Metadata on SDGs Indicator 11.2.1
Indicator category: Tier II

Goal 11: *Make cities and human settlements inclusive, safe, resilient and sustainable.*

Target 11.2: *By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons*

Indicator 11.2.1: *Proportion of the population that has convenient access to public transport disaggregated by age group, sex, and persons with disabilities*

UN-HABITAT
FOR A BETTER URBAN FUTURE

1. Institutional information

Organization(s): United Nations Human Settlements Programme (UN-Habitat)

2. Concepts and definitions

2.1 Definitions

This indicator will be monitored by the proportion of the population that has convenient access to public transport. The access to public transport is considered convenient when a stop is accessible within a walking distance along the street network of 500 m from a reference point such as a home, school, work place, market, etc. to a low-capacity public transport system (e.g. bus, Bus Rapid Transit) and 1 km to a high-capacity system (e.g. rail, metro, ferry). Additional criteria for defining public transport that is convenient include:

a). Public transport accessible to all special-needs customers, including those who are physically, visually, and/or hearing-impaired, as well as those with temporary disabilities, the elderly, children and other people in vulnerable situations.

b). Public transport with frequent service during peak travel times

c). Stops present a safe and comfortable station environment

2.2 Rationale

This indicator aims to successfully monitor the use of and access to the public transportation system and the move towards easing the reliance on the private means of transportation, improving the access to areas with a high proportion of transport disadvantaged groups such as elderly citizens, physically challenged individuals, and low-income earners or areas with specific dwelling types such as high occupancy buildings or public housing and reducing the need for mobility by decreasing the number of trips and the distances travelled. The accessibility based urban mobility paradigm also critically needs good, high-capacity public transport systems that are well integrated in a multimodal arrangement with public transport access points located within comfortable walking or cycling distances from homes and jobs for all.

The ability of residents including persons with disabilities and businesses to access markets, employment opportunities, and service centers such as schools and hospitals is critical to urban economic development. The transport system provides access to resources and employment opportunity. Moreover, accessibility allows planners to measure the effects of changes in transport and land use systems. The accessibility of jobs, services and markets also allow policymakers, citizens and businesses to discuss the state of the transport system in a comprehensible way. The transportation system is a critical enabler of economic activities and social inclusion. The

Accessibility to public transport for all, Delhi, India @ indiaexpress.com.

access to transport SDG indicator addresses a significant gap that was never addressed by the MDGs, i.e. directly addressing transport as a critical enabler of economic activities and social inclusion. Already, the "externalities" associated with transport in terms of Green House Gas Emissions, traffic congestion and road traffic accidents have been increasing. Emissions from transport are now responsible for 23% of global Green House Gas Emissions and are increasing faster than any other source; outdoor air pollution alone, a major source of which is transport, is responsible for 3.7 million deaths annually, road traffic accidents kill more than 1.2 million people every year and severe traffic congestion is choking cities and impacting on GDPs. Achieving SDG 11 requires a fundamental shift in the thinking on transport- with the focus on the goal of transport rather than on its means. With accessibility to services, goods and opportunities for all as the ultimate goal, priority is given to making cities more compact and walkable through better planning and the integration of land-use planning with transport planning. The means of transport are also important but the SDG's imperative to make the city more inclusive means that cities will have to move away from car-based travel to public transport and active modes of transport such as walking and cycling with good inter-modal connectivity.

The rising traffic congestion levels and the resulting negative air quality in many metropolitan areas have elevated the need for a successful public transportation system to ease the reliance on the private means of transportation. Cities that choose to invest in effective public transportation options stand out to gain in the long run. Cities that have convenient access to public transport, including access by persons with disabilities are more preferred as these are more likely to offer lower transportation costs while improving on the environment, congestion and travel times within the city. At the same time, improving the access to areas with a high proportion of transport disadvantaged groups such as elderly citizens, physically challenged individuals, and low income earners or areas with specific dwelling types such as high occupancy buildings or public housing also helps increase the efficiency and the sustainability of the public transport system. Public transport is a very important equalizer of income, consumption and spatial inequalities. This indicator is empirically proven that public transport makes cities more inclusive, safe and sustainable. Effective and low-cost transportation is critical for reducing urban poverty and inequalities and enhancing economic development because it provides access to jobs, health care, education services and other public goods.

Clean public transport is a very efficient mean for the reduction of CO2 emissions and therefore it contributes to climate change and lower levels of energy consumption. Most importantly public transport need to be easily accessible to the elderly and disabled citizens.

2.3 Concepts:

This indicator will be monitored by the proportion of the population that has convenient access to public transport. Because most public transport users walk from their trip origins to public transport stops and from public transport stops to their trip destination, local spatial availability and accessibility is sometimes evaluated in terms of pedestrian (walk) access, as opposed to park and ride or transfers.

Hence, the access to public transport is considered convenient when an officially recognized stop is accessible within a walking distance along the street network of 500 m from a reference point such as a home, school, work place, market, etc. to a low-capacity public transport system (e.g. bus, Bus Rapid Transit) and 1 km to a high-capacity system (e.g. rail, metro, ferry). Additional criteria for defining public transport that is convenient include:

a). Public transport accessible to all special-needs customers, including those who are physically, visually, and/or hearing-impaired, as well as those with temporary disabilities, the elderly, children and other people in vulnerable situations.

b). Public transport with frequent service during peak travel times

c). Stops present a safe and comfortable station environment

The following definitions are required to define and measure convenient access to public transport.

Public transport is defined as a shared passenger transport service that is available to the general public and is provided for the public good. It includes cars, buses, trolleys, trams, trains, subways, and ferries that are shared by strangers without prior arrangement. It may also include informal modes of transport (para-transit) - but it is noted that these are often lacking in designated routes or stops.

For a city to understand the nature of its transport system and in turn make the necessary planning and investment decisions, it is recommended to do an inventory of its public transport modes including major characteristics. For cities where a mix of formal and informal transport systems exist, it is also recommended to disaggregate the indicator findings by the share of population with access to each type of transport system, which is critical for decision-making processes. Recent data has shown that many cities in developing regions may lack a formal public transport system, but residents still enjoy a high level of access to public transport driven by a comprehensive paratransit network which does not necessarily have designated stops. A mapping of the transport routes where these paratransit networks can stop is thus recommended, and countries are encouraged to document each type of transport mode.

Street Network is defined as a system of interconnected lines that represent a system of streets or roads for a given area. A street network provides the foundation for network analysis that will help to measure the pedestrian access/ walking distance of 500 m or 1 km to a public transport stop; or the network along which random informal transport modes can be accessed. Some cities have detailed data on their street network, type, street design (e.g. availability of a safe walking path) or topological structure of the network. However, if such data is not available, it is proposed to use OpenStreetMap as a baseline and fill missing gaps through digitizing of missing lines from satellite imagery (e.g. Google Earth). The major assumption in the use of these data sources is that all streets are walkable and on the same elevation level.

Service Area, in the context of indicator 11.2.1 is defined as the area served by public transport within 500 m walking distance to a low capacity-system or 1 km to a high-capacity system based on the street network.

Traffic congestion in shanghai, China © Julius Mwelu / UN-Habitat.

2.4 Comments and limitations:

As the Outcome Document 2nd Meeting of the Urban SDGs Campaign in Bangalore (12-14 February 2015) recognizes that no internationally agreed methodology exists for measuring convenience and service quality of public transport. Harmonized global/local data on urban transport systems do not exist, nor are they comparable at the world level. The "spatial access" (500 m or 1 km walking distance) provides a very basic measure that has a reasonable chance of being tracked by a wide range of cities and countries; but it is not enough to properly measure "convenient access". At a minimum, it is recommended that additional features of quality be taken into account, as described in the recommended secondary indicators section. Eventually, a complete shift to a measure of access of destinations and opportunities would be ideal, if data systems can be developed to support this, and applied in a consistent manner in cities around the world.

3. Methodology

3.1 Computation Method

This indicator is computed based on the following criteria:

The identification of service areas is typically achieved using the network analysis operation (using GIS) by constructing a zone of proximity along street networks around each public transport stop or each public transport route. The metadata proposes to identify the size of the coverage area by the network distance of 500 m or 1 km (instead of using a mere buffer of 500 m - equal proximity) around the transport stop.

Hence, for indicator 11.2.1, public transport is considered "convenient" for those living within a 500 m walkable distance of the nearest low-capacity stop and 1 km to the nearest high-capacity stop. Using network distance (the walking distance computed using the street network to reach a public transport feature) will help to realistically reflect the configuration of the street network and to recognize the presence of any barriers preventing direct access to public transport features. While the service area for each stop should be created separately, all areas should be merged to create a continuous service area for all public transport modes. Countries are encouraged to disaggregate the analysis by the two types of public transport carriers (low and high-capacity), since this will help them understand the prevailing public transport strengths and limitations, and in turn the identification of the required actions and investments. Countries are furthermore encouraged to distinguish between formal and informal public transport systems in the dataset, as service quality features may vary greatly and need to be taken into consideration for planning and investment decisions.

Public transport motorcyclist popularly known as Okada in Lagos, Nigeria © Julius Mwelu / UN-Habitat.jpg

In addition to using the above-mentioned distance measures, others have suggested the use of travel time to public transport features as a measure of proximity to places of opportunity. Using travel time has the advantage of potentially accounting for pedestrian-unfriendly factors such as steep terrains. However, because of the additional data requirements and the amount of processing effort involved, travel time measures are more difficult to use in practice. The recommendation is therefore to use network distance to the public transport stop to develop its service area – but provide the option to consider travel time as a sub-indicator.

3.2 The identification of the population served

Once a service area is created, the next step is to overlay the area onto other polygons, such as census tracts or zones, for which socio-demographic data (such as population figures, disabled persons, type of residence area, etc.) is available. Gridded population, which disaggregates population data from the different sized enumeration areas or other data release units into uniformly sized grids is becoming popular with many countries and is a good source of the socio-demographic attributes for this indicator. For demonstration purposes we will refer to these population data polygons (whether individual housing units, census tracts, population grid or other units) as the population zones. Typically, a service area (denoted as *i*) intersects, either fully or partially, with more than one population zone *j (j=1.....J)*. The population served by the public transport service in buffer *i*, *Pi*, is thus equal to the sum of the population of all population zones that intersect with the created service areas, *Pij* . Hence

$$P_i = \sum_{j=1}^{n} P_{ij}$$

For this indicator, higher spatial resolution of the population zones is recommended to reduce over-estimation of the population with access to public transport which may result from units that are too big. Where possible, population data from individual buildings that is collected by national statistical offices is recommended. Noting the complexities surrounding the use of such data in many countries, census tract level data or gridded population datasets are good alternatives.

Green Mobility Zone project in London © diariodotransporte.com.

3.3 Integrating local temporal availability

The methodology described above covers public transport service solely based on spatial access to stops or routes and does not address the temporal dimension associated with the availability of public transport. We note that temporal aspect of public transport availability is important because a service within walking distance is not necessarily considered as available if waiting times go beyond a certain threshold level that is required. This wait time for public transport is related to the frequency of the service as well as the threshold for tolerable waits for potential public transport users. We will leave out completely the temporal measurement for global comparison, but countries that can additionally capture this component are encouraged to collect and report this information as part of the disaggregation.

Finally, the share of the population with convenient access to public transport out of the entire city population will be computed as:

$$\%\ \text{Population with convenient access to Public transport} = \left[\frac{\text{Population with convenient access to Public transport}}{\text{City Population}}\right] X100$$

Additional methodological comments:

The method to estimate the proportion of the population that has convenient access to public transport is based on five steps (core indicator):

a). Delimitation of the urban area/ or city which will act as the spatial analysis scope,

b). Inventory of the public transport stops in the city or the service area,

c). Network analysis based on street network to measure walkable distance of 500 m (or 1 km) to nearest transport stop ("service area"),

d). Estimation of population within the walkable distance to public transport, and

e). Estimation of the proportion of the population with convenient access out of the total population of the city.

a) Delimitation of the urban area/ or city which will act as the spatial analysis scope: Following consultations with 86 member states, the United Nations Statistical Commission in its 51st Session (March 2020) endorsed the Degree of Urbanisation (DEGURBA) as a workable method to delineate cities, urban and rural areas for international statistical comparisons. Countries are thus encouraged to adopt this approach for delimitation of the urban area/city within which indicator 11.2.1 is measured, which will help them produce data that is comparable across urban areas within their territories, as well as with urban areas and cities in other countries. More details on DEGURBA and its application are available here: https://unstats.un.org/unsd/statcom/51st-session/documents/BG-Item3j-Recommendation-E.pdf

b) Inventory of public transport stops. Data and information on types of public transport available in each urban area/ city, as well as the location of public transport stops can be obtained from city administration or transport service providers. In many cases, however, this information is lacking, incomplete, outdated or difficult to access (especially where strong inter-agency collaboration is lacking). In these cases, alternative sources which have proven to be useful include open data sources (e.g. OpenStreetMap, Google and the General Transit Feed Specification - GTFS feeds), volunteered geospatial data, paratransit mapping, community-based maps, and point mapping using global positioning systems (GPS) or from high to very high resolution satellite imagery (e.g. Google Earth). When information is available, characteristics of the quality, universal accessibility for people with disabilities, safety, and frequency of the service can be 'assigned' to the public transport stops' inventory for detailed analysis and further disaggregation according to the statistical capacities of countries and cities.

c) Network analysis based on street network to measure walkable distance of 500 m or 1 km meters to nearest transport stop ("service area"): To calculate the walking distance to each stop, data on a well-defined street network (by City Authorities or from Open Sources such as OpenStreetMap) is required. The Network Analyst tool (in GIS) can be used to identify service areas around any location on a network. A network service area is a region that encompasses all accessible areas via the streets network within a specified impedance/distance. The distance in each direction (and in turn the shape of the surface area) varies depending on, among other things, existence of streets, presence of barriers along each route (e.g. lack of footbridges and turns) or availability of pedestrian walkways along each street section. In the absence of

detailed information on barriers and walkability along each street network, the major assumption in creating the service areas is that all streets are walkable. Since the analysis is done at the city and national level, local knowledge can be used to exclude streets which are not walkable. The recommendation is to run the service area analysis for each public transport stop per applicable walking distance thresholds (500 m or 1 km), and then merge all individual service areas to create a continuous service area polygon.

In urban areas where paratransit is the main mode of public transport, the use of street networks along which the carriers stop should be used in place of the designated stops. Cities and countries are encouraged to provide notes on their type of public transport system (whether formal, informal paratransit or a mix).

d) **Estimation of population within the walkable distance to public transport:** The combined service area of 500 m walking distance to the low-capacity stops and 1km to the high-capacity stops generated in (c) above is overlaid in GIS with high resolution demographic data. The best source of population data for the analysis is individual dwelling or block level total population which is collected by National Statistical Offices through censuses and other surveys. Where this level of population data is not available, or where data is released at large population units, countries are encouraged to create population grids, which can help disaggregate the data from large and different sized census/ population data release units to smaller uniform sized grids. For more details on the available methods for creation of population grids, explore the links provided under the references section on "Some population gridding approaches". A generic description of the different sources of population data for the indicator computation is also provided in the detailed Indicator 11.2.1 training module (see link in references section). Once the appropriate source of population data is acquired, the total population with convenient access to public transport in the city will be equal to the population encompassed within the combined service area for all public transport modes.

e) **Estimation of the proportion of the population with convenient access to public transport out of the total population of the city or urban area.** Estimate the proportion of population with access to public transport within 500 m and 1 km walking distance out of the total population of the city or urban area. Countries and cities are encouraged to disaggregate the data on access to public transport by the capacity of the carriers - that is between low-capacity and high-capacity systems. Where applicable, countries and cities are also encouraged to disaggregate the data by type of carrier – whether formal or informal paratransit. The disaggregation is directly relevant in understanding the entire public transport system and also identifying the weaknesses and opportunities in the system which are relevant in making policy and investment decisions.

Matatu vehicles serve as public transportation in Nairobi Kenya © Julius Mwelu / UN-Habita.

3.4 Recommended secondary indicators

While the core indicator provides a good measurement that will help cities and urban areas identify their public transport situation, it does not cover the entire spectrum of information required to comprehensively analyse "convenient access" to public transport and to in turn inform policy and investments. Here, we recommend some secondary indicators which can be used to measure "convenient access" to public transport, and which may provide a useful complement to the core indicator of spatial distance to stops. Several are identified here, but there may be others. It should however be noted that these secondary indicators may require more data inputs and sometimes field-based surveys, and that their collection may vary significantly across jurisdictions making comparisons difficult. Despite this, these indicators provide critical information that can help cities and urban areas improve their public transport systems and ensure the needs of all urban dwellers are catered for. The suggested secondary indicators include:

- **Transit system performance:** The methodology described above for monitoring the core indicator covers public transport service solely based on spatial access to stops and does not address the performance of the system, such as frequency of service, capacity, comfort, etc. We note that performance aspects of public transport are important because a service within walking distance is not necessarily considered as accessible if waiting times are long, frequency of service is low or if conditions are unsafe/insecure. These are not included in the core indicator, but countries are encouraged to collect and report this information as a secondary indicator. Transport stakeholders participating in Expert Group Meeting held in Berlin on 19 -20 October 2017 recommended the use of 20 minutes average waiting time during peak hours (from 5 am to 9 pm) to assess the frequency of the service. This data can be acquired from public transport timetables for some cities, from public transport service providers or through surveys. This measurement may however be limited in cities where paratransit modes are prevalent since they often do not operate according to fixed schedules.
- **Affordability:** This can be used to further explain the indicator since access is only convenient for those who can afford the transport services. Affordability is often measured as the percentage of household income spent on transport of the poorest quintile of the population. Data can be obtained from surveys. The recommended indicator for affordability is that the poorest quintile should not spend more than 5% of their net household income on transport.

Public transport © Franklin Heijnen / Flickr.

- **Safety/security:** This parameter may be difficult to measure but could be quantitatively captured in part from accident and crime statistics near stations and on the transit systems themselves. For example, safety of the public transport can be measured by the share or number of crimes within the public transport system to the total crimes in the city. In addition, it is recommended to include a question on the perception of safety of public transport in the national crime surveys, or in transport user surveys.
- **Comfort & Access to Information:** An additional feature of "convenient access" may be the presence of information systems such as real-time electronic schedule displays or other user information systems (e.g. apps), while comfort may also relate to features on the system and typical crowding or load factor levels.
- **Modal shift to sustainable transport:** It is important to continuously monitor the modal share (percentage of travelers using a particular type of transportation incl. private cars, taxis, Non-motorised Transport, Public Transport, etc.), as well as passenger-km travelled on electric vehicles as percentage of total passenger-km travelled in the urban area from city mobility surveys. This parameter is important to understand the city's overall mobility mix, monitor the modal shift towards more sustainable transport over time, and provide actionable recommendations to move towards low carbon, shared, high capacity mobility systems in the future. The data on this secondary indicator is largely available for many cities. UN-Habitat thus requests for such information in the country reporting template every year to understand the transitions in the modal share.

Other measurement considerations which can be considered in the indicator measurement, and which can further improve understanding of prevailing public transport trends in cities include"

- **Alternative metrics of "spatial access":** In some cities, alternative modes to reach a public transport stop exist - such as safe cycling lanes, bike share systems or other forms of micro-mobility. In these contexts, experts in the transport sector have suggested that a cycling distance of 2 km can be included in the creation of service areas to each public transport stop.
- **Obstacles to reaching stations:** Distance to stations may be adjusted by taking into account factors that create obstacles and make accessing the station difficult, at least for some travelers. An obvious example is the presence of walkways along the street network and the need to take stairs or steep ramps to reach a station, making it difficult for elderly or people with disabilities. Alternative routes would need to be identified, or stations indicated as not providing convenient access for some population groups. To identify the prevailing limitations, field observations will be required, which should capture, among other information, availability of safe walkways along the street network and existence of ramps or elevators ("universal access"), and special seating areas for the elderly and disabled.

3.5 Achieving a higher level of "convenient access" – Access to opportunities

Beyond the secondary indicators for measuring convenient access to public transport lies another approach that understands Transportation as a means, not an end. This is based on the purpose of 'transportation' to gain access to destinations, activities, services and goods. Ultimately, people do not wish to access transit stations, they wish to access destinations, and even access non-physical objectives such as "opportunities".

Operationally, access to "opportunities" means the ability of individuals to reach desired final destinations in a reasonable amount of time, for a reasonable cost, with adequate safety/security/ comfort, etc. For example, this may be measured as a maximum one-hour travel time between any origins and destinations (O-Ds) within a city, or at least those O-D combinations used (or desired to be used) by individuals.

While measuring "access to opportunities" has more analytical and policy value to measuring "access to transit stations", it is more difficult and data intensive, so it is not proposed as the core indicator. Though, as data systems improve and cities become more able to collect the needed data, it may eventually make sense to shift to this as a core indicator. We note here that there are three basic types of data needed to construct this indicator:

- Data on the residential locations of individuals
- Data on the desired destinations of individuals (such as job, shopping, school, hospital locations)
- Data on the available travel options and travel times linking the origins to the destinations.

In fact, the first and third of these are very similar to what is needed to construct the core indicator, since residential locations and transit data are needed. The main additional data requirement is on the destinations, and there may be some additional complexities in putting the three types of data together. Efforts are ongoing to try to operationalize this approach and help cities beginning to collect the needed data.

3.6 Disaggregation

The core indicator of access to public transport stations, and the proposed secondary indicators can in principle be disaggregated by various characteristics of groups within the population, to track whether all such groups have good access. Information can be disaggregated as shown below, including potential disadvantages such as disability, and by various other characteristics. Obtaining such data typically requires major efforts (mainly surveys) and often changes in mainstream mechanisms of data collection.

Typical types of disaggregation include:

- Disaggregation by location (intra-urban).
- Disaggregation by income group.
- Disaggregation by sex.
- Disaggregation by accessibility for persons with disabilities.
- Disaggregation by age group .
- Disaggregation by type of public transport system (low-capacity vs high-capacity systems)
- Disaggregation by formality of public transport carrier (formal vs paratransit transport modes)
- Disaggregation by mode to reach public transport (walking vs cycling)

Quantifiable Derivatives:

- Proportion of urban area that is served by convenient public transport systems.
- Proportion of population/urban area that has convenient access to public transport stop with universal accessibility for people with disabilities.
- Proportion of population/urban area that has frequent access to public transport during peak hours.
- Proportion of population/urban area that has frequent access to public transport during off-peak hours.
- Proportion of population with access to low capacity systems (e.g. bus) and high capacity systems (e.g. metros), access by walking vs. biking, etc.
- Proportion of population with access to formal vs paratransit transport modes
- Share of population using different transport modes (modal share)

3.7 Treatment of missing values:

Data and information gaps are anticipated in the first few years of collection of data for this indicator, and this will be largely as a result of the slow adoption of the proposed methodology by the national governments and statistical systems. The spatial nature of the indicator and the variations in the definitions of what is public transport by countries will all affect the availability of data. Hence missing data for selected countries will be scored incrementally based initially on whether an existing public transport system is in place or not.

If public transport is in place, then a modelled level of availability will be used to estimate a score instead of reporting zero for missing data.

3.8 Sources of discrepancies:

For this indicator, national data built up from a “national sample of cities approach”, complemented with internationally available spatial data sources will be used to derive final estimates for reporting at national and global figures. As national agencies are responsible for data collection, no differences between country produced data and international estimated data on the indicator are expected to arise. Where such discrepancies exist, these will be resolved through planned technical meetings and capacity development workshops.

4.Data Sources

4.1 Description:

- **Location of public transport stops:** typically available from city administration or transport service providers, General Transit Feed Specification (GTFS) feeds, OpenStreetMap, Google (if not available at all, for instance in cities with informal paratransit services, innovative technologies/ apps and stakeholder consultations could assist the cities to map out the routes and stops).

- **Street Network**: Ideally available from city administration but could also come from OpenStreetMap, the Global Roads Open Access Data Set (gROADS) and other open source streets data providers.
- **Population data:** available from censuses or other demographic surveys at individual dwelling units or enumeration zones, which can be further disaggregated to uniform grids through population modelling approaches.
- **Number of residents per dwelling unit:** available from census/household surveys.
- **Demographic data for disaggregation:** typically available from household surveys that collect information both on household/individual characteristics and travel patterns. Must also provide information on the location of the respondent. These surveys could also be used to collect information about the perceived quality of the service, such as time to reach a station considering obstacles, typical wait times, safety, etc. Note that such household surveys are often not easily available and rarely updated on a frequent (e.g. every 2-3 years) basis.

4.2 Collection process:

At the Global level, all this data will be assembled and compiled for international consumption and comparison by the UN-Habitat and other partners. UN-Habitat and partners will explore several capacity building options to ensure that uniform standards for generation, reporting and analysing data for this indicator are applied by all countries and regions.

5. Data availability

This indicator is categorized under Tier II, meaning the indicator is conceptually clear and an established methodology exists but data is not easily available.

No internationally agreed methodology exists for measuring convenience and service quality of public transport. In addition, global/local data on urban transport systems do not exist. Moreover, data is not harmonized and comparable at the global level. Obtaining this data will require collecting it at municipal/city level with serious deficiencies in some areas where such data on public transport, transport infrastructure and demographics is not available... In addition, an open-source software platform for measuring accessibility, the Open Trip Planner Analyst (OTPA) accessibility tool, will be available to government officials and all urban transport practitioners. This tool was developed by the World Bank in conjunction with Conveyal (http://conveyal.com), this tool leverages the power of the OTPA engine and open standardized data to model block-level accessibility. The added value of the tool (free and user friendly) is its ability to easily calculate the accessibility of various opportunities and transportation scenarios.

Through a multi-stakeholder collaboration, data on access to public transport has been collected for 1200 cities and urban areas in all world regions which is incrementally being improved and continuously shared with countries to build on.

Women safety in public transport © CNN.com

6. Calendar

6.1 Data collection:

The monitoring of the indicator can be repeated at an annual interval, allowing several reporting points until the year 2030. Monitoring at annual intervals will allow to determining whether the proportion of the population with convenient public transport is increasing significantly over time, as well as monitor what is the share of the global urban population living in cities where the convenient access to public transport is below the acceptable minimum. Indicator 11.2.1 has the potential to measure improvement within short term intervals. Moreover, the disaggregated monitoring for this indicator will provide increasing attention on the access to transport especially among the vulnerable populations such as women, children, persons with disabilities and older persons. It will also help to track a modal shift towards more sustainable modes of transport including public transport integrated with walking and cycling.

UN-Habitat has developed simple reporting template appended to this metadata to collect city level data. The template, which will be send to countries on an annual basis is expected to be used until 2030, but slight changes may be effected as data on more aspects becomes available. The template is appended to this metadata and can also be accessed here.

6.2 Data release:

A three year window will be applied, based on availability of new data.

7. Data providers

National Focal points as designated by respective Governments underpins the governance framework for monitoring the Transport Target. Such focal points could be the ministries themselves, NSOs, academic or research institutions, Civil Society Organisations, transport operators or a combination of these working under an agreement facilitated by the National Government. UN-Habitat will be working with its partner organizations to support countries in the data collection efforts, by providing capacity building and quality assurance support. UN-Habitat and partners will also ensure the exchange of knowledge and experience between participating countries. Specific agreements will be drawn up with respective countries and cities for collaboration in the monitoring - as well as with partner organizations involved in transport data collection including the International Association of Public Transport (UITP), the Institute for Transport and Development Policy (ITDP), the World Bank, the International Transport Forum (ITF), the Partnership on Sustainable, Low Carbon Transport (SLoCaT), the Wuppertal Institute of Climate, Energy and Environment, the German Aerospace Center (DLR) and others. Comprehensive reporting will be undertaken on a biennial basis. Reports will be published in the public domain with data available in the UN-Habitat global databases.

8. Data compilers

UN-Habitat

9. References

URL:

1. http://unhabitat.org/ knowledge/data-and-analytics

References:

1. Alain Bertaud, Cities as Labor Markets, February 2014, http:// marroninstitute.nyu.edu/uploads/content/Cities_as_Labor_ Markets.pdf (Accessed May 29, 2016)
2. Tracking the SDG Targets: An Issue Based Alliance for Transport
3. http://unhabitat.org/planning-and-design-for-sustainable-urban-mobility-global-report-on-human-settlements-2013/
4. http://unhabitat.org/urban-themes/mobility/
5. http://www.digitalmatatus.com/
6. http://www.slocat.net/content-stream/187
7. https://www.jtlu.org/index.php/jtlu/article/view/683/665
8. http://data.london.gov.uk/dataset/public-transport-accessibility-levels/resource/86bbffe1-8af1-49ba-ac9b-b3eacaf68137/proxy
9. Presentations by transport stakeholders participating in Expert Group Meeting on 19/20 October 2017 in Berlin: https://www.dropbox.com/sh/ktfyvi34s3v4wzi/AADm4z0fvSJ17Se89zyU6lswa?dl=0
10. National Sample of Cities: https://unhabitat.org/national-sample-of-cities/#
11. Access to Opportunities (World bank): http://www.worldbank.org/en/topic/transport/brief/connections-note-25
12. Global Mobility Report 2017 (SUM4All): https://openknowledge.worldbank.org/bitstream/handle/10986/28542/120500.pdf?sequence=4
13. Coverage Areas for Public Transport: https://www.witpress.com/Secure/elibrary/papers/UT08/UT08017FU1.pdf
14. Detailed Indicator 11.2.1 training module: https://unhabitat.org/sites/default/files/2020/06/indicator_11.2.1_training_module_public_transport_system.pdf
15. Some population gridding approaches: https://sedac.ciesin.columbia.edu/data/collection/usgrid/methods; https://www.ciesin.columbia.edu/data/hrsl/; https://ec.europa.eu/eurostat/statistics-explained/index.php/Population_grids; https://www.worldpop.org/methods
16. Sustainable Mobility for All. 2017. Global Mobility Report 2017: Tracking Sector Performance. Washington DC, License: Creative Commons Attribution CC BY 3.0

UN HABITAT
FOR A BETTER URBAN FUTURE

United Nations Human Settlements Programme (UN-Habitat),
P.O. Box, 30030, Nairobi, 00100 Kenya.

Contact
Robert Ndugwa: robert.ndugwa@un.org
Chief, Data & Analytics Unit
Knowledge and Innovation Branch
UN-Habitat
www.unhabitat.org