmental sustainability and governance. The city's CPI is the average of a city's score along the six dimensions. A 2015 ranking of sixty cities ranged from a high CPI score of 86.76 (Oslo) to a low score of 35.68 (60).[69] The CPI thus assesses a city's aggregate performance and enables comparison with other global cities, but it does not measure spatial disparities *within* cities.

4. A New Mind-the-Gap Index – Proposed approach and pilot results

Severe inequality characterizes many cities around the world, yet few tools measure urban spatial disparities – that is, disparities between neighborhoods or other units within the city.

In light of what already exists, there does appear to be scope to develop and test a new index to capture key aspects of urban spatial inequality.

The aim is to provide a method that could be readily replicated in a range of settings, without significant data and other costs. The results should be of interest to governments at national, subnational, and local levels, as well as civil society and development partners.

While location, culture, institutional capacity as well as social and economic structures create conditions specific to every city, it is possible to develop a broad framework based on common elements designed to capture inequalities in line with both the 2030 Agenda and the New Urban Agenda.

This section outlines possible approaches to a new index, starting with guiding principles and suggesting five broad dimensions, as well as data requirements and survey and administrative sources. We then go on to present the results from pilot applications in three large cities.

4.1 Guiding Principles

The following principles could shape such an index:

- Multi-dimensional, yet simple – with minimum number of dimensions and indicators.
- Focused on inequality and relevant to policy makers – capturing both situation on the ground and policy action/inaction.
- Sufficiently flexible to apply in a diversity of urban settings.

It would be important to complement ongoing efforts, such as the CPI, which are already quite extensive. For example, the CPI has identified and tracked data to assess city performance in the aggregate, which might be tailored along the lines suggested by the MTG Index to measure within-city disparities. In addition, the initiatives of national and local governments to collect data and identify deprived areas will be critical sources of data on disparities.

We suggest five potential dimensions – and possible indicators

- **Opportunities** – income, unemployment, youth NEET (neither in employment, education or training), commuting time
- **Services** – education and health
- **Security** – crime, perceptions of safety, police or emergency service response times
- **Sustainability** – safe water, risk of flooding/ landslides
- **Voice** – electoral turnout, representativeness of govt (share of women)

Ideally, we would want to capture and overlay these indicators against **racial and ethnic disparities**.

In practice of course, what is possible is determined by data availability. For the current exercise, we were limited to existing, publicly available data that was free-of-charge.

4.2 Data requirements

Understanding spatial inequality requires reliable data estimates at neighborhood or postcode level. This should ideally be updated on a regular basis, although a one-off survey is a useful way to test.

Household and/or individual surveys gather a wide range of demographic and housing data. An example of a household/individual survey that is representative at the neighborhood level is the American Community Survey (ACS).[70]

The Demographic and Health Surveys (DHS) are household surveys covering a wide range of indicators in the areas of population, health, and nutrition. The DHS are available for a number of countries and are a popular data source for core development indicators. The DHS sample is typically representative at three levels: national level, residence level (urban-rural), and regional (province/state). Most DHS data are not representative at a level suitable for the measurement of disparities within cities, such as the district, neighborhood, or other community levels.

A small number of DHS surveys have included data representative at a district level. Examples include the 2017 Tajikistan DHS, which included a small set of representative indicators for twelve districts in Khatlon province, and the 2015-2016 Malawi DHS, which was representative at the district level for select key indicators. While more granular than typical DHS survey data, these datasets were not suitable for within-city analysis because of the characteristics of the Tajikistan and Malawi surveys.[71]

The Multiple Indicator Cluster Surveys (MICS) are household surveys developed by UNICEF to assess the well-being of children, women, and men on the dimensions of health, education, and child protection. Most MICS surveys are representative at the national level. However, some MICS surveys cover either a specific population group within a country, such as the Roma population in Serbia, or a geographic area, such as a 2015-2016 MICS survey for Dakar City in Senegal.

Administrative data can be used to track service delivery and infrastructure, including roads and schools, as well as socioeconomic indicators. National statistics bodies, such as Statistics Indonesia (BPS) and the National Institute of Statistics and Geography (INEGI) in Mexico serve as repositories and often collect and distribute data from other national and subnational governmental agencies.

Small area estimation can be used to generate data for small geographic areas or sub-populations when only national surveys are available. Techniques include Bayes estimation and “synthetic” estimation based on linear regression models.[72]

4.3 Applications in three cities

This section presents results from pilot applications of the Mind-the-Gap Index in Addis Ababa, Jakarta, and Mexico City. Major disparities were found in each city across the dimensions and indicators measured by the MTG Index.

The pilot applications also yielded insight into opportunities and challenges of using a composite index to measure urban spatial disparities, such as the need for better data at a local level. Full papers for each city describing the data and methods in greater detail are available on request.

4.3.1 Addis Ababa

Addis Ababa, Ethiopia’s capital and most populous city, is home to 25 percent of the country’s urban residents – about 4.8 million people.[73] Recent studies by the World Bank have provided a wealth of insight on poverty and the dynamics of inequality in Addis.[74] Much of Addis’s urbanization has been “informal and can be categorized as low-density, spatially fragmented, and spread out. Informal settlements, mostly with very limited access to basic services and poor living conditions, are growing, including on the periphery” of the city.[75] As elsewhere in the world, Ethiopia’s rapid urbanization has thus created challenges in terms of housing, service delivery, and informal settlements, and is associated with rising urban inequality.

Addis is subdivided into ten sub-cities and approximately 118 woredas.[76] While the kebele is the smallest administrative unit in Ethiopia, this demarcation is no longer used in Addis Ababa, where the *woreda* is the smallest administrative unit.[77] The sub-city population size averages 233,160, ranging from a high of 349,128 (Kolfe Keraniyo) to a low of 150,756 (Akaki Kaliti).[78]

For Addis Ababa, existing publicly available data allows the construction of an Index using the following dimensions and indicators:

- **Opportunities** – employment; educational attainment; poverty gap
- **Services** – education; safe sanitation
- **Housing** – overcrowding; housing quality
- **Sustainability** – clean water; waste disposal; disaster vulnerability

Available data also do not allow for the inclusion of a voice dimension within Addis Ababa.

While a wealth of data and analysis is available for Ethiopia and Addis on various fronts, data at a granular level to capture key aspects of well-being and service access within Addis is scarce.[79] The main data source for the pilot MTG Index is the 2007 Population and Housing Census of Ethiopia, as planned censuses were postponed in 2017 and 2019 due to security concerns. This is the most recent source covering employment, education, housing, and services at the within-city level (it is representative for Addis's ten sub-cities). The estimates presented here are therefore illustrative, and not intended to reveal current levels of inequality even if the patterns and challenges may still be relevant. It would be useful to update with more recent sources.

The MTG Index suggests that major disparities existed, with an index range from .225 to .731. The largest disparities emerged in the opportunities dimension, with the sub-cities Lideta and Addis Ketema falling far behind the rest of Addis Ababa in employment, tertiary education attainment, and the size of the poverty gap. Along the housing dimension, Lideta and Addis Ketema sit at the bottom of the housing dimension due to high levels of overcrowding and housing made of low quality and rudimentary material, primarily wood and mud.

It appears that disadvantages were compounded. Specifically, in Kolfe Keraniyo, Lideta, and Addis Ketema are sub-cities with poor educational and employment opportunities that also had the worst access to basic necessities such as tap water, toilets, and proper waste disposal, as well as sub-standard housing. Table 1 summarizes high and low performing sub-cities for each indicator. Results for the full pilot Index are included in Appendix I.

Table 1: Mind-the-Gap Index, Addis Ababa: Summary Statistics

	Mean	Maximum	Minimum	Standard Deviation
Employment	77.5	82.3 (Bole)	72.8 (Addis Ketema)	.027
Educational attainment	15.7	23.4 (Kirkos)	7 (Addis Ketema)	.041
Poverty gap	4.3	9.8 (Lideta)	2 (Yeka)	.022
Access to sanitation	14.4	30.4 (Bole)	7.2 (Akaki Kaliti)	.063
Education enrollment	52.1	59.1 (Kirkos)	34.3 (Addis Ketema)	.07
Overcrowding	2.5	3.19 (Addis Ketema)	2.08 (Bole)	.339
Housing quality	18.9	38 (Bole)	9.3 (Addis Ketema)	.086
Access to tap water	68.8	77 (Nefas Silk-Lafto)	55.6 (Addis Ketema)	.058
Waste disposal	71.6	89.6 (Kirkos)	57.9 (Yeka)	.115
Disaster vulnerability	10	16.7 (Kolfe Keraniyo)	5.3 (Lideta)	.034

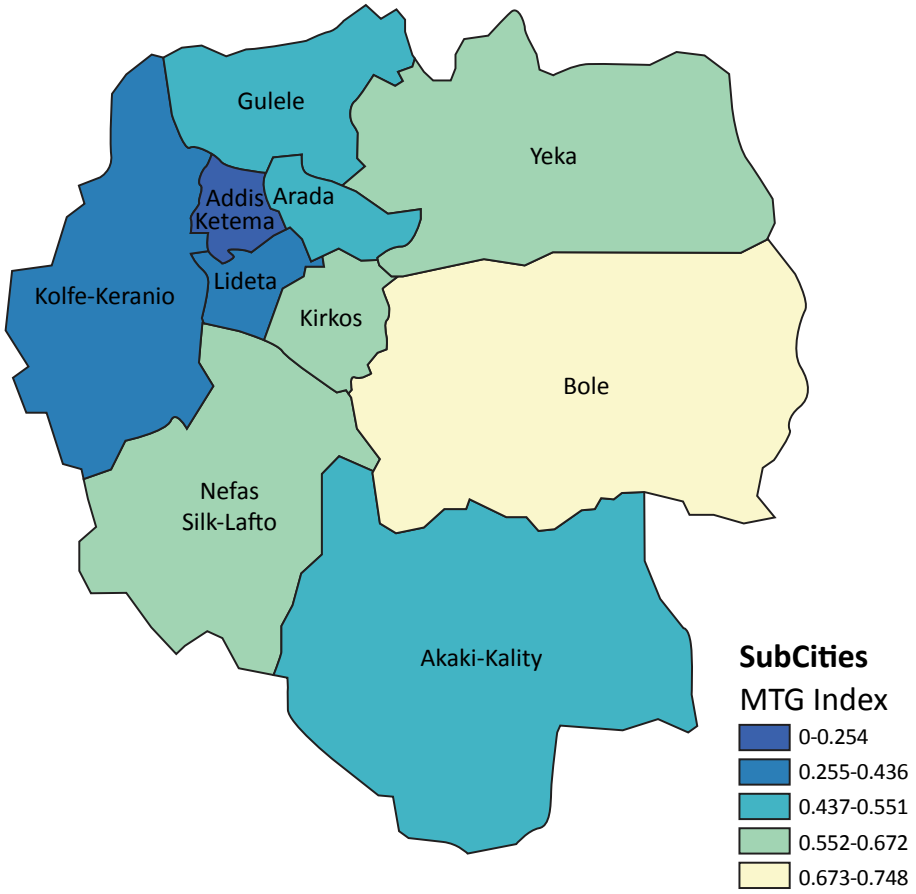
Note: Results at sub-city level.

At the high-performing end, the sub-cities Bole and Kirkos rank at or near the top of all four dimensions of the MTG Index. Bole and Kirkos outpaced the rest of Addis Ababa in opportunities and services, placing first and second in those dimensions. Moreover, Bole placed at the top of half of the dimensions and more than a third of all of all indicators that comprise the index.

At the same time, no sub-city performed consistently well across all indicators and dimensions. For example, whereas Bole placed first or second across opportunities, services, and housing, it only placed fifth in the sustainability dimension due to below average prevalence of waste disposal services.

A map showing performance of Addis's ten sub-cities on the MTG Index illustrates spatial disparities (Figure 12). High-achieving sub-cities, with higher Index scores, are lighter in color, whereas poor-performing sub-cities are dark blue. The sub-city with the lowest MTG Index score – Addis Ketema – is shown in dark blue and is located beside to two other low-scoring sub-cities in the northeast: Lideta and Kolfe-Keranio. Bole performed best overall on the MTG Index and is separated from the cluster of low-scoring sub-cities in the northeast by Nefas Silk-Lafto, Kirkos, and Yeka, which all achieved relatively "high" MTG Index scores (above .600).

Figure 12: Map of Mind-the-Gap Index Results, Addis Ababa



4.3.2 Jakarta

Jakarta, one of the world's growing megacities, is home today to nearly eleven million people.[80] It is both Indonesia's most prosperous and populous, as well as its most unequal, place. Current trends are driven less by migration from rural areas, and more by the administrative reclassification of areas from rural to urban as they become denser and gain infrastructure and amenities, as well as natural population growth in urban areas.[81] This growth has put pressure on Jakarta's infrastructure and exacerbated urban challenges, including a housing affordability crisis, substandard housing infrastructure, and neglect of the informal urban settlements known as *kampungs*.

Important earlier work by the World Bank, including a major 2019 study of Indonesia's urbanization, has identified disparities and assessed the impact of growing cities on the country's trajectory.[82] A study by Afifah drew from the 2015 Indonesian National Socioeconomic Survey (SUSENAS) to assess water and sanitation service delivery indicators for 510 districts.[83] SUSENAS's large sample size and representativeness at the district level enabled a granular level of detail in the study's findings. In several identified districts in Papua, for example, access to improved drinking water was found to be 10 percent or less.

Jakarta is the administrative equivalent of a province and has six districts (five municipalities and one regency), which are further subdivided into forty-four sub-districts. The sub-district appears to be the most salient administrative level for the analysis of spatial inequality in Indonesia's cities. It is obviously more granular than the district level, and representative data is available at the sub-district level.[84] The population size of the sub-districts in Jakarta average 243,553, with a large range – from a high of 601,651 (Cengkareng) and low of 10,101 (Kepulauan Seribu Selatan).

For Jakarta, existing publicly available data allows the construction of an Index using the following dimensions and indicators:

- **Opportunities** – slum households; poverty gap
- **Services** – health; education; public transportation
- **Sustainability** – clean water; sanitation; disaster vulnerability
- **Security** – crime; social conflict
- **Voice** – electoral turnout

The main data source for the pilot MTG Index is the 2018 Survey of Village Potential (PODES), which we drew upon for eight of eleven indicators in Jakarta, namely slum households, access to health facilities, public transportation, access to improved water, sanitation, disaster risk, crime, and social conflict. We relied largely on village level performance to create sub-district averages. We aggregated the village scores to the level of the sub-district. Household level data was used for the poverty measure.

The overall results reveal major disparities, with an Index range from .274 (in Johar Baru) to .805 (in Cipayung). Table 2 presents summary statistics, and indicators scores used to estimate the Index are presented in Appendix II.

Table 2: Mind-the-Gap Index, Jakarta: Summary Statistics

	Mean	Maximum	Minimum	Standard Deviation
Slum households	5.38	29.25 (Penjaringan)	0.00 (-)	7.37
Poverty gap	3.72	7.83 (Cilincing)	1.34 (Senen)	1.65
Health	4.60	8.50 (Grogol Petamburan)	1.38 (Pasar Rebo)	1.38
Education	18.35	22.46 (Koja)	10.59 (Kapulauan Seribu Selatan)	2.23
Public transportation	94.87	100.00 (-)	19.69 (Menteng)	16.79
Improved water	68.72	100.00 (-)	0.00 (-)	33.20
Sanitation	81.20	100.00 (-)	25.90 (Kelapa Gading)	24.13
Disaster vulnerability	40.71	100.00(-)	0.00 (-)	35.92
Crime	72.62	100.00 (-)	0.00 (-)	32.88
Social conflict	21.47	100.00 (-)	0.00 (-)	27.35

Note: Results at sub-district level.

As noted above, Jakarta is comprised of forty-four sub-districts within six municipalities. Highlights are as follows:

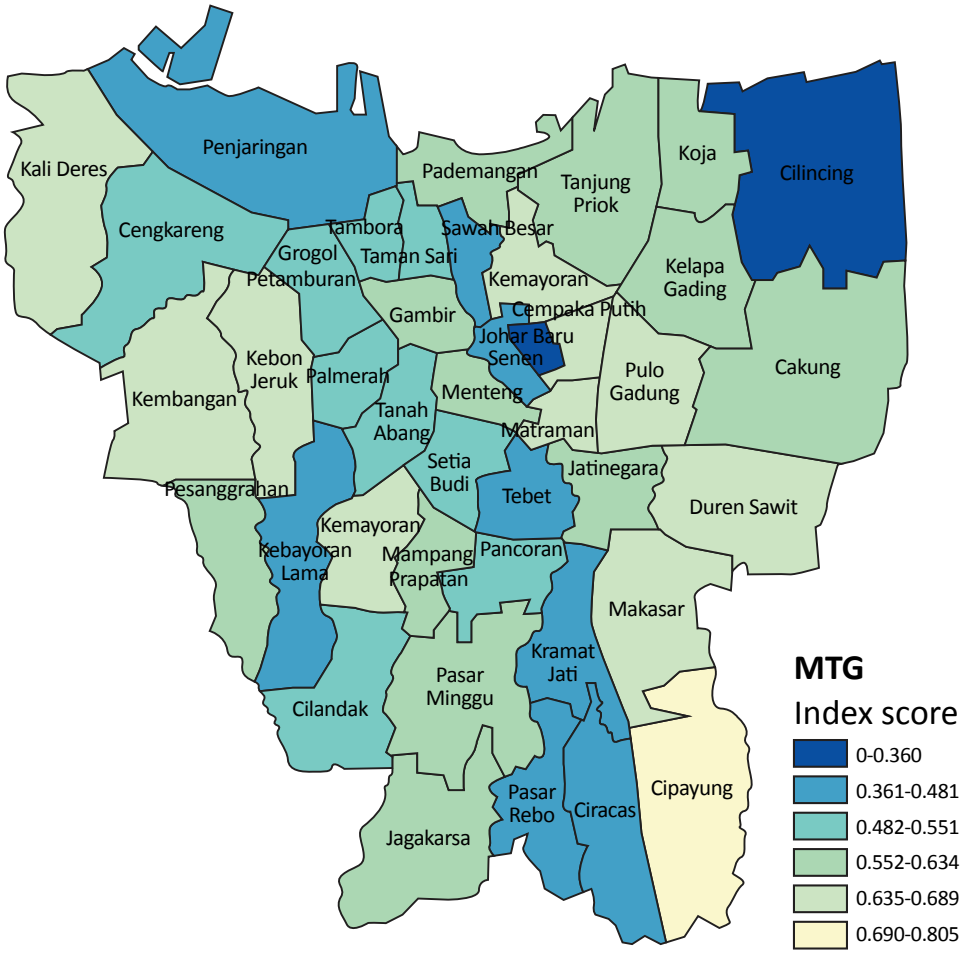
- Five of the seven lowest-performing sub-districts are in two municipalities: Jakarta Pusat and Jakarta Timur.
- Jakarta Pusat scored the lowest average among the six municipalities at .531.
- The best-performing sub-district in Jakarta Pusat, Kemayoran, only ranked 11th among Jakarta's 44 sub-districts.
- Jakarta Timur ranked second of the six municipalities with an index score of .609 – but we found large disparities at the sub-district level. Two of the six worst-performing sub-districts, Ciracas and Pasar Rebo, are located in Jakarta Timur, as well as five of the seven highest scoring sub-districts in the index, Cipayung, Makasar, Pulo Gadung, Duren Sawit, and Matraman are also in Jakarta Timur.
- Kepulauan Seribu scored the highest of Jakarta's municipalities at .682, although Kepulauan Seribu consists of only two sub-districts (Kepulauan Seribu Selatan and Kepulauan Seribu Utara).

These highlighted results, in some cases, contrast with the prevailing view of where advantage and deprivation are located. For example, Kepulauan Seribu is far from Jakarta's economic center and is commonly seen as the least urbanized of Jakarta's districts, yet it performs well overall on the MTG Index. Jakarta Pusat is home to Jakarta's economic and business center, yet it performs relatively poorly overall. We note that this may be due to the presence of especially high or low-performing sub-districts in these districts. Further, because our selection of indicators was shaped by data limitations, the results presented here are merely illustrative. It is possible that with data for additional key indicators the average performance of Kepulauan Seribu and Jakarta Pusat would more closely reflect what we would expect.

Disparities in housing were especially great: in the five lowest-scoring sub-districts (Cilincing, Penjaringan, Grogol Petamburan, Taman Sari, and Tebet) around one in five families live in slum housing with Penjaringan and Cilincing approaching 30 percent. This underlines the importance of addressing housing issues in any strategy to tackle inequality.

A map showing performance of the forty-four sub-districts of Jakarta on the MTG Index is illuminating (Figure 13). High-achieving sub-districts, with higher Index scores, are lighter in color, whereas poor-performing sub-districts are darker. Sub-districts with the lowest MTG Index scores – Johar Baru and Cilincing – are shown in dark blue. The map demonstrates how pockets of relative advantage and deprivation exist throughout Jakarta, often in close proximity.

Figure 13: Map of Mind Gap Index Results, Jakarta



4.3.3 Mexico City

With more than 21 million people residing in its metropolitan area, Mexico City is one of the world's largest cities.[85] In recent decades, urban development in Mexico City has mostly followed patterns of low density and scattering.[86] Stark disparities in wealth, opportunities, and access to services both shape and result from this pattern of development, including an urban footprint that has expanded at a much faster rate than the population. Research by the World Bank has illuminated how urbanization shapes well-being on a multiplicity of fronts.[87] Housing has been outpaced by demand and high prices in central areas have pushed low-income residents to the periphery of the city and/or to illegally occupy land, often within informal settlements that are not supplied with access to basic services and efficient transportation options. Neza-Chalco-Itza in Mexico City's eastern outskirts, is one of the world's largest slums, with around 4 million residents.[88]

Mexico City is officially one of the thirty-two states of the country, and is divided into sixteen alcaldías or delegations, the equivalent of municipalities. Together, Mexico City, fifty-nine municipalities from the adjacent State of Mexico, and one from the State of Hidalgo, comprise the metropolitan area of the valley of Mexico (ZMVM).

For Mexico City, existing publicly available data allows the construction of an Index using the following dimensions and indicators:

- **Opportunities** – employment; education level; internet access
- **Services** – health; social security
- **Housing** – overcrowding; access to toilet
- **Sustainability** – access to drainage; improved water

Our selection of indicators was shaped by data availability. The main data source for the pilot MTG Index is the 2010 Census, which enables insights into disparities within the city and is representative at the locality level. While more recent data is available at the municipality level, the average population size is quite large -- averaging about 553,913, and ranging as high as 1,815,786 in Iztapalapa, and would not capture disparities at the most local level.

The 2010 Census covers 548 localities, however due to either missing or incomplete information, localities under 25 households have been dropped from the MTG Index dataset. The pilot MTG Index includes 149 localities across Mexico City's sixteen municipalities. Locality population size averages for the 149 localities measured is 59,317.5, with high of 1,815,786 (Iztapalapa) and low of 79 in (Los Tlapancos).

The overall results reveal MTG Index suggests that major disparities exist, with an index range from .245 in Ejidos de San Andrés Totoltepec, located in Tlalpan, to .879 in Benito Juárez. Table 2 presents summary statistics and the full Index is included in Appendix III. A map is not included because we could not find a map displaying current boundary locations for the 149 localities included in the pilot MTG Index.

Table 3: Mind-the-Gap Index, Mexico City: Summary Statistics

	Mean	Maximum	Minimum	Standard Deviation
Employment rate	95.6	100 (-)	74 (Avenida el Cerro)	1.3
Average adult education level	7.9	13.5 (Benito Juárez)	6.1 (Carretera a Santa Ana)	0.9
Access to internet	11.7	68.8 (Benito Juárez)	0 (-)	13.3
Overcrowding	1.4	2.4 (Tipipili)	0.6 (Benito Juárez)	.3
Access to toilets	96.3	100 (-)	65.8 (Texacatipac)	4.7
Access to drainage	95.2	100 (-)	59.4 (Tlaltepec)	7.3
Improved water	45.3	100 (Paraje Atocle)	0 (-)	41.2
Access to health insurance	53.7	98.8 (Tlatzala)	12.5 (Ejidos de San Andrés Totoltepec)	15.8
Access to social security	45.1	89.5 (Tlatzala)	12.2 (Ejidos de San Andrés Totoltepec)	14.5

Note: Results at locality level.

Across the pilot MTG Index's 149 localities, the highlights are as follows:

Outside of El Paraíso (Mecoxtla) in Tláhuac, the thirty bottom localities were in three municipalities: Tlalpan, Milpa Alta, and Xochimilco. Among those thirty localities, eleven were within Tlalpan, ten in Milpa Alta, and eight in Xochimilco.

- Overall, not weighting for each individual locality's population, Tlalpan scored the lowest average among the sixteen municipalities at .490.
- Benito Juárez scored the highest of Mexico City's municipalities at .879, although these results may be skewed as Benito Juárez does not contain multiple localities.

When aggregating localities' index scores at their respective municipality levels while incorporating per capita income data from UNDP's Municipal Human Development Report 2010-2015, some interesting trends emerge.

- The top end of the distribution is uniform: Benito Juárez and Miguel Hidalgo score first, second, and third respectively in both the MTG Index ranking and in terms of per capita income.
- Five of the top six municipalities are the same in both the MTG Index and per capita income (albeit some reshuffling in rankings amongst Coyoacán, Cuauhtémoc, and Iztacalco. Azcapotzalco is the only municipality that does not place in the top six in both categories).
- The largest divergence exists with Tlalpan, which places last amongst municipalities in regards to MTG Index score, but places more in middle of the distribution (10th) in regards to per capita income.

The widest disparities within the MTG Index results emerged in the services dimension: access to health care ranged from 99% in Tlatzala (Cuayuca) to as low as 12.5% in Ejidos de San Andrés Totoltepec. Similarly, access to social security ranged from 89.5% in Tlatzala (Cuayuca) to 12.2% in Ejidos de San Andrés Totoltepec. Overall, there was a strong correlation between access to health care and access to social security across the 149 localities.

Rates of employment are high across all of Mexico City. Fifteen localities had full employment. All but ten localities exceeded 90%, and only one, Avenida el Cerro, was below 80%. However, employment may not be a good indicator for overall prosperity – especially since the quality of work and pay are not taken into account. It is notable that the fifteen localities reporting below average years for adult education and are also among the lowest with access to the Internet.

Access to drainage was ubiquitous across the localities of Mexico City. Thirty-six localities report universal access to drainage, and 115 of 149 localities had at least 90% access to drainage. In all localities, access to drainage exceeded 50% with the worst-performing locality, Tlaltepec, reporting 59%. Access to water (individuals who are supplied with water in their residents for personal and domestic consumption) is much less ubiquitous with thirty-nine localities lacking access to water within households.

Similar to drainage, access to toilets was relatively common within Mexico City with thirty-three localities having full access and all but ten localities having at least 90% access. While only one locality failed to exceed 80% (Texacatipac), the seven lowest localities were in Milpa Alta and Tlalpan. Overcrowding, at the top end of the distribution, was found to be related with overall MTG score where nine of the top ten localities with the lowest levels of overcrowding placed in the top ten of the overall MTG Index.

5. Lessons Learned and Emerging Conclusions

Addressing inequality within cities has emerged as a major threat to sustainable development. There is much evidence of deep spatial inequality in cities, often associated with high rates of congestion, crime, pollution and social exclusion. Yet when well-managed, cities can bring new opportunities and growing prosperity. Urbanization can reduce inequality through expanding economic activity, access to better education and health services, and innovation. Whether the process of urbanization is well-managed, or fuels growing divides, will largely determine the future of inequality.

The international community has recognized the challenge of urban inequality as central to the global sustainable development agenda. Sustainable Development Goal 11, which calls for resilient, inclusive, and sustainable cities, implicitly requires that more be done to address the glaring social and economic disparities within cities. Similarly, the New Urban Agenda, adopted in 2016 at the United Nations Conference on Housing and Sustainable Urban Development (Habitat III) in Quito, Ecuador, reaffirms the global commitment to a "vision of cities for all."[89]

By tracking multiple dimensions of well-being across indicators and granular geographic units, the MTG Index underlines key facets of urban inequality:

- *Advantage and deprivation exist side-by-side.* In today's cities, wealth and infrastructure often coexist alongside pockets of deprivation. In Jakarta, for example, the two worst-performing sub-districts – Ciracas and Pasar Rebo – are located in Jakarta Timur, in proximity to high-performing sub-districts such as Cipayung, Makasar, Pulo Gadung, Duren Sawit, and Matraman.
- *High-performing areas still have deprivations.* Although deprivations tend to cluster, even relatively prosperous areas experience challenges which are surfaced through the data. In Addis Ababa, no sub-city performed consistently well across all indicators and dimensions. For example, whereas Bole places well - first or second - across opportunities, services, and housing, it places fifth in the sustainability dimension due to below average prevalence of waste disposal services.
- *Policymakers must identify priority challenges.* Key challenges vary from city to city and neighborhood to neighborhood. In Mexico City, the largest disparities were found in the services dimension (access to health care, for example, ranged from 99% in Tlatzala to as low as 12.5% in Ejidos de San Andrés Totoltepec). In Jakarta, the greatest disparities between sub-districts were found within the housing dimension. This underlines the need to tailor policy solutions where deprivation is greatest.

The pilot versions of the MTG Index in Addis Ababa, Jakarta, and Mexico City highlight the promise of spatial analysis as a tool to monitor and respond to inequality in global cities. The process of designing and obtaining data for them also underscores both opportunities and challenges associated with spatial analysis, especially the need for better data at a local level.

An advantage of the proposed approach is the reliance on census and survey data, as opposed to resource-intensive image analysis. A drawback is that it is possible to miss "small deprived areas within larger non-deprived areas or small remote settlements."[90]

The MTG Index is also flexible: depending on data availability and which policy issues are salient in a particular urban setting, different indicators can be "swapped" into the five suggested dimensions.

Data constraints determine the scope of spatial analysis. Data availability for each city was obviously varied, which shaped – and limited – each pilot Index:

- In Addis Ababa, the main data source was the 2007 Population and Housing Census of Ethiopia. While this is the most recent source covering employment, education, housing, and services at the within-city level, it is dated. More recent planned censuses were postponed in 2017 and 2019. Further, the 2007 Census is only representative for each of Addis's ten sub-cities – making Addis the least granular of the three pilot MTG Indices.

- In Jakarta, we used the Survey of Village Potential (PODES) – an administrative survey representative at both the village and sub-district levels, enabling relatively granular analysis. This enabled us to measure and compare disparities between Jakarta's forty-four sub-districts. The topical scope of PODES data, however, was more limited than household surveys such as Indonesia's National Socioeconomic Survey, which collects data for a broad array of social and economic categories.
- In Mexico City, as in Addis, we relied on the national census to obtain sufficiently local data. Mexico's 2010 census is representative at the locality level. Unfortunately, due to missing information in the 2010 census dataset, we were able to include only 149 of Mexico City's localities.

In all cases, construction of the MTG Index using more recent and complete data would enable a more accurate and current picture of spatial disparities.

The three pilot MTG Indices thus highlight the following gaps and challenges:

- *Across dimensions, more local data is needed.* Effective measurement of disparities in cities will require improved data for local spatial units. International institutions and partner governments should build capacity to collect and disseminate representative local data for our proposed dimensions - opportunities, services, security, sustainability, and voice.
- *Future efforts should enhance data comparability.* The pilot MTG Indices utilize different indicators in each city due to differences in data availability. Data collecting organizations should coordinate to develop standardized sub-national and local indicators to enable precise comparison of data between different cities.
- *Develop both household surveys and administrative sources.* Composite indices measuring prosperity and well-being often use household surveys as a primary data source. However, household surveys may be too costly and time-intensive to carry out on a frequent basis at a local level. Administrative surveys are less costly, but more limited in providing insight on household behavior. Both are potentially valuable data sources that should be implemented at a local level to aid initiatives to measure spatial inequality.

Lack of data to assess disparities in voice – political participation and access to government – was an especially notable challenge. Voice is a critical dimension of well-being because it underlies the ability of ordinary people to secure needed reforms and essential goods.[91] Suitable data to measure voice at a local level was only identified in the case of one pilot MTG city (Jakarta), and even in this case our indicator, electoral turnout in the provincial election, only roughly proxies' access to government and political participation. Better metrics of voice at a local level are needed.

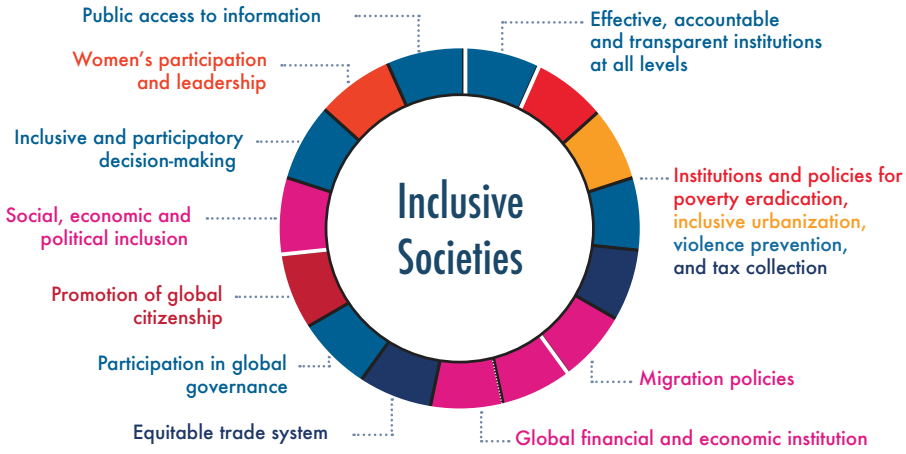
Along the services dimension, we also found limited data on emergency response times of police, fire departments, and paramedics, which would have been a particularly useful metric to gauge how place shapes well-being. Similarly, youth NEET (neither in employment, education, or training) is highly illuminating regarding access to opportunity and the labor market, but data at a local level to capture this indicator was not found in the three pilot countries.

The MTG Index should complement existing efforts to measure spatial inequality detailed in this report. UN-Habitat's Global Urban Observatories and the City Prosperity Initiative, for example, are highly promising projects focused on addressing urban disparities.

Data collection and analysis will require the cooperation of national, state/provincial and local governments and national statistical offices. Local actors, including civil society, non-governmental organizations, service providers and public institutions need to be resourced and empowered to participate in both generating and sharing data.

Since the Quito Declaration's adoption, many urban challenges have intensified and spatial inequality and segregation, as shown by the COVID-19 pandemic, continue "to have an impact on peoples' lives in most of the world's cities, producing a dramatic concentration of disadvantages in specific places and for specific people."[92] A focus by governments – at the national and local levels – on spatial disparities will help to ensure that urbanization's enormous benefits to prosperity, inclusivity, and livability are enjoyed more equitably by future generations of urban residents.

The Grand Challenge on Inequality and Exclusion is an initiative of the Pathfinders for Peaceful, Just and Inclusive Societies



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Appendix I. Addis Ababa: MTG Index Ranking, Dimensions and Indicators

			Opportunities			Services		Housing		Sustainability		
Rank	Sub-City	Index value	Employment	Educational attainment	Poverty gap	Access to sanitation	Education enrollment	Overcrowding	Housing quality	Access to tap	Waste disposal	Disaster Vulnerability
1	Bole	.748	82.3	17.4	3.4	30.4	49	2.08	38	72	65.7	9
2	Kirkos	.672	78.8	23.5	3.3	17.9	59.1	2.48	20.3	73.2	89.6	11.6
3	Nefas Silk Lafto	.639	79	14.3	3.8	17.5	51.9	2.17	30.1	77	65.7	11.5
4	Yeka	.605	76.6	19.3	2	12.7	57	2.2	14.8	71.6	57.9	6.8
5	Arada	.551	75.8	16.4	3.3	16.1	58.6	2.84	14.9	68.5	86.7	13.7
6	Gulele	.548	79.2	16.9	3.2	9.9	51.2	2.34	10.5	73.1	70.4	9
7	Akaki Kaliti	.524	79.7	13.5	3.8	7.2	58	2.5	16	65.3	59.7	7.3
8	Kolfe Keranio	.436	76.5	15	5.3	11.3	49.6	2.39	20.4	65.1	59.1	16.7
9	Lideta	.399	73.8	12.9	9.8	10.6	51	2.87	13.2	65.9	83.8	5.3
10	Addis Ketema	.254	72.8	7	5.3	10.2	34.3	3.19	9.3	55.6	79.9	9

Appendix II. Jakarta: MTG Index Ranking, Dimensions and Indicators

			Opportunities		Services			Sustainability			Security		Voice
Rank	Kecamatan	Index value	Slum Households	Poverty gap	Health	Education	Public transportation	Improved Water	Trash Shelter	Disaster vulnerability	Crime	Social conflict	Electoral turnout
1	Cipayung	0.805	0.02	1.35	4.55	17.33	89.42	100	89.86	0	15.40	0	80.13
2	Kepulauan Seribu Selatan	0.740	2.44	7	4.95	10.59	100	23.92	100	0	23.92	0	81.71
3	Kembangan	0.689	0.00	2.04	2.75	20.38	100	80.45	74.51	9.44	25.03	0	77.71
4	Makasar	0.685	3.84	2.7	4.33	17.80	100	87.57	100	100	37.26	34.11	81.41
5	Pulo Gadung	0.678	4.81	2.6	5.94	16.34	100	71.37	69.60	28.63	60.51	26.74	79.90
6	Duren Sawit	0.677	2.61	3	7.27	19.60	100	60.25	100	59.25	100	0	81.52
7	Matraman	0.675	2.33	2.42	6.47	20.44	100	100	100	11.04	100	0	78.12
8	Cempaka Putih	0.674	0.14	2.99	3.73	18.64	100	100	100	0	100	0	78.70
9	Kali Deres	0.668	0.67	7.21	3.67	18.79	100	47.09	100	75.92	38.15	0	84.38
10	Kemayoran	0.659	4.98	5.5	3.81	19.84	100	88.04	100	25.29	25.29	13.33	78.33
11	Kebon Jeruk	0.642	0.15	3.85	4.10	18.12	100	100	76.74	11.40	100	8.80	78.94
12	Jagakarsa	0.634	0.00	4.11	2.84	18.48	100	66.00	79.42	68.13	65.57	0	79.87
13	Kepulauan Seribu Utara	0.624	0.00	7.31	7.12	17.65	100	0	100	0	87.14	0	79.43
14	Koja	0.620	3.26	5.11	4.74	22.46	100	100	100	100	44.52	22.68	79.43
15	Jatinegara	0.619	9.56	3.5	5.93	20.30	100	47.81	90.50	26.32	71.08	40.09	80.96
16	Gambir	0.617	6.77	3.84	8.02	20.78	100	96.83	100	0	68.75	18.94	75.19
17	Cakung	0.615	0.57	2.81	3.90	21.84	100	61.55	100	19.79	100	0	77.85
18	Kelapa Gading	0.606	3.74	2.44	6.56	14.02	100	100	25.90	100	100	0	80.91
19	Pesanggrahan	0.606	0.24	3.42	6.81	21.79	100	100	76.60	27.17	100	0	76.08
20	Menteng	0.604	9.05	2.37	5.84	17.36	19.69	73.72	100	0	8.13	0	75.26
21	Tanjung Priok	0.596	2.38	6.31	4.99	19.03	100	100	100	89.99	100	0	79.19
22	Pademangan	0.591	9.82	2.03	3.87	18.38	100	100	100	100	100	0	77.44

23	Mampang Prapatan	0.588	2.34	3.85	4.21	16.55	100	100	38.95	78.57	100	0	79.44
24	Pasar Minggu	0.573	1.21	3.2	3.69	18.07	100	0	100	90.64	10.79	0	75.73
25	Kebayoran Baru	0.568	3.47	3.26	5.90	16.68	100	20.30	100	57.23	53.61	0	74.10
26	Tambora	0.551	5.14	3.6	3.56	18.87	100	93.23	42.82	14.51	57.74	51.60	76.26
27	Palmerah	0.546	6.56	4.17	6.62	19.55	100	57.28	55.48	0	100	0	75.07
28	Pancoran	0.529	0.00	2.1	4.63	19.16	100	55.57	27.42	63.43	100	14.28	78.52
29	Setia Budi	0.522	3.97	2.01	3.65	16.88	29.15	95.31	100	0	0	0	72.21
30	Tanah Abang	0.512	3.90	1.86	3.85	17.11	89.98	85.76	44.44	33.94	100	37.30	75.77
31	Cilandak	0.511	0.00	1.5	3.85	15.23	100	19.37	61.39	52.28	76.48	28.76	74.56
32	Cengkareng	0.505	2.52	5.74	2.14	20.77	100	100	100	88.15	100	44.86	79.32
33	Taman Sari	0.493	20.52	3.87	3.45	15.53	100	53.74	63.86	14.10	94.01	19.93	75.61
34	Grogol Petamburan	0.489	23.67	3.98	8.50	20.52	100	84.69	100	35.06	100	43.53	76.40
35	Tebet	0.481	19.26	3.78	5.53	18.70	87.53	29.92	35.13	60.72	65.64	17.45	78.56
36	Penjaringan	0.466	29.25	6.11	3.66	17.03	100	100	100	100	67.36	0	78.50
37	Kramat Jati	0.463	1.45	3.5	2.63	17.93	100	25.22	73.13	51.46	100	66.05	79.65
38	Senen	0.457	8.32	1.34	6.02	14.51	100	25.23	100	0	85.35	73.66	73.07
39	Ciracas	0.450	0.07	4.43	3.43	19.76	100	0	35.27	0	100	59.44	79.23
40	Sawah Besar	0.448	5.36	2.77	3.46	17.17	58.42	100	100	11.19	100	74.79	76.90
41	Kebayoran Lama	0.445	1.43	2.75	4.76	18.58	100	51.82	51.33	33.21	100	49.00	73.89
42	Pasar Rebo	0.420	0.65	3.15	1.38	18.55	100	21.80	78.20	22.61	100	85.94	82.74
43	Cilincing	0.360	28.24	7.83	2.17	19.35	100	100	100	100	13.57	13.57	77.96
44	Johar Baru	0.274	2.01	4.81	3.32	20.94	100	100	82.27	31.70	100	100	78.46

Appendix III. Mexico City: MTG Index Ranking, Dimensions and Indicators

			Opportunities			Housing		Sustainability		Services	
Rank	Locality	Index Value	Employment Rate	Average Adult Education Level	Access to Internet	Average person per room	Access to toilet	Access to drainage	Access to safe water	Access to health care	Access to social security
1	Benito Juárez	0.879	96.0%	13.52	68.8%	0.60	98.7%	99.9%	99.9%	73.5%	57.4%
2	Miguel Hidalgo	0.836	96.2%	11.88	55.4%	0.70	98.9%	99.9%	99.2%	74.5%	54.0%
3	Coyoacán	0.823	94.8%	11.66	52.5%	0.76	98.7%	99.8%	99.7%	69.1%	59.4%
4	Azcapotzalco	0.814	94.6%	10.80	41.5%	0.84	99.0%	99.9%	99.5%	74.5%	66.8%
5	Cuauhtémoc	0.802	95.7%	11.32	44.7%	0.78	98.2%	99.9%	99.8%	66.6%	57.5%
6	Álvaro Obregón	0.790	95.6%	10.38	42.4%	0.87	98.6%	99.9%	98.8%	69.4%	59.5%
7	Iztacalco	0.783	95.0%	10.50	37.7%	0.88	99.1%	99.9%	99.8%	66.7%	61.0%
8	Cuajimalpa de Morelos	0.778	96.2%	10.42	47.0%	0.86	98.9%	99.6%	97.4%	68.4%	49.4%
9	Gustavo A. Madero	0.778	94.6%	10.23	33.3%	0.89	99.2%	99.9%	99.4%	68.8%	63.1%
10	Venustiano Carranza	0.777	94.9%	10.53	36.0%	1.52	93.9%	90.9%	84.8%	60.5%	41.0%
11	Tlalpan	0.762	95.2%	10.97	46.4%	1.30	92.0%	92.0%	4.0%	60.7%	57.1%
12	La Magdalena Contreras	0.762	95.4%	9.94	36.2%	0.92	98.9%	99.7%	95.7%	66.4%	57.6%
13	Paraje Atocle	0.759	96.4%	10.67	42.5%	1.74	100.0%	100.0%	0.0%	44.6%	33.7%
14	La Venta	0.742	98.7%	8.78	30.1%	1.11	98.4%	100.0%	98.4%	62.7%	62.3%
15	San Lorenzo Acopilco	0.733	96.7%	9.17	23.9%	1.52	94.6%	94.0%	44.2%	31.2%	29.9%
16	Iztapalapa	0.732	94.9%	9.61	28.2%	1.00	99.3%	99.8%	98.6%	61.2%	55.8%
17	Tláhuac	0.729	95.5%	9.76	27.5%	1.26	94.3%	97.1%	0.0%	82.3%	70.5%
18	Xochimilco	0.715	95.2%	10.19	32.2%	1.11	98.7%	97.5%	95.9%	43.6%	39.1%
19	San Bartolomé Xicomulco	0.709	93.6%	9.55	15.9%	1.49	96.4%	98.2%	5.4%	46.8%	44.4%
20	Xaluis (Ixtahuaca)	0.705	100.0%	8.85	7.9%	1.98	100.0%	93.1%	24.1%	38.0%	36.4%
21	Santa Ana Tlacotenco	0.703	97.7%	8.99	12.7%	1.05	98.5%	97.6%	94.7%	50.1%	48.4%
22	Santa Catarina Yecahuitzotl	0.702	95.2%	9.26	22.9%	1.14	99.0%	99.3%	93.4%	38.1%	35.5%
23	San Juan Ixtayopan	0.701	95.6%	9.41	24.6%	1.12	96.6%	97.0%	95.0%	47.8%	42.4%
24	Paraje Xometitla	0.693	96.0%	10.22	19.2%	1.51	100.0%	78.4%	5.3%	35.8%	35.6%
25	San Antonio Tecómitl	0.691	95.1%	9.55	23.4%	1.60	92.9%	92.6%	0.0%	61.6%	60.7%
26	Maxulco (Barrio Cruztitla)	0.690	95.9%	9.30	24.7%	1.24	97.3%	97.3%	45.2%	76.5%	71.9%
27	San Andrés Mixquic	0.683	97.7%	9.46	17.2%	1.16	94.4%	92.6%	76.9%	48.4%	46.6%
28	San Nicolás Tetelco	0.676	95.5%	9.04	13.2%	1.13	97.2%	85.0%	77.9%	51.6%	35.1%
29	Santa Catarina (Piedra Blanca)	0.675	98.0%	10.74	35.3%	1.13	96.4%	99.2%	84.2%	60.6%	54.1%
30	San Pablo Oztotepec	0.672	93.9%	9.33	16.0%	1.16	98.8%	97.8%	47.6%	50.3%	42.4%
31	Atoctienco	0.663	98.3%	8.55	0.0%	1.21	100.0%	100.0%	93.1%	64.8%	50.0%
32	San Nicolás Tetelco	0.658	95.7%	9.69	19.7%	1.55	80.8%	80.0%	88.5%	27.7%	26.9%
33	Conzontlicpa	0.654	96.0%	8.01	12.9%	1.43	100.0%	100.0%	87.1%	70.1%	46.5%
34	San Salvador Cuauhtenco	0.642	94.0%	9.06	16.5%	1.11	97.6%	99.2%	98.4%	51.2%	46.9%

35	Villa Milpa Alta	0.642	97.9%	9.25	17.8%	1.67	100.0%	85.0%	0.0%	98.8%	89.5%
36	Cuacuahotlipa	0.639	96.7%	7.30	2.3%	1.57	95.6%	95.6%	88.9%	73.6%	73.0%
37	San Francisco Tecoxpa	0.639	96.3%	9.08	15.4%	1.12	99.3%	97.4%	96.7%	55.7%	46.5%
38	Atoctenco (Tlalaxco)	0.635	97.8%	9.26	6.0%	1.24	98.8%	98.8%	82.1%	57.3%	39.5%
39	Hueycotzingo	0.629	94.4%	7.59	0.0%	1.60	100.0%	100.0%	92.0%	70.7%	59.6%
40	Ampliación San Miguel	0.628	97.5%	8.10	9.1%	1.55	100.0%	100.0%	75.0%	63.7%	46.6%
41	Prolongación Niños Héroes	0.623	97.2%	7.99	9.2%	1.56	88.7%	85.2%	0.0%	38.1%	38.1%
42	Cruz Blanca	0.619	97.4%	7.69	11.0%	1.49	92.7%	97.1%	92.6%	57.8%	53.0%
43	Tlaltepetla (Tehuistitla)	0.616	100.0%	8.00	11.5%	1.00	98.9%	99.7%	98.1%	59.8%	54.9%
44	Kilómetro 30	0.615	98.1%	8.88	19.4%	0.98	100.0%	96.8%	0.0%	69.4%	60.7%
45	Los Pinos	0.614	100.0%	7.31	3.4%	1.36	100.0%	100.0%	3.1%	84.7%	81.5%
46	Cuauhtlamila	0.611	93.5%	8.28	14.1%	1.16	98.7%	96.2%	34.6%	64.7%	60.1%
47	Tecacalango	0.608	96.0%	9.14	24.2%	1.03	99.2%	99.2%	79.4%	68.5%	51.6%
48	Tezontitla	0.606	97.2%	8.63	16.8%	1.96	100.0%	100.0%	0.0%	77.9%	67.2%
49	San Pedro Atocpan	0.605	97.4%	8.94	10.6%	1.27	97.6%	96.4%	30.3%	45.0%	40.7%
50	San Miguel Ajusco	0.604	95.3%	8.87	20.1%	1.01	99.0%	99.3%	96.4%	54.8%	50.8%
51	El Zapote (Techultepec)	0.604	97.1%	8.92	12.5%	1.48	98.6%	100.0%	1.4%	71.1%	71.0%
52	Barranca Seca (Pozo Ocho)	0.603	97.8%	6.87	10.9%	1.43	100.0%	97.8%	78.3%	52.0%	48.0%
53	Chichilecas	0.599	93.2%	8.44	0.0%	1.34	100.0%	100.0%	45.7%	61.3%	60.6%
54	Barrio Nochtitla	0.597	97.9%	7.85	1.0%	1.44	98.0%	100.0%	46.0%	65.1%	53.4%
55	Punta Galicia	0.596	94.7%	8.23	17.9%	1.86	100.0%	100.0%	63.0%	25.0%	24.4%
56	Puerto las Cruces (Monte las Cruces)	0.593	96.9%	8.63	3.7%	1.76	92.6%	96.2%	0.0%	35.0%	34.1%
57	Barrio San Miguel	0.592	96.7%	9.29	7.9%	1.28	89.5%	92.1%	83.8%	56.0%	38.6%
58	Achayatipac	0.591	97.6%	7.96	2.4%	1.30	100.0%	100.0%	78.0%	59.6%	29.2%
59	Tepexomulco	0.591	95.4%	8.45	12.8%	1.08	100.0%	92.7%	90.2%	35.2%	27.7%
60	Cuauhtunco	0.589	96.6%	8.31	5.1%	1.33	98.3%	100.0%	57.6%	60.2%	36.4%
61	Pepelaxtla	0.588	86.4%	7.92	16.7%	1.12	87.5%	97.4%	0.0%	47.6%	44.3%
62	Acueducto	0.586	100.0%	7.37	3.0%	1.67	97.0%	100.0%	81.8%	51.0%	45.0%
63	San Lorenzo Tlacoyucan	0.584	99.5%	8.44	9.1%	1.36	94.2%	97.1%	3.6%	64.3%	54.2%
64	Xila	0.584	100.0%	8.99	4.2%	0.88	99.0%	99.9%	99.8%	66.1%	59.6%
65	La Herradura (Séptima Curva)	0.582	100.0%	7.54	0.0%	1.41	92.0%	96.0%	80.0%	53.3%	46.9%
66	Parres (El Guarda)	0.580	97.4%	7.71	12.8%	1.39	100.0%	100.0%	15.0%	63.5%	47.7%
67	Tlalatlaco	0.577	98.0%	7.71	1.7%	2.37	92.7%	69.1%	5.8%	27.6%	25.9%
68	Tecoloxtitla	0.576	98.8%	8.82	14.6%	1.38	100.0%	100.0%	0.0%	57.1%	55.4%
69	Colonia San Juan	0.569	98.8%	7.78	5.9%	1.30	98.1%	100.0%	69.2%	41.2%	36.9%
70	Tecpallo	0.569	97.3%	7.55	7.7%	1.53	89.2%	68.6%	81.1%	72.5%	42.3%
71	Carretera a Santa Ana	0.563	98.0%	6.11	8.3%	1.65	96.0%	100.0%	87.5%	49.0%	43.3%
72	Colonia Héroes de 1910	0.563	95.2%	10.08	8.2%	0.92	97.9%	97.9%	8.2%	47.3%	44.7%
73	El Oyameyo	0.563	98.8%	10.05	22.7%	0.93	97.8%	97.8%	2.2%	44.7%	37.2%
74	Tepuente	0.560	98.0%	8.44	0.0%	1.62	100.0%	92.3%	50.0%	60.8%	47.0%
75	Tlatzala (Cuayuca)	0.551	100.0%	6.84	5.4%	0.84	99.0%	99.5%	93.1%	59.7%	49.7%
76	San Miguel Topilejo	0.549	96.6%	8.33	13.1%	1.05	98.2%	98.0%	96.3%	67.0%	62.1%
77	Kilómetro 28 Sur	0.549	98.8%	7.90	7.4%	1.49	94.6%	100.0%	0.0%	67.7%	52.6%

78	Paraje Tehuizco	0.547	97.4%	7.27	0.0%	1.61	97.5%	97.5%	57.5%	68.1%	30.9%
79	Huixtotlazintla	0.547	93.3%	7.27	7.1%	1.36	96.4%	100.0%	7.1%	63.8%	62.9%
80	Palo Dulce	0.545	97.6%	7.85	3.7%	1.10	100.0%	92.6%	0.0%	5.6%	5.6%
81	Tlatepexco	0.542	91.8%	7.65	0.0%	1.64	95.4%	96.9%	0.0%	95.5%	81.7%
82	Paraje Tochuca (San Salvador)	0.542	92.5%	9.76	37.5%	1.57	90.5%	78.6%	2.4%	26.4%	20.9%
83	Lomas de Xocotlán	0.541	96.2%	8.35	3.8%	1.52	100.0%	96.2%	96.2%	32.5%	31.6%
84	Las Cruces Parte Alta (Tehuepanco)	0.540	100.0%	7.58	0.0%	1.25	95.7%	84.8%	84.8%	49.7%	28.2%
85	Corrantitla	0.539	98.5%	6.98	0.0%	1.50	87.5%	87.5%	93.8%	48.3%	47.6%
86	Cruztitla	0.531	90.3%	8.50	2.5%	1.29	100.0%	100.0%	16.7%	51.0%	48.6%
87	Tlacaxatl (Barrio Xochitepec)	0.530	96.1%	8.11	12.2%	1.13	96.0%	96.0%	0.0%	54.2%	40.6%
88	Santa Rosa	0.528	87.2%	7.33	3.3%	1.14	98.2%	99.2%	69.3%	56.6%	48.2%
89	San Isidro Cuatepec	0.527	94.3%	8.06	3.1%	1.05	99.4%	99.2%	93.3%	53.1%	49.8%
90	Texopantitla	0.521	98.2%	8.22	3.4%	1.47	96.6%	100.0%	40.2%	56.3%	52.0%
91	Tlaltepec	0.520	100.0%	6.52	12.9%	1.40	94.4%	85.7%	0.0%	49.7%	48.4%
92	Paraje Cuauhtetec	0.516	85.5%	8.00	5.0%	1.54	95.1%	97.4%	2.6%	58.8%	19.4%
93	El Pato	0.515	94.2%	7.10	3.0%	1.66	89.7%	93.7%	92.6%	56.0%	29.4%
94	Tecoexcontitla	0.513	90.0%	9.61	17.5%	1.48	95.7%	95.6%	5.3%	61.5%	58.5%
95	La Ciénega	0.509	96.1%	7.42	1.1%	1.88	94.9%	97.9%	61.1%	45.1%	39.1%
96	Prolongación Narciso Mendoza	0.506	98.0%	8.53	11.1%	1.52	100.0%	96.8%	96.8%	50.7%	48.4%
97	Rancho las Siete Yuntas	0.504	95.1%	7.64	10.7%	1.24	97.0%	98.5%	55.2%	60.5%	56.4%
98	Santa Rosa	0.500	95.0%	7.36	15.5%	1.10	96.5%	96.4%	96.3%	66.1%	61.0%
99	Metenco	0.500	97.8%	8.84	8.0%	1.35	82.5%	85.2%	0.0%	69.2%	67.7%
100	Xoctonco	0.499	95.8%	8.10	6.9%	1.80	96.4%	96.4%	0.0%	21.5%	20.4%
101	Hueytepetl	0.498	86.9%	7.48	4.0%	1.54	96.0%	94.0%	80.0%	54.1%	28.7%
102	Rancho el Cedro	0.495	97.9%	6.83	3.7%	1.27	93.3%	96.7%	3.3%	43.1%	39.4%
103	Tabla los Pozos	0.491	92.1%	7.32	0.0%	0.92	100.0%	100.0%	12.1%	67.2%	53.1%
104	Xometitla (Tlalitenco)	0.490	95.9%	7.70	6.8%	1.12	97.4%	97.4%	86.8%	67.1%	66.0%
105	Colonia Aguayoto	0.489	99.3%	8.30	2.6%	1.43	98.7%	100.0%	0.0%	36.6%	36.6%
106	El Gavillero	0.489	94.5%	6.70	1.4%	1.72	97.1%	95.7%	0.0%	67.9%	54.4%
107	Zacuaztitla	0.487	94.3%	7.47	0.0%	1.40	100.0%	96.0%	80.0%	38.4%	37.5%
108	San José	0.481	98.2%	7.08	0.0%	1.04	98.3%	97.3%	94.8%	73.2%	54.8%
109	Paraje Zacapa	0.479	93.4%	7.89	8.3%	1.44	97.3%	97.3%	3.6%	37.1%	30.6%
110	Coametzu	0.474	96.1%	7.13	0.0%	1.64	96.6%	96.6%	69.0%	30.1%	29.4%
111	Tepetenco	0.470	98.6%	8.39	13.6%	1.29	92.5%	97.5%	15.0%	42.4%	38.3%
112	Carretera al Ajusco II	0.469	100.0%	7.46	0.0%	1.90	100.0%	92.3%	3.8%	50.0%	38.5%
113	Paraje Oluca	0.467	95.9%	7.65	12.8%	1.97	84.6%	100.0%	0.0%	89.5%	31.9%
114	Totolapa	0.466	100.0%	6.80	3.6%	1.31	100.0%	100.0%	3.6%	71.4%	70.9%
115	Lomas de Tepemecatl	0.466	96.5%	7.75	3.1%	1.56	97.5%	97.2%	36.9%	30.8%	27.5%
116	San Ignacio de Loyola	0.464	97.3%	7.28	2.5%	1.63	94.9%	98.2%	0.0%	35.4%	35.4%
117	Texacazintla (Xacalixpa)	0.463	88.9%	7.51	0.0%	1.18	100.0%	100.0%	15.9%	24.6%	23.3%
118	Omaxal	0.463	95.7%	7.40	7.7%	1.54	92.1%	96.2%	0.0%	40.3%	40.3%
119	La Herradura	0.458	93.4%	7.49	8.7%	1.63	97.8%	97.8%	0.0%	38.6%	37.3%
120	Los Tlapancos	0.455	92.9%	7.20	0.0%	1.68	92.0%	92.0%	37.5%	55.1%	26.6%
121	Prolongación Mina	0.452	98.3%	6.90	0.0%	1.10	97.7%	98.3%	47.8%	49.5%	39.8%
122	San Antonio Cuilotepec	0.451	99.1%	7.19	3.6%	1.41	99.0%	100.0%	47.9%	54.2%	45.2%
123	Mecalco	0.451	98.5%	7.75	7.3%	1.11	95.1%	100.0%	35.0%	24.2%	19.1%
124	Kilómetro 30.5	0.450	93.4%	7.79	0.0%	1.39	97.8%	89.1%	0.0%	49.5%	38.7%

125	Toltecas (Parte Alta)	0.450	90.0%	6.99	0.0%	1.45	84.4%	59.4%	93.8%	60.0%	57.3%
126	Ocotitla Tepachuxiac	0.450	94.4%	7.07	0.0%	1.84	96.4%	97.4%	70.3%	56.1%	52.3%
127	Joyas Parte Alta	0.448	85.7%	7.64	1.4%	1.45	93.2%	98.6%	2.7%	47.9%	47.9%
128	San Marcos	0.446	100.0%	7.76	8.0%	1.43	97.2%	100.0%	8.3%	50.4%	28.5%
129	Paraje Cuatepec	0.444	89.5%	7.32	4.5%	1.66	98.2%	96.4%	1.8%	47.3%	37.4%
130	Texacatipac	0.441	91.7%	8.48	5.1%	1.82	92.9%	92.9%	0.0%	31.8%	24.0%
131	Prolongación las Rosas	0.440	96.2%	8.24	7.4%	1.55	94.6%	97.3%	0.0%	49.0%	40.8%
132	El Pedregal	0.431	94.1%	6.79	1.6%	1.59	98.6%	95.7%	0.0%	45.7%	27.6%
133	El Paraíso (Mecoxtla)	0.424	90.2%	7.42	2.2%	1.78	99.3%	85.5%	0.0%	57.5%	39.9%
134	Cuanejaque	0.423	96.5%	6.64	0.0%	1.34	81.8%	81.8%	0.0%	72.7%	45.2%
135	Ocotla Chico	0.421	87.4%	6.99	0.0%	1.60	100.0%	100.0%	9.1%	43.1%	43.1%
136	Paraje Izotitla	0.417	96.7%	8.10	5.7%	1.00	100.0%	100.0%	100.0%	60.8%	48.3%
137	Tlachiultepec de Ahuayucan (Las Malvinas)	0.413	83.1%	7.78	5.7%	1.72	100.0%	96.6%	0.0%	56.7%	51.2%
138	Las Palmas (Chimeo)	0.399	93.9%	7.38	0.0%	1.87	92.6%	92.3%	0.0%	44.0%	27.2%
139	Piedra Larga	0.392	96.8%	6.33	1.9%	1.07	100.0%	100.0%	70.4%	56.4%	55.5%
140	Temamatla	0.383	94.4%	7.44	3.8%	1.05	97.0%	98.5%	36.4%	49.2%	44.4%
141	Xalcuitongo (La Asunción)	0.381	98.2%	7.83	3.7%	1.59	97.3%	97.3%	0.0%	50.0%	46.2%
142	Barrio Nochicala	0.366	95.3%	8.14	8.7%	1.31	97.9%	66.0%	2.1%	43.8%	42.4%
143	Paraje de Apantenco	0.342	100.0%	6.97	5.0%	1.23	100.0%	96.3%	96.3%	44.9%	17.8%
144	Avenida el Cerro	0.341	74.0%	6.76	0.0%	1.89	92.9%	96.3%	81.5%	40.0%	35.7%
145	Barrio San Antonio (Cruz Monte)	0.318	95.6%	7.54	2.1%	1.78	91.8%	77.6%	0.0%	23.8%	21.6%
146	El Hilar	0.316	100.0%	7.96	0.0%	2.26	96.7%	86.7%	0.0%	16.8%	16.8%
147	Ampliación Chalmita	0.290	98.5%	7.34	3.8%	1.83	89.7%	70.5%	0.0%	23.9%	21.3%
148	Tipipili	0.271	92.2%	6.33	2.1%	1.28	65.9%	97.6%	0.0%	70.2%	44.4%
149	Ejidos de San Andrés Totoltepec	0.245	97.0%	6.88	0.0%	1.70	84.4%	78.1%	0.0%	12.5%	12.2%

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