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**Concepts, definitions and data sources for the study of urbanization: the 2030
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Concepts, definitions and data sources for the study of urbanization: the 2030 Agenda for Sustainable Development

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Since 1990, the world has seen an increased gathering of its population in urban areas. This trend is not new, but relentless and has been marked by a remarkable increase in the absolute numbers of urban dwellers.¹ This urban transformation has positioned cities at the core of the development agenda. It is undeniable that urbanization is indeed one of the most significant trends of the past and present century, providing the foundation and momentum for global change.

Cities have become a positive and potent force for addressing sustainable economic growth, development and prosperity. They drive innovation, consumption and investment in both developed and developing countries.² Cities can certainly take the lead to address many of the global challenges of the 21st century, including poverty, inequality, unemployment, environmental degradation, and climate change; they are the string that connects all Sustainable Development Goals together. City density and economies of agglomeration link economy, energy, environment, science, technology and social and economic outcomes. These interrelations are important to formulate integrated policies needed to achieve sustainable development. Working at urban level, it is possible to include people, locations and city conditions to ensure that no one – and no place – is left behind.

Nevertheless, the success towards sustainability is not assured, and cities do not always perform well. There is a clear need to have sound and timely data and metrics for development goals to be met; effective systems that enable cities to make correct decisions on the best policies to adopt, and assist in tracking changes, whilst systematically documenting their performance. This is fundamental towards achieving higher levels of urban prosperity and sustainable urban development for all.

But, what is exactly a city or an urban area? Which size is required to qualify as a city? What type of particular administrative, legal or historical status is needed? How do we distinguish an urban area from a town or a village? A study of the city as a unit of analysis is critical for overcoming future challenges and for better repositioning cities as engines of national development. A concrete guidance on definitions, measurements, and unified standards is necessary to make sure that we work with harmonized and mutually agreed concepts. However, these concepts and related monitoring approaches should not aim at changing existing administrative and statistical definitions in countries, but to adopt a functional set of monitoring methods that are pragmatic, cost-effective, simple and accurate. These changes could be made at a 'supra-national' level as guiding principles, and related metrics, that can provide data consistency and serve at the same time as a global and regional platform for comparability.

When a country measure basic needs, the provision of public goods, tangible and intangible assets, urban risks and conditions, it needs to be sure these measurements are similar and comparable to other cities; yet, with multiple definitions of what constitutes an urban area, numerous official concepts to define the extent and conditions of cities, and various techniques of measurement that are not compatible, the world is far from having internationally validated data and information needed to define what exactly constitutes progress or lack of. It is also far from having sound systems required to aggregate values at regional and global level. SDGs monitoring and reporting is somehow compromised.

¹ It is estimated that the urban population increased every year on average by 57 million people between 1990 to 2000. Urban population increased by 77 million between 2010-2015. UN-Habitat (2016) *World Cities Report: Urbanization and Development, Emerging Futures*, Nairobi.

² UN-Habitat (WCR)

There are multiple definitions of what constitutes urban..., and they are no comparable: The estimations of the proportion urban in countries are confronted to various and multiple definitions of what constitutes an ‘urban settlement’. National Statistics Offices employ definitions with very different criteria that are not compatible and make difficult to aggregate values in a consistent manner. Such definitional difficulties are related not only to the use of various concepts, as it is the case with slightly more than half of countries applying two or more criteria, but also to the changes of definitions over time in the same given country. It is estimated that nearly two-thirds of countries utilize an administrative definition to classify urban areas, but almost all of them add an additional element such as population size, density, economic occupation or urban functions to characterize urban settings. Another 49 countries utilize only population size and density, but this number doubles when it is used in conjunction with other criteria.

Things are made more complicated when analyzing population thresholds used by countries. While Denmark or Iceland define urban locals when they have only 200 inhabitants or more, The Netherlands and Nigeria fix a threshold of 20,000, Mali opts for 30,000 inhabitants, and Japan’s cities known as *shi* refer to population of 50,000 inhabitants or more. Moreover, some countries combine population size criterion with other elements to define what constitutes urban. For instance, urban areas in Bhutan need to satisfy at least 4 conditions out of 5 criteria: a minimum population (1,500 inhabitants), a threshold in population density (1,000 persons per sq. km), depend on non-primary economic activities (more than 50%), a minimum requirement for the area of the urban centre (not less than 1.5 sq. km.), and the need to have economic potential for future growth (revenue base). Likewise, Cambodia recognizes as urban communes the places where there is a population above 2,000 inhabitants with a percentage of male employment in agriculture below 50%, and a population density exceeding 200 persons per square kilometer. Interestingly, while the last parameter of population density is defined by the Chinese authority as having at least 1,500 persons per square kilometre, in Germany the urban communes have population density equal or greater than 150 inhabitants per sq. km.

How do we understand what is the city with the use of various concepts. The statistical definition of what constitutes the city is not an easy task. This complicates the estimation of its population. One third of countries use the concept of ‘urban agglomeration’ to estimate their city data, and another 12% only for their capital cities. As much as 38% of countries use another concept that is the ‘city proper’. It is estimated that one-fifth of countries combine various definitions to estimate city and population data in their urban areas. Nearly 5% of additional countries use a different criterion to define their urban populations, which is the “metropolitan area”.

These concepts are different not only in the method of analysis, but also in the territorial scale they cover, and thus the population they include or not in the estimations.

The City Proper is often the smallest unit of analysis and refers to the area confined within city limits.³ It is the single political jurisdiction which is part of the historical city centre. With few exceptions, the ‘City Proper’ is a very narrow administrative demarcation of the city and does not consider adjacent areas of the city and rural areas that are included in the urban extent of the city. For example, while the City Proper of Chongqing in China contains less than 6 million inhabitants, the urban agglomeration or municipal district has a total population of more than 30 million inhabitants, making of this city one of the largest in the world. Except for capital cities, many countries report on their urban populations using the statistical concept of “City Proper”, this is the case for instance with Benin, Bolivia, Congo, Czech Republic, Egypt, Germany, Korea, the Philippines, Poland, Russia, Saudi Arabia, and various other countries. Interestingly, other nations use a mix of statistical concepts, such as Belarus, Brazil, Ecuador, Nigeria, The Netherlands, just to cite a few of them. The use of the “City Proper” combined or not with

³ United Nations. Dept. of Economic and Social Affairs (2002). *Demographic yearbook, 2000*. United Nations Publications, 2002. p. 23. ISBN 92-1-051091-7.

other conceptual definitions is an obvious source of recurrent controversy, and tends to produce inaccurate information on the city population.

The Urban Agglomeration concept refers to “the population contained within the contours of a contiguous territory inhabited at urban density levels without regard to administrative boundaries”. In other words, it integrates the ‘City Proper’ plus suburban areas that are part of what can be considered as city boundaries; a term that in itself is controversial.

In most cities where population data was estimated using the “Urban Agglomeration” concept, numbers tend to be higher than the built-up area of the urban extent of the same city that is produced using a more refined concept of analysis.⁴ This is the case for instance with Bogota that has a population of 9.7 million in the urban agglomeration vs 7.8 of the built-up area, Guatemala City that has a population of 2.9 vs 2.6, Hyderabad with a population estimated at 8.9 million using ‘urban agglomeration’ vs 7.6 million of the built-up area, Karachi 16 million vs 12 million using the same statistical concepts respectively; this data was derived in 2015. The reason for this discrepancy is that in most cases, countries include populations that are not inhabited at ‘urban density levels’, as the definition indicates, in the rural portions of the administrations (municipalities, boroughs or communes) that are part of the conurbation. Still, this concept is the one that comes closer to the spatial notion of the ‘city’ and produces the most accurate data. For this reason, UN Population Division prefers to adjust, when it is possible, all definitions to this statistical concept.

The Metropolitan Area concept is more elusive and complicated. It has statistical, technical, administrative and political meanings. The US Census Bureau, as various others, define it as ‘geographical region with a relatively high population density that is considered as a statistical area’⁵. The ‘Metropolitan Area’ concept is associated to a conurbation area, which normally has a densely populated urban core and less-populated surrounding territories. ‘Metropolitan Areas’ usually comprises multiple jurisdictions and municipalities, as well as satellite cities, towns and intervening rural areas that are socio-economically tied to the urban core.⁶

In many countries the demarcation of the metropolitan area does not coincide with the urban extent of the city, making population figures differ greatly. There are few countries like Australia, Belgium, Italy and Canada that mostly use ‘Metropolitan Area’ definitions. Others use it only for the capital city and few other urban areas within their countries, as it is the case with Brazil, Chile, Cuba, Egypt, Iraq, Malaysia, Peru, etc. In general terms ‘Metropolitan area’ definitions are not comparable among countries and have little use at aggregated value level.

Still, metropolitan data, associated to governance mechanisms, matters a great deal, since it impedes or facilitates the sustainable development of regions.⁷ The galvanizing power that metropolitan areas have, in terms of density and economies of scale and agglomeration, contribute to influence major national decisions concerning infrastructure provision, economic development and inequality reduction.⁸ Data at this level is paramount for decision-making. However, this statistical concept is less useful for global statistics and for the purpose of monitoring and reporting with a comparable scale and definition.

⁴ Refer to the methodology of the study “Urban Expansion of Cities” and the Global Sample of Cities, UN-Habitat, New York University and Lincoln Institute of Land Policy, 2016.

⁵ United Nations Census Bureau (2016).

⁶ Metropolitan Area definition, <https://www.revolvvy.com/main>.

⁷ Gómez David, López Moreno Eduardo, Rajack Robin and Lanfranchi Gabriel (2017) *Steering The Metropolis: Metropolitan Governance for Sustainable Urban Development*, BID, UN-Habitat, CAF.

⁸ Gómez David, López Moreno Eduardo, Rajack Robin and Lanfranchi Gabriel (2017) *Steering The Metropolis: Metropolitan Governance for Sustainable Urban Development*, BID, UN-Habitat, CAF.

Towards a ‘functional’ agreed definition of the city and its scale to facilitate the collection of spatial indicators: Cities and towns have been the mayor facilitators of economic growth and development. The urban Goal (11) is an explicit recognition of the transformative potential of cities and the capacity they have to realize other Goals. However, monitoring the urban SDGs is not an easy task. Goal 11 indicators present major challenges that other SDGs indicators do not necessarily confront. A mixed-bag of approaches has been proposed to address the data needs for city/urban indicators under SDGs particularly where the city is the unit of analysis. Out of the 16 agreed indicators for Goal 11 that were endorsed as part of the global indicators framework by the Statistical Commission⁹, 7 require to be mainly collected at local city level and not by routine data collection mechanisms such as censuses or household surveys.¹⁰ Meaning that National Statistical Offices need to coordinate with local authorities and service providers on the institutional and practice ways of data collection of information at city level. But they also need to agree on an ambiguous practical definition of what constitutes the city and where it ends from a statistical spatial perspective. In support of this process, UN Agencies and international development organizations are working in the preparation of standardized method of measurement and sound techniques of aggregation, otherwise important problems of consistency in data collection and analysis will be always present.¹¹

Need to define city boundaries: In order to provide ‘the right information on the right things and at the right time’, there is a need of spatial data, adequate technology and management systems to complement high-quality official statistics in which spatial analysis becomes a central component. Spatial data provides relevant information for policy makers to decide on local-level allocation of resources and the monitoring of equitable outcomes across and within cities.¹² At least half of Goal 11 indicators require some form of spatial data collection and analysis at urban and intra-city level. There are other various SDGs indicators with an urban dimension that need disaggregated information on sex, age, race, ethnicity, migration status and disability, with a strong geographic location component. Disadvantages are more and more concentrated in spatial locations, and this demands special tools of analysis and understanding for the sake of shared prosperity and sustainability.

The measurement of spatial indicators require to define city boundaries, which is not an easy task due to the uniqueness of the urban form, the fragmented and interstitial fabric of the cities, and the spatial and functional blur of the urban-rural areas. Besides, many cities tend to expand on contiguous physical areas at the periphery; others mostly grow by the annexation of rural or urban settlements outside the urban extent; still others urbanize in areas that are not contiguous to the urban extent. These urban dynamics generate cities with different patterns and conditions that make difficult to delimit an urban area. Spatial urban analysis certainly suffers from the lack of a standard international definition.

Need of a consistent set of cities to produce national aggregates. As the international development community and countries refine the operational definition of what a city is, and agree on the best way to measure the city’s extent, they will also be challenged by the difficulties to report on national (urban) progress in a systematic manner over time. Indeed, all indicators collected at city level, such as public transport, solid waste, air quality, public space, etc., will require to be aggregated at national level. Without a consistent set of cities needed to produce time series analysis and to measure national progress in a more structured manner, countries will report on various random cities that would not be necessarily

⁹ Statistical Commission (2017), Forty-seven session in March 2017,

¹⁰ These indicators are: 11.2.1 public transport; 11.3.1 land consumption; 11.3.2 civil society participation; 11.5.1 budget on cultural heritage; 11.6.1 solid waste; 11.6.2 air quality; and 11.7.1 public space.

¹¹ Refer to UN-Habitat *Guide to Assist National and Local Governments to Monitor and Report on SDG Goal 11 Indicators*, prepared in collaboration with UN Environment, UNISDR, WHO, UN Women, UNODOC, UNEP, UNESCO and UN Statistical Division.

¹² UN-Habitat (2016) *Sustainable Development Goal 11, A Guide to Assist National and Local Governments to Monitor and Report on SDG Goal 11 Indicators*, Nairobi.

the same overtime. They will not represent the cities of the country in a statistical form. The lack of an appropriate method of aggregation of city data would make it difficult, if not impossible, to generate national values in a systematic manner. This, in turn, will make problematic to produce national reports, and it will also compromise the production of regional and global aggregates of locally produced urban data.

RECOMMENDATIONS

The Commission on Population and Development is invited to consider the following recommendations for its fifty-first session to be held in New York for further transmission to relevant bodies:

1. ***Adopt as a statistical concept the ‘urban extent’ for the delimitation and measurement of cities and urban agglomerations.*** The adoption of this concept will enable national governments and development partners to standardize the definition and the unit of measurement of what constitutes an urban area. This standard definition will prevent inconsistencies arising from the use of different urban definitions, when collecting and analysing information at city and sub-city levels.

UN-Habitat and partners have been working in this definition, using satellite imagery and field work, creating a Global Sample of 200 Cities¹³ used in the monitoring of some of the urban SDGs.¹⁴ As unit of analysis, cities transcend municipal boundaries and group many municipalities into single agglomerations. The “Urban Extent” resolves the methodological problem of the city boundaries. It is based in the morphology of the city, its ‘hard edge’, urban built-up, sub-urban built-up and open spaces. The study areas of the ‘Urban Extent’ are based on the enumeration areas fixed by the National Statistical Office.¹⁵ This concept provides more refined information of the added area when analyzing city growth in two or more periods in time, creating conditions to better understand urban dynamics.

2. ***Create a National Sample of Cities, enabling National Governments to monitor and report on Goal 11 indicators and to produce national aggregates in a consistent and systematic manner.*** This national sample can serve to harmonize urban data and indicators using a set number of cities agreed upon, that are statistically representative of the country’s urban human settlements.

Governments recognize that it is not possible, and perhaps not necessary, to study each and every city in the country to monitor national trends on SDGs urban indicators. A carefully constructed sample that takes into account sub-regional and city specific characteristics and variances, can be used to monitor the dominant pattern in the country’s cities in an aggregated manner.

The national sample of cities will be drawn using sound statistical and scientific methodologies based on the Global Sample of Cities approach.¹⁶ The criteria for the selection of this sample considers the

¹³ The Global Sample of Cities (200) was developed by UN-Habitat, New York University and Lincoln Institute of Land Policy. It was applied in the Urban Expansion Programme that estimated the qualitative and quantitative growth of cities from 1990 to 2015.

¹⁴ Among other studies and reports, the Global Sample was used in the preparation of the Secretary-General Report on SDGs 2016 and 2017.

¹⁵ UN-Habitat (2017) *Report of the Expert Group meeting on Geospatial definitions for human settlements indicators (SDG 11 and land related indicators)*, Nairobi.

¹⁶ The global sample was created, tested, and applied in a series of studies undertaken by a tri-partite collaboration between UN Habitat, New York University, and the Lincoln Institute of Land Policy as part of a 3-year research study “Monitoring Urban Expansion Programme”. This study was done in preparation of the Habitat III Conference (2016). The use of the Global Sample of Cities allows for national, regional and global monitoring of progress on the New Urban Agenda, the outcome document of Habitat III, and the city-related Sustainable

number of cities in the country, the population and the size of the city, geographic location, functionality, economic and political importance and other factors decided by the national government. Still, national Governments will be able to add cities as they may require, ensuring that national reports are based on the same number of cities and conditions. The added cities can provide qualitative information, specific city analysis and possible best practice studies.

The adoption of a National Sample of Cities brings the following advantages: i) integrates cities of all sizes, functions and types as part of a national system of cities that can help to amalgamate the disjointed energies and potential of urban centres; ii) assists in the aggregation of locally produced city indicators for national monitoring and reporting, and for the production of regional and global reports and analysis; c) provides a platform for collecting different layers of data with a unified methodology that can be used to report on national progress on the SDGs or other elements of the urban agenda; d) allows the calculation of an un-weighted national average as well as weighted national averages on the overall urban SDGs indicators; e) creates baseline data and establishes benchmarks and national targets with the same technique of standardization that will enable for comparisons of indicators and city measurements; f) facilitates a systematic disaggregation of information at national, sub-national and city levels along key SDGs indicators and dimensions of development needed to address territorial disparities.

3. ***Adopt a monitoring platform that promotes integration of the different SDGs indicators to address, in a structured manner, the environmental, social and economic components of sustainability.*** As important as SDGs indicators of Goal 11 are, they encourage some form of sectoral intervention that can be even more pronounced by the silo-approach intervention of many government agencies.

It is recommended that countries and cities adopt a unified and standardized platform for SDGs monitoring and reporting of urban indicators. UN-Habitat's City Prosperity Initiative (CPI) offers the possibility to organize a systemic approach to the city, incorporating new analytical tools based on spatial indicators. The CPI works as a support for multi-scale decision-making that connects the city, with the region and the overall country. It promotes integration of the different dimensions and components of urbanization to respond to city challenges and opportunities in a holistic and integrated manner.

The CPI has been implemented in more than 400 cities across the world, integrating Goal 11 indicators and other SDGs indicators that have an urban component. Countries that use this platform are able to identify, quantify, evaluate, monitor and report on progress made by cities in a more structured manner. The adoption of an integrated approach of the city, offers the following advantages: i) provides a single value of the state of the city; ii) establishes benchmarks for local, national and global monitoring; iii) creates city baseline and information; iv) generates a local monitoring mechanism, and; v) identifies priorities and transformative actions to achieve sustainable urban development.

Development Goals. It will supplement and augment country reports and assist in the preparation of global and regional aggregates.