NYU STERN | URBANIZATION PROJECT

The Land and Housing Survey in a Global Sample of Cities

Preamble: The Survey in the Context of Monitoring the Quantity and Quality of Global Urban Expansion

This *Preamble* summarizes the rationale and conceptual framework of the *Land and Housing Survey in a Global Sample of Cities,* for which we are enlisting your participation. The *Survey* is part of a broader research initiative—titled *Monitoring Global Urban Expansion*—undertaken by the NYU Stern Urbanization Project in partnership with the United Nations Human Settlements Programme (UN-Habitat) and the Lincoln Institute of Land Policy. The main objective of this initiative is to add a spatial dimension to monitoring global urbanization, and to support evidence-based planning and policy making in cities and metropolitan areas the world over.

Monitoring Global Urban Expansion seeks to understand both the quantitative and the qualitative attributes and characteristics of urban expansion in the entire *Universe of Cities*, defined as all the 4,000+ cities and metropolitan areas that had more than 100,000 inhabitants in 2010.At this stage, we focus on a scientifically constructed *global sample* of 200 cities, consisting of roughly 5% of the universe of cities, and containing approximately one-quarter of the world urban population. The sample is stratified, representing cities in four city-size categories in eight world regions. A map of the cities in the sample is given in figure 1 below.

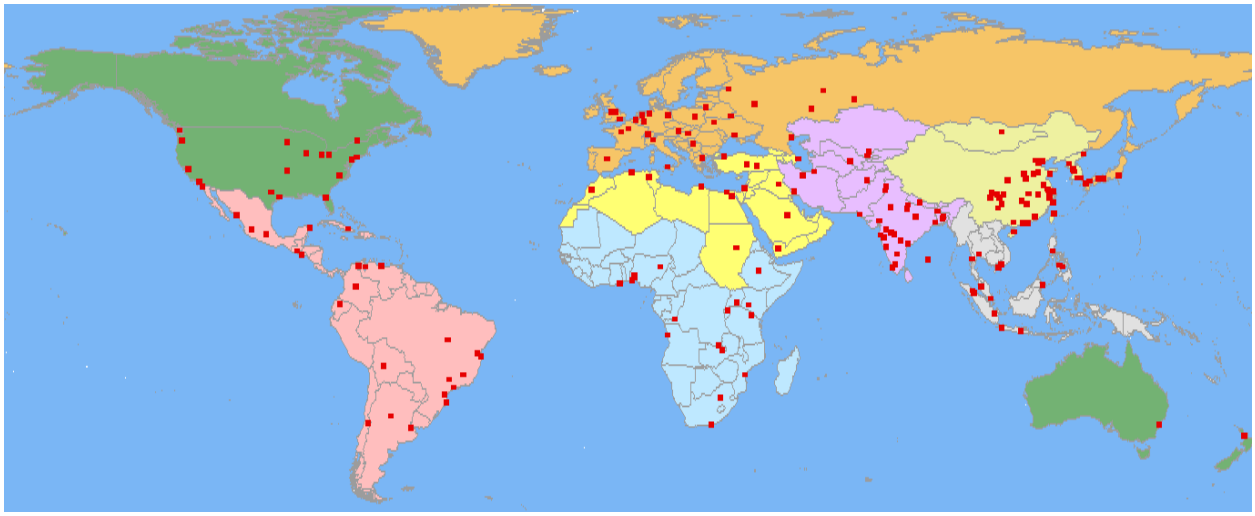


Figure 1: The Global Sample of 200 Cities

Each city in the sample represents a subset of cities in the universe. We can therefore study the cities in the sample in detail, calculate a set of metrics associated with each city, and then use these metrics to obtain statistically significant results for the Universe of Cities as a whole. These results intend to fill a crucial gap in our understanding for other than city populations and their change over time, we possess little systematic scientific knowledge about cities.

Monitoring Global Urban Expansion will not only provide new insights on the extent of cities, their population densities, their physical fragmentation and the change in these quantities over time. It will also provide new information about the quality of the urban fabric in cities, answering

questions regarding the availability of arterial roads, the share of land in streets, the walkability of urban neighborhoods, and the average size of plots in expansion areas. The new survey, to which we are asking you to contribute, will also make available information on the regulatory regime governing residential land and housing as well as information on the affordability of residential land and housing in cities.

Monitoring Global Urban Expansion is necessary not only to increase our understanding of cities but equally, to assist us in preparing for the next wave of urbanization. The urban population of our planet is expected to double by 2050. We can effectively prepare for accommodating this population but only if we gain a better understanding of how much land will be needed to accommodate it and how to prepare this land for orderly, equitable and sustainable urban development.

At present, the global monitoring initiative consists of three phases. A brief description of the these phases is given below:

Phase I: The Atlas of Urban Expansion—The 2015 Edition

The *Atlas* provides satellite-based maps of urban extent and their associated metrics— including built-up area, built-up area density, fragmentation, and compactness—for a global sample of 200 cities for the years 1990, 2000 and 2013. The Atlas pages for Mek'ele, Ethiopia, are shown in figure 2 below.

Phase II: The Quality of the Urban Fabric in Expansion Areas

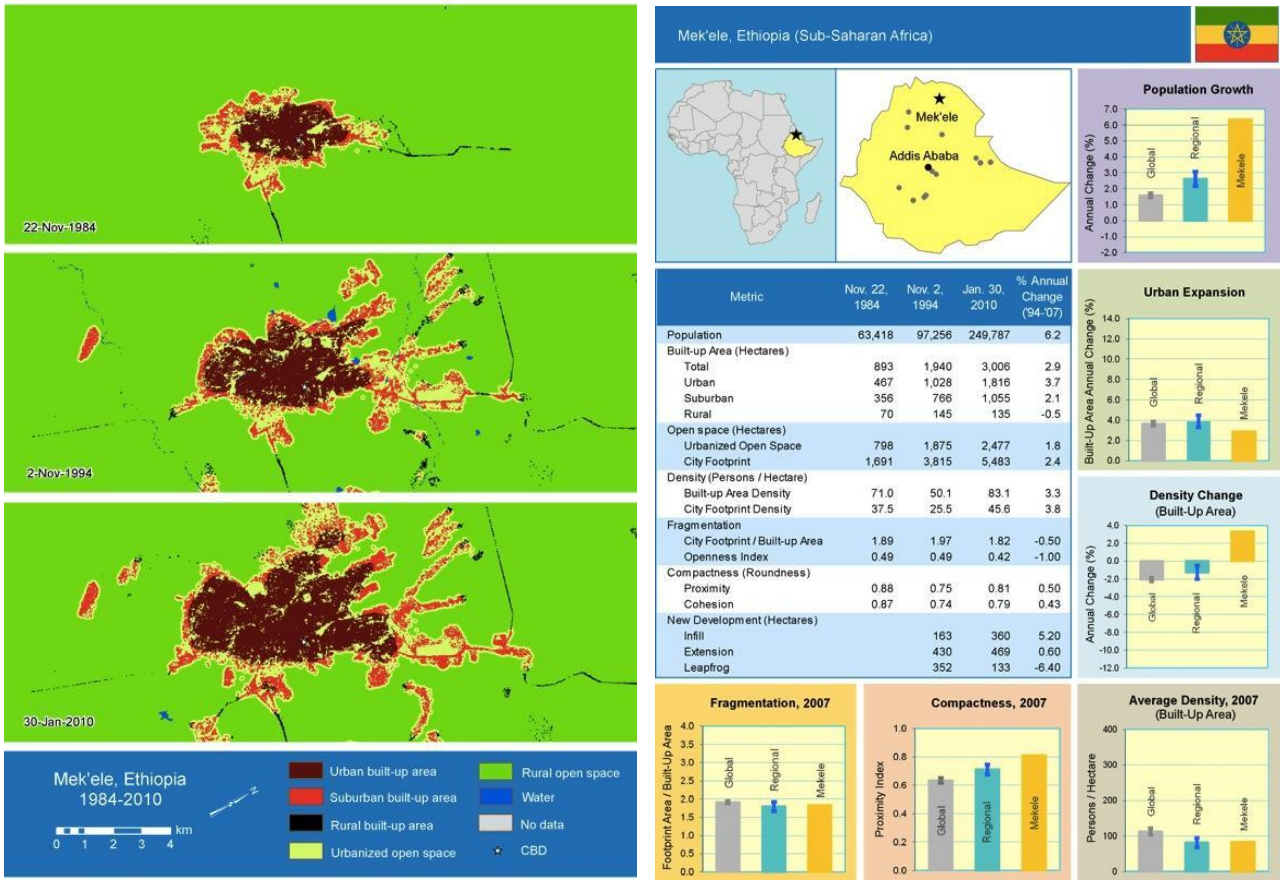
The quality of the urban fabric in expansion areas is determined through an intensive mapping effort that measures (1) the share of land in arterial roads and access to arterial roads; (2) the share of land in streets and the distribution of street widths; (3) the share of land in residential areas in different stages of the housing sector evolution (atomistic housing, informal land subdivisions, formal land subdivisions, and housing projects); (4) average block size and the density of street intersections; and (5) plot dimensions in land subdivisions.

Most of the data for this phase of the monitoring effort is obtained by analyzing a randomly selected set of 10-hectare locales in the expansion areas of cities—areas developed between circa 1990 and circa 2013—using high-resolution satellite imagery. The randomly selected locales for the expansion area of Addis Ababa, Ethiopia and the analysis of a typical locale are shown in figure 3 below.

Phase III: The Land and Housing Survey in the Global Sample of Cities

The first two phases of Monitoring Global Urban Expansion provide us with new information on the quantity of expansion as well as certain attributes of its quality. Both are *descriptive* and do not, in and of themselves, provide us with *explanations* as to why quantities and quality vary among cities in the sample as well as over time. They also do not tell us much about the *consequences* of different attributes of urban expansion, for example whether housing and residential lands are more affordable in some cities than in others and, if so, why. In addition, the information in the first two phases does not tell us whether different attributes of urban expansion, or of housing and residential land, vary as a result of policy or regulatory intervention.

The *Land and Housing Survey in the Global Sample of Cities* aims to fill these gaps. The first objective of the survey is to obtain information on the regulatory regime governing the development of residential land and housing on the urban fringe, a regime than can be detrimental in ensuring that residential land remains plentiful, affordable and accessible and that development on the urban fringe is orderly, so as to facilitate the provision of public works as well as public transport. The second objective of the survey is to ascertain whether residential land and housing in the city are indeed plentiful, affordable, and accessible.



Metric	Nov. 22, 1984	Nov. 2, 1994	Jan. 30, 2010	% Annual Change ('94-'07)
Population	63,418	97,256	249,787	6.2
Built-up Area (Hectares)				
Total	893	1,940	3,006	2.9
Urban	467	1,028	1,816	3.7
Suburban	356	766	1,055	2.1
Rural	70	145	135	-0.5
Open space (Hectares)				
Urbanized Open Space	798	1,875	2,477	1.8
City Footprint	1,691	3,815	5,483	2.4
Density (Persons / Hectare)				
Built-up Area Density	71.0	50.1	83.1	3.3
City Footprint Density	37.5	25.5	45.6	3.8
Fragmentation				
City Footprint / Built-up Area	1.89	1.97	1.82	-0.50
Openness Index	0.49	0.49	0.42	-1.00
Compactness (Roundness)				
Proximity	0.88	0.75	0.81	0.50
Cohesion	0.87	0.74	0.79	0.43
New Development (Hectares)				
Infill		163	360	5.20
Extension		430	469	0.60
Leapfrog		352	133	-6.40

Figure 2: Atlas pages for Mek'ele, Ethiopia

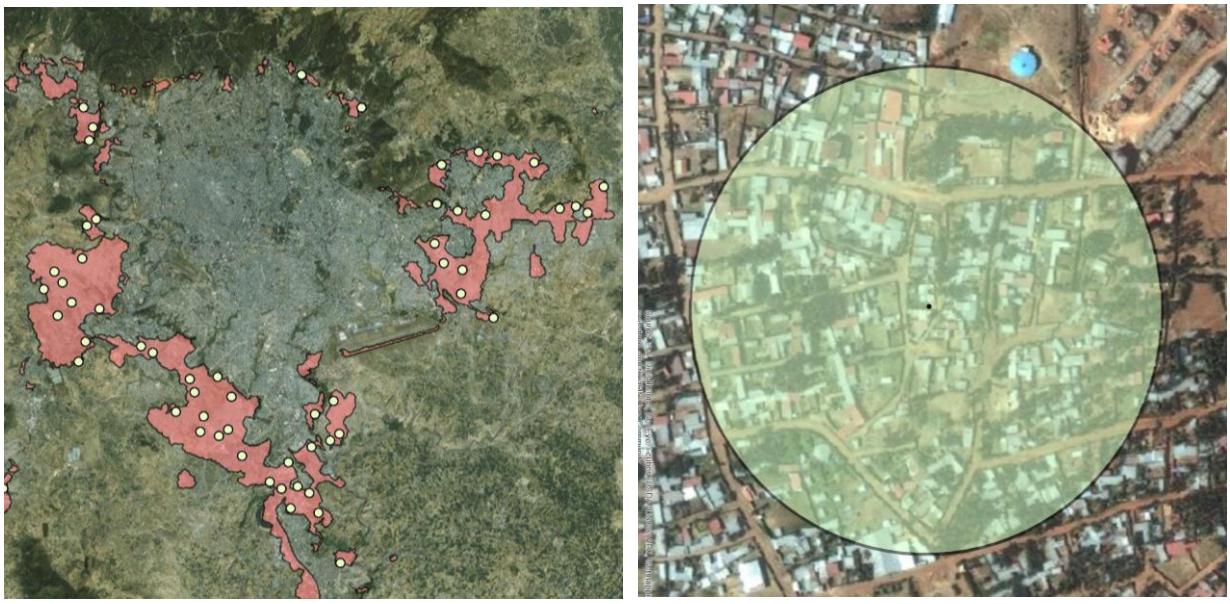


Figure 3: Randomly selected 10-hectare locales in the expansion area of Addis Ababa, 1990-2013 (left) and a typical locale in the expansion area as seen on *Google Earth*

To conclude, *The Land and Housing Survey in the Global Sample of Cities* is a key component in a new initiative to monitor global urban expansion, an initiative whose time has come. This initiative is now necessary, both to understand the way cities grow and expand and to forge new evidence-based policies and plans than can guide the rapid urban expansion expected in the coming decades.