Goal 1: Make cities and human settlements inclusive, safe, resilient and sustainable
Target 11.b: By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015–2030, holistic disaster risk management at all levels
Indicator 11.b.1: Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015–2030

Institutional information

Organization(s):

United Nations Office for Disaster Reduction (UNISDR)

Concepts and definitions

Definition:

NA

[a] An open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction established by the General Assembly (resolution 69/284) is developing a set of indicators to measure global progress in the implementation of the Sendai Framework. These indicators will eventually reflect the agreements on the Sendai Framework indicators.

Rationale:

The indicator will build bridge between the SDGs and the Sendai Framework for DRR. Increasing number of national governments that adopt and implement national and local DRR strategies, which the Sendai Framework calls for, will contribute to sustainable development from economic, environmental and social perspectives.

Comments and limitations:

The HFA Monitor started in 2007 and over time, the number of countries reporting to UNISDR increased from 60 in 2007 to 140+ countries now undertaking voluntary self-assessment of progress in implementing the HFA. During the four reporting cycles to 2015 the HFA Monitor has generated the world's largest repository of information on national DRR policy inter alia. Its successor, provisionally named the Sendai Monitor, is under development and will be informed by the recommendations of the OEIWG. A baseline as of 2015 is expected to be created in 2016-2017 that will facilitate reporting on progress in achieving the relevant targets of both the Sendai Framework and the SDGs.

Members of both the OEIWG and the IAEG-SDGs have addressed that indicators that simply count the number of countries are not recommended, instead that, indicators to measure progress over time have been promoted. Further to the deliberations of the OEIWG as well as the IAEG, UNISDR has proposed computation methodologies that allow the monitoring of improvement in national and local DRR strategies over time. These methodologies range from a simple quantitative assessment of the number of these strategies to a qualitative measure of alignment with the Sendai Framework, as well as population coverage for local strategies.

Methodology

Computation Method:

Note: Computation methodology for several indicators is very comprehensive, very long (about 180 pages) and probably out of the scope of this Metadata. UNISDR prefers to refer to the outcome of the Open Ended Intergovernmental Working Group, which provides a full detailed methodology for each indicator and sub-indicator.

The latest version of these methodologies can be obtained at:

http://www.preventionweb.net/documents/oiewg/Technical%20Collection%20of%20Concept%20Notes%20on%20Indicators.pdf

A short summary:

Summation of data from National Progress Reports of the Sendai Monitor

Disaggregation:

By country

By city (applying sub-national administrative units)

Treatment of missing values:

- At country level

  In the Sendai Monitor, which will be undertaken as a voluntary self-assessment like the HFA Monitor, missing values and 0 or null will be considered equivalent.

- At regional and global levels

  NA

Regional aggregates:

See under Computation Method.

It will be calculated, at the discretion of the OEIWG, as either a linear average of the index described in 3.3, or as a weighted average of the index times the population of the country, divided by global population.

Sources of discrepancies:

There is no global database collecting DRR policy information besides the HFA Monitor and the succeeding Sendai Monitor

Data Sources

Description:

National Progress Report of the Sendai Monitor, reported to UNISDR

Collection process:

The official counterpart(s) at the country level will provide National Progress Report of the Sendai Monitor.

Data Availability

Description:

Around 100 countries

The HFA Monitor started in 2007 and over time, the number of countries reporting to UNISDR increased from 60 in 2007 to 140+ countries now undertaking voluntary self-assessment of progress in implementing the HFA. Given the requirements for disaster risk reduction strategies enshrined in reporting on the SDGs and the targets of the Sendai Framework, it is expected that by 2020, all member states will report their DRR strategies according to the recommendations and guidelines by the OEIWG.

Time series:

2013 and 2015: HFA monitor

Calendar

Data collection:

2017-2018

Data release:

Initial datasets in 2017, a first fairly complete dataset by 2019

Data providers

Name:

The coordinating lead institution chairing the National DRR platform which is comprised of special purpose agencies including national disaster agencies, civil protection agencies, and meteorological agencies.

Description:

The coordinating lead institution chairing the National DRR platform which is comprised of special purpose agencies including national disaster agencies, civil protection agencies, and meteorological agencies.

Data compilers

UNISDR

References

URL:

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References:

The Open-ended Intergovernmental Expert Working Group on Indicators and Terminology relating to Disaster Risk Reduction (OEIWG) was given the responsibility by the UNGA for the development of a set of indicators to measure global progress in the implementation of the Sendai Framework, against the seven global targets. The work of the OEIWG shall be completed by December 2016 and its report submitted to the General Assembly for consideration. The IAEG-SDGs and the UN Statistical Commission formally recognizes the role of the OEIWG, and has deferred the responsibility for the further refinement and development of the methodology for disaster-related SDGs indicators to this working group.

http://www.preventionweb.net/drr-framework/open-ended-working-group/

The latest version of documents are located at:

http://www.preventionweb.net/drr-framework/open-ended-working-group/sessional-intersessional-documents

Related indicators

1.5; 11.5; 11.b; 13.1; 2.4; 3.6; 3.9; 3.d; 4.a; 6.6; 9.1; 9.a; 11.1; 11.3; 11.c; 13.2; 13.3; 13.a; 13.b; 14.2; 15.1; 15.2; 15.3; 15.9.

Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable
Target 11.b: By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015–2030, holistic disaster risk management at all levels
Indicator 11.b.2: Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies

Institutional information

Organization(s):

United Nations Office for Disaster Reduction (UNISDR)

Concepts and definitions

Definition:

NA

[a] An open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction established by the General Assembly (resolution 69/284) is developing a set of indicators to measure global progress in the implementation of the Sendai Framework. These indicators will eventually reflect the agreements on the Sendai Framework indicators.

Rationale:

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Methodology

Computation Method:

Note: Computation methodology for several indicators is very comprehensive, very long (about 180 pages) and probably out of the scope of this Metadata. UNISDR prefers to refer to the outcome of the Open Ended Intergovernmental Working Group, which provides a full detailed methodology for each indicator and sub-indicator.

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Disaggregation:

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Treatment of missing values:

- At country level

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- At regional and global levels

  NA

Regional aggregates:

See under Computation Method.

It will be calculated, at the discretion of the OEIWG, as either a linear average of the index described in Computation Method, or as a weighted average of the index times the population of the country, divided by global population.

Sources of discrepancies:

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Data Sources

Description:

National Progress Report of the Sendai Monitor, reported to UNISDR

Collection process:

The official counterpart(s) at the country level will provide National Progress Report of the Sendai Monitor.

Data Availability

Description:

Around 100 countries

The HFA Monitor started in 2007 and over time, the number of countries reporting to UNISDR increased from 60 in 2007 to 140+ countries now undertaking voluntary self-assessment of progress in implementing the HFA. Given the requirements for disaster risk reduction strategies enshrined in reporting on the SDGs and the targets of the Sendai Framework, it is expected that by 2020, all member states will report their DRR strategies according to the recommendations and guidelines by the OEIWG.

Time series:

2013 and 2015: HFA monitor

Calendar

Data collection:

2017-2018

Data release:

Initial datasets in 2017, a first fairly complete dataset by 2019

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Description:

The coordinating lead institution chairing the National DRR platform which is comprised of special purpose agencies including national disaster agencies, civil protection agencies, and meteorological agencies.

Data compilers

UNISDR

References

URL:

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References:

The Open-ended Intergovernmental Expert Working Group on Indicators and Terminology relating to Disaster Risk Reduction (OEIWG) was given the responsibility by the UNGA for the development of a set of indicators to measure global progress in the implementation of the Sendai Framework, against the seven global targets. The work of the OEIWG shall be completed by December 2016 and its report submitted to the General Assembly for consideration. The IAEG-SDGs and the UN Statistical Commission formally recognizes the role of the OEIWG, and has deferred the responsibility for the further refinement and development of the methodology for disaster-related SDGs indicators to this working group.

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Related indicators

1.5; 11.5; 11.b; 13.1; 2.4; 3.6; 3.9; 3.d; 4.a; 6.6; 9.1; 9.a; 11.1; 11.3; 11.c; 13.2; 13.3; 13.a; 13.b; 14.2; 15.1; 15.2; 15.3; 15.9.

Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable
Target 11.1: By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums
Indicator 11.1.1: Proportion of urban population living in slums, informal settlements or inadequate housing

Institutional information

Organization(s):

United Nations Human Settlements Programme (UN-Habitat)

Concepts and definitions

Definition:

Methodology – This indicator integrates the component of the population living in slums that has been monitored for the last 15 years by UN-Habitat in mostly developing countries with two new components – people living in inadequate housing and informal settlements - that aim at broadening the spectrum of inadequate living conditions to capture realities also present in more developed countries and wealthier urban contexts. By integrating these three components, the indicator is now universal and can be monitored in both developing and developed regions.

This indicator will focus on documenting the limitations manifested in realizing the right to adequate housing for all as measured through the proportion of the population that live in slums, informal settlements or inadequate housing. The below definitions and concepts are important for reporting on this indicator.

The proportion of urban population living in slums, informal settlements or inadequate housing is currently being measured by the proportion of urban population living in slums.

Rationale:

As the Millennium Development Goals (MDGs) are turning a page, the unprecedented proliferation of slums and informal settlements, and a chronic lack of adequate housing, continue to be amongst the major challenges of urbanization and its sustainability. Slums, informal settlements and inadequate housing are the face of poverty and inequality in cities, and no transformative action will be achieved in the world without addressing the challenge of urban poverty represented by them. Therefore, it is necessary to further ensure access for all to adequate housing and basic services and upgrade slums, for the full recognition of the urban poor as rightful urban dwellers, for realizing their potential and for enhancing their prosperity, and thus the prosperity of the whole urban environ.

This indicator is extremely relevant since it is partly a continuation of the MDGs (Target 7.D) and provides therefore also a comprehensive baseline for developing countries worldwide. As per all the agreed goals and targets, to measure the achievement of this indicator will require the mobilisation of the means required to efficiently monitor them, calling up for a revitalised partnership with the participation of all countries, all stakeholders and all communities concerned.

Today, in our world, one in eight people live in slums (UN-Habitat, 2016; UN-Habitat, 2015b). This means that a quarter of the world's urban population are slum dwellers. In several cities, poor families struggle to access adequate housing. Living in central locations often equals to inadequate living conditions, while living in peripheries, where housing can be more affordable, entails deprivation of basic services, urban amenities and access to livelihoods.

Slum upgrading and adequate housing have an equalizing impact in the distribution of prosperity, thus helping urban environs to be inclusive and end urban poverty in the world.

In order to address the wording proposed by Target 11.1 and Indicator 11.1, and to provide a statistical continuity between MDGs and SDGs in what refers to the people living in slums, the five components of the 'slum household' definition (access to improved water, access to improved sanitation, structural durability, overcrowding and security of tenure; all of them part of the definition of adequate housing) must form the basis to monitor SDG 11 Target 11.1, complemented by the extra indicators that will allow measurements referring to informal settlements and inadequate housing, respectively.

It is suggested that one extra indicator for inadequate housing and one for informal settlements – totaling seven variables to be measured – could keep the tracking of this target feasible. For example, in the case of informal settlements, the existence of a municipal permit is a workable means of measurement, while inadequate housing could be effectively measured through the affordability criteria, as at least 330 million households around the world are financially stretched by housing costs (McKinsey Global Institute, 2014).

Concepts:

a. Slums – In the wake of the MDGs' launching, an Expert Group Meeting was convened in 2002 by the United Nations Human Settlements Programme (UN-Habitat), the United Nations Statistics Division and the Cities Alliance to agree on an operational definition for slums to be used for measuring the indicator of MDG 7 Target 7.D, 'to have achieved by 2020 a significant improvement in the lives of at least 100 million slum dwellers'. The agreed definition classified a 'slum household' as one in which the inhabitants suffer one or more of the following 'household deprivations': 1) Lack of access to improved water source, 2) Lack of access to improved sanitation facilities, 3) Lack of sufficient living area, 4) Lack of housing durability and, 5) Lack of security of tenure. By extension, the term 'slum dweller' refers to a person living in a household that lacks any of the above attributes (UN-Habitat, 2003a).

These five components –derived from the 'adequate housing' definition (A/HRC/25/54, 2013; see below) – have been used, ever since for reporting and tracking of the MDGs, as the primary or secondary data measured to determine the number of slum dwellers living in developing countries, and they were also the basis to establish the successful achievement of MDG Target 7.D. For each component, the experts agreed with the following definitions (UN-Habitat, 2003b; United Nations, 2007):

Access to improved water – A household is considered to have access to improved drinking water if it has sufficient amount of water (20 litres/person/day) for family use, at an affordable price (less than 10% of the total household income) and available to household members without being subject to extreme effort (less than one hour a day for the minimum sufficient quantity), especially to women and children. An improved drinking water source is a facility that is protected from outside contamination, in particular from faecal matters' contamination. Improved drinking water sources include: piped water into dwelling, plot or yard; public tap/stand pipe serving no more than 5 households; protected spring; rainwater collection; bottled water (if secondary source is also improved); bore hole/tube well; and, protected dug well.

Access to improved sanitation – A household is considered to have access to improved sanitation if an excreta disposal system, either in the form of a private toilet or a public toilet shared with a reasonable number of people, is available to household members. Such improved sanitation facilities, therefore, hygienically separates human waste from human contact. Improved facilities include: flush/pour-flush toilets or latrines connected to a sewer, septic tank or pit; ventilated improved pit latrine; pit latrine with a slab or platform which covers the pit entirely; and, composting toilets/latrines.

Sufficient living area – A dwelling unit provides sufficient living area for the household members if not more than three people share the same habitable room. Additional indicators of overcrowding have been proposed: area-level indicators such as average in-house living area per person or the number of households per area. Additionally, housing-unit level indicators such as the number of persons per bed or the number of children under five per room may also be viable. However, the number of persons per room has been shown to correlate with adverse health risks and is more commonly collected through household surveys (UN-Habitat, 1998).

Structural quality/durability of dwellings – A house is considered as 'durable' if it is built on a non-hazardous location and has a permanent and adequate structure able to protect its inhabitants from the extremes of climatic conditions such as rain, heat, cold, and humidity. The following criteria are used to determine the structural quality/durability of dwellings: permanency of structure (permanent building material for the walls, roof and floor; compliance with building codes; the dwelling is not in a dilapidated state; the dwelling is not in need of major repair); and location of house (hazardous location; the dwelling is not located on or near toxic waste; the dwelling is not located in a flood plain; the dwelling is not located on a steep slope; the dwelling is not located in a dangerous right of way – rail , highway, airport, power lines).

Security of tenure – Secure tenure is the right of all individuals and groups to effective protection by the State against forced evictions. Security of tenure is understood as a set of relationships with respect to housing and land, established through statutory or customary law or informal or hybrid arrangements, that enables one to live in one's home with security, peace and dignity (A/HRC/25/54). Regardless of the type of tenure, all persons with security of tenure have a legal status against arbitrary unlawful eviction, harassment and other threats. People have secure tenure when: there is evidence of documentation that can be used as proof of secure tenure status; and, there is either de facto or perceived protection from forced evictions. Important progress has been made to integrate the measurement of this component into the computation of the people living in slums.

b. Informal Settlements – Informal settlements are not only found in the developing world, but they exist in the developed world, too. Similarly, informal housing units are not poverty's peculiarity, but they belong to all income levels. Therefore, informal settlements can be defined (United Nations, 2015; UN-Habitat, 2015b) as residential areas where: 1) inhabitants have no security of tenure vis-à-vis the land or dwellings they inhabit, with modalities ranging from squatting to informal rental housing, 2) the neighbourhoods usually lack, or are cut off from, basic services and formal city infrastructure and 3) the housing may not comply with current planning and building regulations, is often situated in geographically and environmentally hazardous areas, and may lack a municipal permit. Informal settlements can be a form of real estate speculation for all income levels of urban residents, affluent and poor. Slums are the poorest and most dilapidated form of informal settlements.

Informality should be understood as a technicality more than an income-based denomination that stigmatises the poor, therefore informal settlements' estimates should be based on a technical compliance relevant to all income levels. For example, an approved municipal permit for any given housing unit would be a clear indication of formality. If municipalities lack the capacity to deliver such a permit, this is an administrative gap that this indicator will also point out.

c. Inadequate Housing – Article 25 of the Universal Declaration of Human Rights includes ‘adequate housing’ as one of the components of the right to adequate standards of living for all. Adequate housing must provide more than four walls and a roof. The United Nations Committee on Economic, Social and Cultural Rights’ general comments No.4 (1991) on the right to adequate housing and No.7 (1997) on forced evictions have underlined that the right to adequate housing should be seen as the right to live somewhere in security, peace and dignity. For housing to be adequate, it must, at a minimum, meet the following criteria: 1) Legal security of tenure, which guarantees legal protection against forced evictions, harassment and other threats; 2) Availability of services, materials, facilities and infrastructure, including safe drinking water, adequate sanitation, energy for cooking, heating, lighting, food storage or refuse disposal; 3) Affordability, as housing is not adequate if its cost threatens or compromises the occupants’ enjoyment of other human rights; 4) Habitability, as housing is not adequate if it does not guarantee physical safety or provide adequate space, as well as protection against the cold, damp, heat, rain, wind, other threats to health and structural hazards; 5) Accessibility, as housing is not adequate if the specific needs of disadvantaged and marginalized groups are not taken into account (such as the poor, people facing discrimination; persons with disabilities, victims of natural disasters); 6) Location, as housing is not adequate if it is cut off from employment opportunities, health-care services, schools, childcare centres and other social facilities, or if located in dangerous or polluted sites or in immediate proximity to pollution sources; 7) Cultural adequacy, as housing is not adequate if it does not respect and take into account the expression of cultural identity and ways of life.

The measurement of ‘inadequate housing’ is meant to broaden that of slums and informal settlements particularly in the developed world where the ‘slum household’ definition is less applicable, ensuring the universality of Indicator 11.1. Even though countries with available data could measure the full spectrum of the adequate housing components, for the purpose of measurability it is recommended that only one of the elements of the adequate housing definition is selected for measurement. In this regard, affordability is not only a key housing adequacy criterion, but could be the most suitable means of measurement for inadequate housing, as affordability increasingly becomes a global crisis with strong negative impact on the wellbeing of people and on the exacerbation of urban inequality. The underlying principle is that households financial costs associated with housing should not threaten or compromise the attainment and satisfaction of other basic needs such as, food, education, access to health care, transport, etc. Based on the existing method and data through the Urban Indicators Program (1996-2006), affordability is measured as the net monthly expenditure on housing cost that exceeds 30% of the total monthly income of the household.

Comments and limitations:

Different local characteristics of poor housing units around the world and the under recognition of the slum challenge by some concerned authorities and stakeholders, have made it difficult to agree universally on some definitions and characteristics when referring to poor informal housing.

The lack of appropriate tools at national and city levels to measure all the components required to monitor indicator 11.1 has often brought challenges for statistics offices to reliably include all components that measure slums, sometimes resulting in the underestimation of poor housing units or slum households. We have scheduled several technical workshops and EGMs that will help build the capacity for reporting in the first 3 years of the 2030 Agenda for Sustainable Development.

In the case of security of tenure, its complicated relation with land and property makes it a difficult aspect to include in the different related surveys and, therefore, to measure and monitor due to lack of routine data. However, the most recent years, important progress has been made to integrate the measurement of this component into major surveys and censuses in several countries.

Also, Indicator 11.1 does not capture homelessness, as it is not included in household surveys.

Finally, many countries still have limited capacities for data management, data collection and monitoring, and continue to grapple with limited data on large or densely populated geographical areas. This means that complementarity in data reporting will be key to ensure that both national and global figures achieve consistencies in the final reported data.

Methodology

Computation Method:

Method of computation – This indicator considers three components to be computed as follows:

a) Slum households (SH): = 100[(Number of people living in slum)/(City population)]

b) Informal settlements households (ISH): = 100[(No.of people living in informal settlements households)/(City population)]

c) Inadequate housing households (IHH): = 100[(No. of people living in inadequate housing)/(City population)]

The unit of measurements for all these indicators will be %. At a later stage an index of measurements will be developed that will incorporate all measures and provide one estimate.

The data for this indicator is already being reported in nearly all developing countries in what refers to the slum component. We expect to carry this success, lessons learnt and experiences to the reporting of informal settlements and inadequate housing data for all countries.

Disaggregation:

Potential Disaggregation: Disaggregation by location (intra-urban), Disaggregation by income group, Disaggregation by sex, race, ethnicity, religion, migration status (head of household), Disaggregation by age (household members), Disaggregation by disability (household members)

Quantifiable Derivatives: Proportion of households with durable housing, Proportion of households with improved water, Proportion of households with improved sanitation, Proportion of households with sufficient living space, Proportion of households with security of tenure, Proportion of households with one (1) housing deprivation, Proportion of households with multiple (3 or more) housing deprivations, Proportion of households with approved municipal permit, Proportion of households with (in)adequate housing (affordability).

Treatment of missing values:

- At country level

  All countries are expected to fully report on this indicator more consistently with few challenges where missing values will be reported at the national/global level. At the national level, it is possible that missing values will be recorded perhaps representing gaps of non-measurements among populations whose status of slum-hood or informality or inadequate housing is not recorded or unknown or where data is unavailable. Because the values will be aggregated at the national levels, missing values will be less observed at these levels, but are likely to affect the estimates. At the survey and data collection level, survey procedures for managing missing values will be applied based on the unit of analysis/ primary sampling units.

- At regional and global levels

  Global estimates will be adjusted with modelling based on trends to cater for missing information or data.

Regional aggregates:

Regional and global estimates will be derived from national figures with an appropriate disaggregation level. Specialized tools will be developed and agreed upon with local and international stakeholders. Systems of quality assurance on the use of the tools, analysis and reporting will be deployed regionally, and global to ensure that standards are uniform and that definitions are universally applied.

Sources of discrepancies:

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 if standard methodologies and procedures are followed at all stages of the reporting process. Missing data and other local variables and frequency of data collection usually affects the figures reported at the global and national level. For this indicator, national data will be used to derive global figures. In instances where global values differ from national figures, efforts will be made for harmonization. There are many instances where lack of new data will be replaced with modelled data for the global figures. These figures will be acceptable for reporting at the national and global levels with the relevant notes attached to such figures. This is likely to be the case for countries where they have long intervals of collection of new data, or where countries face unstable situations such post-disaster or post-war years.

Data Sources

Description:

Data for the slum and informal settlement components of the indicator can be computed from Census and national household surveys, including DHS and MICS. Data for the inadequate housing component can be computed by using income and expenditure household surveys that capture household expenditures.

UN-Habitat will continue to provide technical support on the estimation of this indicator and its recent integration of spatial and risk analysis and the disaggregation of the information at city level will be further expanded for this indicator. So far, UN-Habitat collects information related to slums and improved shelter as part of the City Prosperity Initiative (CPI) including several other related indicators, such as: i) improved shelter; ii) access to improved water; iii) access to improved sanitation; and iv) overcrowding. Data is being collected for nearly 1000 cities around the world. The method of data collection and the use of this information are critical for the understanding of indicator 11.1. The inadequate housing component of the indicator has extensive evidence, studies and analysis that have been undertaken using collected data and some of these documents are listed as part of biographic references.

Collection process:

We expect that investments in improved data collection and monitoring at country level will produce incentives for governments to improve reporting and performance and also greater readiness to engage with multiple stakeholders in data collection and analysis and in achieving better understanding of the strengths and weaknesses of existing slum definitions and there applications. This will lessen the errors and improve the quality and timeliness of data reporting at the national level.

Data Availability

Description:

Data on slums is available for all developing countries as it has been reported by UN-Habitat in the Millennium Development Goals' reports in a yearly basis. Recently, UN-Habitat has disaggregated information on this indicator at city level, increasing its suitability for SDG 11, its target and indicators. The people living in slums' indicator is currently measured in more than 320 cities across the world as part of UN-Habitat City Prosperity Initiative. It is also a key element of the Participatory Slum Upgrading Programme implemented in 190 cities and in cooperation with around 4 million slum dwellers in Africa, the Caribbean and the Pacific as well as the resilience profiling currently underway.

Data on inadequate housing, measured through housing affordability, is available in many countries. UN-Habitat and World Bank computed this indicator for many years (1996-2006) as part of the Urban Indicators Programme. Recently, the Global Housing Indicators Working Group, a collaborative effort of Cities Alliance, Habitat for Humanity International, the Inter-American Development Bank, UN-Habitat proposed the collection of data on this indicator worldwide.

Time series:

The indicator is updated annually, depending on new data that becomes available in the reference year.

Calendar

Data collection:

All major surveys and census data collection process will continue to incorporate the aspects/components necessary for reporting on this indicator. The monitoring of this indicator will be repeated at regular intervals of 3-5 years, allowing for three-five year reporting points until the year 2030. (From NA to NA)

Data release:

Data has been produced annually for this indicator, and this trend is expected to continue throughout the lifetime of the SDGs.

Data providers

Name:

UN- Habitat, UNEP, Cities Alliance, Slum dwellers International, and World Bank

Description:

This indicator has largely been successfully due to the collaborations between several organizations and institutions including UN- Habitat, UNEP, Cities Alliance, Slum Dwellers International, and World Bank. There are several other experts who have also contributed to the development of the concepts, rationale and definitions, and metadata and will also support measurement, reporting and policy dialogue at the country level, based on the indicators. For primary reporting, national data provider especially the statistical agencies will play an important role of generation of the primary data through census and surveys.

Data compilers

Name:

UN-Habitat

Description:

Final Compilation & reporting at the global level will be lead and guided by UN-Habitat and selected partners.

References

URL:

http://unhabitat.org/urban-knowledge/global-urban-observatory-guo/

References:

Bibliographic References:

- United Nations (2007). Indicators of Sustainable Development: Guidelines and Methodologies. Third Edition, United Nations, New York

- A/HRC/25/54 (2013), Report of the Special Rapporteur on adequate housing as a component of the right to an adequate standard of living, and on the right to non-discrimination in this context

- UN-Habitat (2002) Urban Indicators Guidelines. Nairobi

- UN-Habitat, Global Urban Indicators Database 2012 a. Nairobi

- UN-Habitat (2002), Expert Group Meeting on Urban Indicators, Nairobi, Kenya, November 2002

- UN-Habitat (2003a), Slums of the World: The face of urban poverty in the new millennium

- UN-Habitat (2003b), Improving the Lives of 100 Million Slum Dwellers – Guide to Monitoring Target 11

- UN-Habitat (1998), Crowding and Health in Low Income Settlements of Guinea Bissau, SIEP Occasional Series No.1

- Global report on Human settlement on Slums (2002)

- Turkstra, J. and Raithelhuber, M. (2004). Urban slum Monitoring. ESRI User Conference paper 1667

- Urban Indicators Programme, World Bank and UN-Habitat, Guidelines

- Habitat for Humanity, Global Housing Indicators

- Habitat for Humanity, Housing Indicators for the Sustainable Development Goals, 2015

- McKinsey Global Institute (2014), A Blueprint for Addressing the Global Affordable Housing Challenge

- United Nations (2015), Conference on Housing and Sustainable Urban Development – Habitat III, Issue Paper No. 22 on Informal Settlements

- UN-Habitat, UN-AIDS (2015a) Ending the Urban Aids Epidemic. Nairobi

- UN-Habitat (2015b). Slum Almanac 2015-2016

- UN-Habitat (2016). World Cities Report 2016

URL References:

[1]: http://www.un.org/esa/sustdev/natlinfo/indicators/methodology_sheets.pdf,

[2]: http://unhabitat.org/urban-indicators-guidelines/

[3]: http://mdgs.un.org/unsd/mdg/Metadata.aspx?IndicatorId=0&SeriesId=710,

[4]: http://unhabitat.org/urban-initiatives/initiatives-programmes/participatory-slum-upgrading/

[5]: http://unhabitat.org/slum-almanac-2015-2016/

[6]: http://wcr.unhabitat.org/

[7]: http://www.unhabitat.org/programmes/guo/documents/EGM final report 4 Dec 02.pdf

Related indicators

1.1.1:
Proportion of population below the international poverty line, by sex, age, employment status and geographical location (urban/rural)

1.1.2:
Proportion of population below the international poverty line, by sex, age, employment status and geographical location (urban/rural)

6.1.1:
Proportion of population using safely managed drinking water services

6.2.1:
Proportion of population using safely managed sanitation services, including a hand-washing facility with soap and water

7.1.1:
Proportion of population with access to electricity

8.3.1:
Proportion of informal employment in non-agriculture employment, by sex

8.5.2:
Unemployment rate, by sex, age and persons with disabilities

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 population that has convenient access to public transport, by sex, age and persons with disabilities

Institutional information

Organization(s):

United Nations Human Settlements Programme (UN-Habitat)

Concepts and definitions

Definition:

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 an officially recognized stop is accessible within a distance of 0.5 km from a reference point such as a home, school, work place, market, etc. 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

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 the comprehensible way. The transportation system is a critical enabler of economic activities and social inclusion. The 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 make 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 CO_2 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.

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 distance of 0.5 km from a reference point such as a home, school, work place, market, etc. 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

Public transport is defined as a shared passenger transport service that is available to the general public. It includes cars, buses, trolleys, trams, trains, subways, and ferries that are shared by strangers without prior arrangement. However, it excludes taxis, car pools, and hired buses, which are not shared by strangers without prior arrangement. It also excludes informal, unregulated modes of transport (para-transit), motorcycle taxis, three-wheelers, etc.

Public transport refers to a public service that is considered as a public good that has well designed ‘stops’ for passengers to embark and disembark in a safe manner and demarcated ‘routes’ that are both officially and/or formally recognized.

Additional methodological comments:

The method to estimate the proportion of the population that has convenient access to public transport is based on four steps:
a) Spatial analysis to delimit the built-up area of the urban agglomeration:

Delimit the built-up area of the urban agglomeration and calculate the total area (square kilometres). Area of delimitation should be aligned with census enumeration areas to match with demographic data.

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

Information can be obtained from city administration or service providers. In some cases where this information is lacking, incomplete or outdated, open sources and community-based maps, which are increasingly recognized as a valid source of information, can be a viable alternative.

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) Estimation of urban area with access to public transport:

To calculate the indicator it is necessary to use a map with the inventory of officially-recognized public transport stops and create a buffer area of 500m radius for each stop. Merge and clip with boundary of the boundary built-up area of the urban agglomeration.

d) Estimation of the proportion of the population with convenient access out of the total population of the city:

Overlay GIS demographic data on the number of dwellings within the area with access to public transport stop. Calculate the population within those dwellings. Estimate the proportion of population out of the total population of the city.

Complementary to the above, other parameters of tracking the transport target include the following:

a) Accessibility related to urban planning: this parameter can be measured using density (people/sq.km) from census surveys, Percentage of street space in cities and Number of Intersections / Sq.Km from analysis of earth observations and/or city maps. Density is an important determinant for the efficiency of public transport systems. The adequacy of streets and crossings determine urban accessibility to a great extent.

b) Accessibility related to transport planning: this parameter can be measured using Percentage of population within 500m of mass transit stop from City maps and sample survey data.

c) Affordability: this can be obtained from Percentage of household income of lowest quintile of population spent on transport from Sample surveys and WTP surveys. Poorest quintile should not spend more than 5% (TBD) on transport.

d) Quality: this parameter can be measured using travel time, universal access, safety, security, comfort and user information from sample surveys.

e) Modal shift to sustainable transport: this is also expressed in Modal share (cars, NMT, PT), Passenger KM travelled on EV as percentage of total passenger KM travelled in urban areas from City mobility surveys. This parameter is also important due to transport's contribution to carbon emissions and air quality issues in cities.

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.

It is recognized that convenience measured as distance does not categorize the quality of the public transport which will vary from country to country. Nevertheless, the proposed indicator is a comparable and objective measurement that can be assessed in cities across regions.

Other factors of this indicator such as affordability, safety, and universal accessibility may influence the usage of public means of mobility beyond proximity to the transport stop. Yet, the provision of widely accessible public transport is a precondition for its usage.

Finally, high capacity public transport, such as trains allows for a larger capture area, beyond the 0.5km of the proposed indicator.

It is also recognized that there are various forms of public transport in the member countries that are not fully defined or captured in this methodology. In particular, many developing countries have access to public transport that is available anywhere on the streets and not necessarily at designated public transport stops. The creation of designated stops is a precondition of measurement in these countries.

Methodology

Computation Method:

Method of Computation

This indicator is computed based on the following criteria:

The identification of service areas is typically achieved using the buffering operation (using GIS) by constructing lines of equal proximity around each public transport stop or each public transport route. The buffering operation clearly involves at least two decisions. The first decision is whether routes or stops should be used as the reference of measurement. The two approaches may lead to very different values of spatial availability. But generally, public transport stops offer a more appropriate basis than routes for estimating service area coverage because stops are the actual locations where public transport users access the system. The other decision involved in the buffering operation is the buffer size. A common practice in public transport planning is to assume that people are served by public transport if they are within 0.5km (or 500m) of either a public transport route or stop. Once a distance threshold is defined, buffers are created around the public transport features. Some studies measure the distance based on air, or Euclidean, distance, while others use network distance (that is, the walk distance computed using the street network to reach a public transport feature. Since the network distance between two locations in space is greater than, or equal to, the corresponding air distance, the size of a coverage area defined by the network distance will be smaller than, or equal to, that defined by air distance. Network distance measures are likely to be more realistic because they reflect the configuration of the street network and recognize the presence of any man-made barriers preventing direct access to public transport features. 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. Using travel time is preferable to distance as a measure of proximity because travel time measures account for such 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 rarely used in practice. For this indicator the public transport stop will be used as the point of service.

The identification of the population served

Once a service buffer is constructed, the next step is to overlay the buffer onto other polygons, such as census tracts, for which socio-demographic data (such as population figures, disabled persons, type of residence area, etc. is available. These polygons are referred to as the analysis zones. Typically, a service buffer (denoted as i) intersects, either fully or partially, with more than one analysis 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 in each of the intersecting areas, Pij . Hence

Pi=?_(j=1)^J ¦Pij

Where, Pij is estimated based on the amount of interaction between service buffer i and analysis zone j.

In estimating Pij it is assumed that the population is uniformly distributed within the analysis zones.

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 population with access to public transport out of the entire city population will be computed as;

Percentage with access to Public transport =100x (population with convenient access to Public transport)/(City Population)

Disaggregation:

Information can be disaggregated as shown below, including potential disadvantages such as disability, but it requires strong efforts and changes in mainstream mechanisms of data collection:
Disaggregation by location (intra-urban).
Disaggregation by income group.
Disaggregation by sex (female-headed household).
Disaggregation by race (head of household).
Disaggregation by ethnicity (head of household).
Disaggregation by migratory status (head of household).
Disaggregation by age (households inhabitant).
Disaggregation by mode of public transport.

Quantifiable Derivatives:
- Proportion of urban area that has convenient access to public transport.
- 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 urban central/suburban area that has convenient access to public transport.

Treatment of missing values:

- At country level

  Missing data is 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.

- At regional and global levels

  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. This methodology will be further developed and refined at the first technical working group/EGM for this indicator.

Sources of discrepancies:

For this indicator, national data 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.

Data Sources

Description:

The actual and recommended data sources for this indicator are the following:
- Data on location of public transport stops in city: city administration or service providers, GIS data
- Dwelling units within 500m of public transport stops: Census, GIS data
- Number of residents per dwellings unit: Census/household survey
- Household surveys that collect information on the proportion of households that declare they have access to public means of transport within 0.5 km. These surveys can also collect information about the quality of the service.

Due to its spatial nature, the use of the urban agglomeration is a precondition for the measurement and comparability of this indicator.

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.

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 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 such as data on mass transit and on transport infrastructure. 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. An Expert group meeting is planned later in 2016 that will harmonize the tools and existing data to ensure a more uniform and standard format for reporting on this indicator.

Calendar

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. The proposed indicator 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.

Data release:

Two year to five year windows will be applied, based on availability of new data.

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, operators or a combination of these working under an agreement facilitated by the National Government. A secretariat or resource centre, comprising UN-Habitat and its partner organizations will work with the National Focal Points, providing capacity building and quality assurance support. The resource centre 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. The monitoring framework will be disseminated in UITP and other transport events. A dedicated team combining UN-Habitat and the International Association of Public Transport (UITP) staff will be set up and these will lead the annual monitoring and reporting. 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.

Data compilers

UN-Habitat

References

URL:

http://unhabitat.org/urban-knowledge/global-urban-observatory-guo/

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

Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable
Target 11.3: By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries
Indicator 11.3.1: Ratio of land consumption rate to population growth rate

Institutional information

Organization(s):

United Nations Human Settlements Programme (UN-Habitat)

Concepts and definitions

Definition:

The indicator is defined as the ratio of land consumption rate to population growth rate.

This indicator requires defining the two components of population growth and land consumption rate. Computing the population growth rate is more straightforward and more readily available, while land consumption rate is slightly challenging, and requires the use of new techniques. In estimating the land consumption rate, one needs to define what constitutes "consumption" of land since this may cover aspects of "consumed" or "preserved" or available for "development" for cases such as land occupied by wetlands. Secondly, there is not one unequivocal measure of whether land that is being developed is truly "newly-developed" (or vacant) land, or if it is at least partially "redeveloped". As a result, the percentage of current total urban land that was newly developed (consumed) will be used as a measure of the land consumption rate. The fully developed area is also sometimes referred to as built up area.

Rationale:

Globally, land cover today is altered principally by direct human use: by agriculture and livestock raising, forest harvesting and management and urban and suburban construction and development. A defining feature of many of the world's cities is an outward expansion far beyond formal administrative boundaries, largely propelled by the use of the automobile, poor urban and regional planning and land speculation. A large proportion of cities both from developed and developing countries have high consuming suburban expansion patterns, which often extend to even further peripheries. A global study on 120 cities shows that urban land cover has, on average, grown more than three times as much as the urban population [1]; in some cases similar studies at national level showed a difference that was three to five times fold. [3]. In order to effectively monitor land consumption growth, it is not only necessary to have the information on existing land use cover but also the capability to monitor the dynamics of land use resulting out of both changing demands of increasing population and forces of nature acting to shape the landscape.

Cities require an orderly urban expansion that makes the land use more efficient. They need to plan for future internal population growth and city growth resulting from migrations. They also need to accommodate new and thriving urban functions such as transportation routes, etc., as they expand.

However, frequently the physical growth of urban areas is disproportionate in relation to population growth, and these results in land use that is less efficient in many forms. This type of growth turns out to violate every premise of sustainability that an urban area could be judged by including impacting on the environment and causing other negative social and economic consequences such as increasing spatial inequalities and lessening of economies of agglomeration.

This indicator is connected to many other indicators of the SDGs. It ensures that the SDGs integrate the wider dimensions of space, population and land adequately, providing the framework for the implementation of other goals such as poverty, health, education, energy, inequalities and climate change. The indicator has a multipurpose measurement as it is not only related to the type/form of the urbanization pattern. It is also used to capture various dimensions of land use efficiency: economic (proximity of factors of production); environmental (lower per capita rates of resource use and GHG emissions); social (reduced travel distance and cost expended). Finally, this indicator integrates an important spatial component and is fully in line with the recommendations made by the Data Revolution initiative.

Concepts:

Population growth rate (PGR) is the increase of a population in a country during a period, usually one year, expressed as a percentage of the population at the start of that period. It reflects the number of births and deaths during a period and the number of people migrating to and from a country.

Land consumption includes: (a) The expansion of built-up area which can be directly measured; (b) the absolute extent of land that is subject to exploitation by agriculture, forestry or other economic activities; and (c) the over-intensive exploitation of land that is used for agriculture and forestry.

Comments and limitations:

In some cases, it is difficult to measure the urban expansion by conurbations of two or more urban areas that are in close proximity; to whom to attribute the urban growth and how to include it as one metric usually becomes a challenge. At the same time, data would not always coincide to administrative levels, boundaries and built-up areas. However, the European Commission highlights some possible drawbacks of this indicator that can be technically addressed. Efforts to use the area of reference at the level of the built-up area of the urban agglomeration should be taken into consideration. The delimitation of city boundaries may be another methodological problem that a clear agreed definition can solve.

The indicator may experience difficulties in capturing cities with negative or zero population growth; or cities that due to severe disaster have lost part of their territories. To face this challenge, the baseline/benchmark of population density and its change over time must be taken into consideration. Reducing densities below sustainable levels have impacts on the cities' sustainability.

In the absence of the GIS layers, this indicator may not be computed as defined. As a result more alternative measures for land that is developed or consumed per year can be adequately used. Alternatively, one can monitor the efficient use of urban land by measuring how well we are achieving the densities in residential zones that any city plans or international guidance call for. Comparing achieved to planned densities is very useful at the city level. However, planned densities vary greatly from country to country, and at times from city to city. At the sub-regional or city levels, it is more appropriate to compare average densities achieved currently to those achieved in the recent past. While building more densely does use land more efficiently, high density neighborhoods, especially in and around urban centers, have a number of other advantages. They support more frequent public transportation, and more local stores and shops; they encourage pedestrian activity to and from local establishments; and they create lively (and sometimes safer) street life.

Methodology

Computation Method:

The formula to estimate the land use efficiency will be provided with two stages.

Stage 1: Estimate the population growth rate.

Population Growth rate i.e. PGR=LN(Popt_(t+n)/?Popt_t)/((y))

Where
Popt Total population within the city in the past/initial year
Popt+n Total population within the city in the current/final year
y The number of years between the two measurement periods

Stage 2: Estimating the land consumption rate

This rate gives us a measure of compactness which indicates a progressive spatial expansion of a city.

Land consumption rate i.e LCR=LN(Urb_(t+n)/Urb_t)/((y))

Where
Urb_t Total areal extent of the urban agglomeration in km2 for past/initial year
Urb_(t+n) Total areal extent of the urban agglomeration in km2 for current year
y The number of years between the two measurement periods

The formula to estimate the ratio of land consumption rate to population growth rate (LCRPGR) is provided as follows:

LCRPGR= (+ (Land Consumption rate)/(Annual Population growth rate)¦)

And the overall formula can be summarized as:
LCRPGR=(((LN(Urb_(t+n)/Urb_t))/y))/((LN(Pop_(t+n)/Pop_t)/y))

The periods for both- urban expansion and population growth rates should be at comparable scale.

Disaggregation:

Potential Disaggregation:
- Disaggregation by location (intra-urban)

- Disaggregation by income level
- Disaggregation by urban typology

Quantifiable Derivatives
- Population density
- Population density growth/reduction rate
- Annual amount of urban expansion (km2)

Percentage of urban expansion in relation to the urban footprint area

Treatment of missing values:

- At country level

  All countries are expected to fully report on this indicator more consistently after 2-3 years with few challenges where missing values will be reported due to missing base map files. Therefore any missing values will be representative of populations where either population growth figures are unavailable or land consumption rates are inestimable. Because the values will be aggregated at the national levels from a national sample of cities, missing values will be less observed at national and global levels

- At regional and global levels

  See section above.

Regional aggregates:

Data at the global/regional levels will be estimated from national figures derived from national sample of cities. Regional estimates will incorporate national representations using a weighting by population sizes. Global monitoring will be led by UN-Habitat with the support of other partners and regional commissions.

Sources of discrepancies:

Based on several consultations, we note that in order to calculate the land use efficiency ratio we must stabilize the definition of population and spatial footprint of the city which is literally defined as “urban extension”. Unclear spatial definitions and an occasional use of admin boundaries arbitrarily set for population and surface accounting creates more spatially-generated noise than signal in the final accounting of the indicators. Already some spatial noise is particularly created by the use of ratios. The following data sources will be harmonized to ensure more consistent reporting on this indicator--Satellite data, built-up areas grids, time-standardized census population grids; globally complete classification grids can be aggregated to admin units but may create inconsistencies if they are not available for all cities, allowing to classify them by dominance of the urban/rural surfaces or similar approaches.

Data Sources

Description:

Data for this indicator is available for all cities and countries (UN DESA population data) and satellite images from open sources. Several sources of information are required for this computation: Satellite imagery from open sources or the exact measurements in km squared of the built up areas or the land that is fully developed in Km squared, annual urban population data for the reference years of analysis.

Data for the size of the city land that is currently considered as developed is usually available from the urban planning units of the cities. New options using remote sensing techniques have also been developed to estimate the land that is currently developed or considered as built up areas out of the total city land. This option also accurately extracts land that is considered as wetlands and hence unlikely to be occupied now or in the future.

When the spatial measurement option is used, the use of the urban agglomeration (built-up area) is a precondition for the measurement and comparability of this indicator. Data for this indicator can be easily availed using global and local sources. The indicator has been collected and analyzed since 2000 by several municipalities and countries. Various governments (Mexico, Colombia Brazil, India, Ethiopia, etc., and most European countries) have collected data on this indicator recently.

Eurostat collects data on this indicator using other comparable techniques. World Bank and Lincoln Institute collected data for 120 cities and published it in the Atlas of Urban Expansion. [02]. Currently UN-Habitat, Lincoln Institute and New York University prepared a similar study for another 200 cities. UN-Habitat City Prosperity Initiative is collecting data on this indicator for nearly 300 cities as part of the Agency's efforts to integrate spatial analysis in the SDGs.

Collection process:

National level capacity building initiatives will aim to balance the knowledge and understanding of the analysis, compilation and reporting of this indicator. Global reporting will rely on the estimates that come from the national statistical agencies. With uniform standards in computation at the national level, few errors of omission or bias will be observed at the global/regional level. A rigorous analysis routine will be used to re-assess the quality and accuracy of the data at the regional and global levels. This will involve cross-comparisons with expected ranges of the values reported for cities.

Data Availability

Description:

This indicator is categorized under Tier II, meaning the indicator is conceptually clear and an established methodology exists but data on many countries is not yet available. The Global Human Settlement Layer (GHSL) technology open framework is proposed for global open spatial baseline data production (built-up and population grids) – global open data is available and will be updated by EU support plus international partnership, the tools will be opened to national Authorities by a new platform and capacity building program that will be soon made available with the support of the EU and Habitat. Every country will soon be able to build their own set of built-up and population grids, or to use the globally-available ones.

Time series:

Available time series runs at the city and national level for selected countries

Calendar

Data collection:

The monitoring of the indicator can be repeated at regular intervals of 5 years, allowing for three reporting points until the year 2030. Initial reporting is targeted for 2017 for all cities in the global sample of cities.

Data release:

Updates will be undertaken every year, which would allow for annual updates in reporting at the global level post 2017.

Data providers

UN-Habitat and other partners such as the Global Human Settlement Layer (GHSL) team and ESRI will support various components for reporting on this indicator. The global responsibility of building the capacity of national governments and statistical agencies to report on this indicator will be led by UN-Habitat. National governments/national statistical agencies will have the primary responsibility of reporting on this indicator at national level with the support of UN-Habitat to ensure uniform standards in analysis and reporting.

Data compilers

Name:

UN-Habitat

Description:

UN-Habitat with the support of other selected partners will lead the compilation of data for this indicator.

References

URL:

http://unhabitat.org/urban-knowledge/global-urban-observatory-guo/

References:

Blais, P. (2011). Perverse cities: hidden subsidies, wonky policy, and urban sprawl. UBC Press.

Ewing, R., Pendall, R, and Chen, D. (2002). Measuring Sprawl and its Impact. Smart Growth America. [6]

Glaeser and Abha Joshi-Ghani. (2015). “Rethinking Cities,” in The Urban Imperative: towards Competitive Cities, Oxford University Press.

Global Commission on the Economy and Climate. (2014). Better Growth, Better Climate: The New Climate EconomyReport. Washington DC: Global Commission on the Economy and Climate. [7]

Global Commission on the Economy of Cities and Climate (2015), Accelerating Low Carbon Growth in the World’s Cities [8]

Lincoln Institute (n.d) Atlas of Urban Expansion [2]

Lincoln institute (2011) Making Room for a Planet of Cities [1]

OECD (2013), “Urbanisation and urban forms”, in OECD Regions at a Glance 2013, OECD Publishing. [6]

Robert Burchell et al., Costs of Sprawl Revisited: The Evidence of Sprawl’s Negative and Positive Impacts, Transit Cooperative Research Program, Transportation Research Board, Washington, D.C., 1998
Sedesol (2012) La expansión de las ciudades 1980-2010. [3]

UN-Habitat (2012) State of the World’s Cities Report: Bridging the Urban Divide, 2012. Nairobi [5]

UN-Habitat, CAF (2014) Construction of More Equitable Cities. Nairobi [4]

Smart Growth America, Measuring Sprawl 2014 [9]

Woetzel, J., Ram, S., Mischke, J., Garemo, N., and Sankhe, S. (2014). A blueprint for addressing the global affordable housing challenge. McKinsey Global Institute. [10]

URL References:

[1] http://www.lincolninst.edu/pubs/1880_Making-Room-for-a-Planet-of-Cities-urban-expansion
[2] http://www.lincolninst.edu/subcenters/atlas-urban-expansion/
[3] http://ciczac.org/sistema/docpdf/capacitacion/foro%20sedatu/02.-%20LA%20EXPANSION%20DE%20LAS%20CIUDADES%201980-2010.pdf

[4] http://unhabitat.org/books/construction-of-more-equitable-cities/
[5] http://unhabitat.org/books/state-of-the-worlds-cities-20102011-cities-for-all-bridging-the-urban-divide/)
[6] http://dx.doi.org/10.1787/reg_glance-2013-7-en
[7] http://newclimateeconomy.report/TheNewClimateEconomyReport
[8] http://2015.newclimateeconomy.report/wp-content/uploads/2014/08/NCE2015_workingpaper_cities_final_web.pdf
[9] http://www.smartgrowthamerica.org/documents/measuring-sprawl-2014.pdf, www.smartgrowthamerica.org/documents/MeasuringSprawlTechnical.pdf.
[10] http://www.mckinsey.com/insights/urbanization/tackling_the_worlds_affordable_housing_challenge
[11] http://www.worldbank.org/depweb/english/teach/pgr.html (Accessed on May 30, 2016)
[12] http://indicators.report/indicators/i-68/ (Accessed on May 30, 2016)
[13] http://glossary.eea.europa.eu (Accessed on May 30, 2016)

Related indicators

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

11.6.2:
Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)

11.7.1:
Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities

11.a.1:
Proportion of population living in cities that implement urban and regional development plans integrating population projections and resource needs, by size of city

15.1.2:
Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type

3.9.1:
Mortality rate attributed to household and ambient air pollution

6.1.1:
Proportion of population using safely managed drinking water services

6.2.1:
Proportion of population using safely managed sanitation services, including a hand-washing facility with soap and water

6.3.1:
Proportion of wastewater safely treated

7.1.1:
Proportion of population with access to electricity

7.2.1:
Renewable energy share in the total final energy consumption

8.1.1:
Annual growth rate of real GDP per capita

8.2.1:
Annual growth rate of real GDP per employed person

8.5.2:
Unemployment rate, by sex, age and persons with disabilities

11.6.1:
Proportion of urban solid waste regularly collected and with adequate final discharge out of total urban solid waste generated, by cities

11.7.2:
Proportion of persons victim of physical or sexual harassment, by sex, age, disability status and place of occurrence, in the previous 12 months

11.b.1:
Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015-2030 [a]

Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable
Target 11.5: By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations
Indicator 11.5.1: Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population

Institutional information

Organization(s):

United Nations Office for Disaster Reduction (UNISDR)

Concepts and definitions

Definition:

Death: The number of people who died during the disaster, or directly after, as a direct result of the hazardous event

Missing: The number of people whose whereabouts is unknown since the hazardous event. It includes people who are presumed dead although there is no physical evidence. The data on number of deaths and number of missing are mutually exclusive.

Affected: People who are affected, either directly or indirectly, by a hazardous event.

Directly affected: People who have suffered injury, illness or other health effects; who were evacuated, displaced, relocated or have suffered direct damage to their livelihoods, economic, physical, social, cultural and environmental assets.

Indirectly affected: People who have suffered consequences, other than or in addition to direct effects, over time due to disruption or changes in economy, critical infrastructures, basic services, commerce, work or social, health and psychological consequences.

* In this indicator, given the difficulties in assessing the full range of all affected (directly and indirectly), UNISDR proposes the use of an indicator that would estimate “directly affected” as a proxy for the number of affected. This indicator, while not perfect, comes from data widely available and could be used consistently across countries and over time to measure the achievement of the Target B of the Sendai Framework.

[a] An open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction established by the General Assembly (resolution 69/284) is developing a set of indicators to measure global progress in the implementation of the Sendai Framework. These indicators will eventually reflect the agreements on the Sendai Framework indicators.

Rationale:

The disaster loss data on mortality is significantly influenced by large-scale catastrophic events, which represents important outliers in terms of mortality, as they normally imply considerable numbers of people killed. UNISDR recommends Countries to report the data by event, so complementary analysis to determine true trends can be done by both including and excluding such catastrophic events that can represent important outliers in terms of mortality.

Concepts:

See under Definitions.

Comments and limitations:

Not every country has a comparable national disaster loss database that is consistent with these guidelines (although current coverage exceeds 89 countries). Therefore, by 2020, it is expected that all countries will build/adjust national disaster loss databases according to the recommendations and guidelines by the OEIWG.

As stated by Member States in the First and Second Sessions of the OEIWG, data of "Missing/Presumed dead" is not consistently collected. For many countries, the separation of data on "Missing/Presumed dead" from "Deaths/Deceased", or the collection of data on "Missing/Presumed dead" will require to report against the two separate indicators.

Methodology

Computation Method:

Note: Computation methodology for several indicators is very comprehensive, very long (about 180 pages) and probably out of the scope of this Metadata. UNISDR prefers to refer to the outcome of the Open Ended Intergovernmental Working Group, which provides a full detailed methodology for each indicator and sub-indicator.

The latest version of these methodologies can be obtained at:

http://www.preventionweb.net/documents/oiewg/Technical%20Collection%20of%20Concept%20Notes%20on%20Indicators.pdf

A short summary:

Summation of data on related sub-indicators from national disaster loss databases divided by the sum of relative figures of global population data (e.g. World Bank or UN Statistics information).

Affected people will be calculated as summation of sub-indicators. Several of sub-indicators will be calculated based on country averages of inhabitants per household, number of workers per hectare of agriculture, per livestock, per industry and per commerce.

Disaggregation:

Further to the recommendations of both the OEIWG and the IAEG-SDGs, the Secretariat recommends disaggregating data:

-By country, by event, by hazard type, by hazard family (e.g. using the IRDR classification, natural hazards can be disaggregated as climatological, hydrological, meteorological, geophysical, biological and extra-terrestrial)

-By deaths / missing

-Additionally, the OEIWG proposed disaggregation by age, sex, location of residence and other characteristics (e.g. disability) as relevant and possible, in order to align with SDG's requirements. The Secretariat encourages the adoption of these recommendations.

-Aggregation of "location of residence": ideally by sub-national administrative unit, similar to municipality.

Treatment of missing values:

- At country level

  In National Disaster Loss database data missing values and 0 or null are considered equivalent. This is a consequence of the typical form of disaster situation reports, which account only for those impacts that occurred. Normally impacts that not occur are simply not reported (i.e. there are no explicit reports that something didn't happen, for example if no agricultural damage occurs in a disaster, the associated report simply does not have a section on agriculture, instead of a section stating no impact occurred).

- At regional and global levels

  NA

Regional aggregates:

See under Computation Method.

It will be calculated as the summation of mortality per country divided by the total population.

Sources of discrepancies:

Threshold (e.g. including/excluding small/large scale disasters): International Data Sources record only events that surpass some threshold of impact. For example, EMDAT records only events with mortality greater than 10, affected greater than 100 or an international declaration. Private Insurance or Reinsurance global disaster databases record only events that have insured losses, which affects negatively countries with low insurance market penetration.

Methodology / definition: International data sources use secondary data sources to assemble their datasets. These data sources usually have non uniform or even inconsistent methodologies, producing heterogeneous datasets.

Observation (national level data is more comprehensive): International data collectors, due to limitations on access to information, do not record a large number of events that are not publicised internationally, or are never 'seen' by the secondary data sources used.

Data Sources

Description:

National disaster loss database, reported to UNISDR

Collection process:

The official counterpart(s) at the country level will build/adjust national disaster loss databases according to the recommendations and guidelines by the OEIWG.

Data Availability

Description:

Around 100 countries:

The number of countries with national disaster loss databases using the DesInventar tools and methodology currently stands at 89 countries. Given the requirements for disaster loss data enshrined in reporting on the SDGs and the targets of the Sendai Framework, it is expected that by 2020, all member states will have built or adjusted their national disaster loss databases according to the recommendations and guidelines by the OEIWG.

Time series:

From 1990 to 2013: National Disaster Loss Database

Calendar

Data collection:

2017-2018

Data release:

Initial datasets in 2017, a first fairly complete dataset by 2019

Data providers

Name:

In most countries national disaster loss databases are established and managed by special purpose agencies including national disaster management agencies, civil protection agencies, and meteorological agencies, and disaster data collected by line ministries. Some exceptions include Academic institutions conducting long term research programs, NGO's engaged in DRR and DRM, and insurance databases or data sources when market penetration is very high.

Description:

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Data compilers

UNISDR

References

URL:

http://www.preventionweb.net/documents/oiewg/Technical%20Collection%20of%20Concept%20Notes%20on%20Indicators.pdf

References:

The Open-ended Intergovernmental Expert Working Group on Indicators and Terminology relating to Disaster Risk Reduction (OEIWG) was given the responsibility by the UNGA for the development of a set of indicators to measure global progress in the implementation of the Sendai Framework, against the seven global targets. The work of the OEIWG shall be completed by December 2016 and its report submitted to the General Assembly for consideration. The IAEG-SDGs and the UN Statistical Commission formally recognizes the role of the OEIWG, and has deferred the responsibility for the further refinement and development of the methodology for disaster-related SDGs indicators to this working group.

http://www.preventionweb.net/drr-framework/open-ended-working-group/

The latest version of documents are located at:

http://www.preventionweb.net/drr-framework/open-ended-working-group/sessional-intersessional-documents

Related indicators

1.5; 11.5; 11.b; 13.1; 2.4; 3.6; 3.9; 3.d; 4.a; 6.6; 9.1; 9.a; 11.1; 11.3; 11.c; 13.2; 13.3; 13.a; 13.b; 14.2; 15.1; 15.2; 15.3; 15.9.

Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable
Target 11.5: By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations
Indicator 11.5.2: Direct economic loss in relation to global GDP, damage to critical infrastructure and number of disruptions to basic services, attributed to disasters

Institutional information

Organization(s):

United Nations Office for Disaster Reduction (UNISDR)

Concepts and definitions

Definition:

Direct economic loss: the monetary value of total or partial destruction of physical assets existing in the affected area. Direct economic loss is nearly equivalent to physical damage.

[a] An open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction established by the General Assembly (resolution 69/284) is developing a set of indicators to measure global progress in the implementation of the Sendai Framework. These indicators will eventually reflect the agreements on the Sendai Framework indicators.

Rationale:

The disaster loss data is significantly influenced by large-scale catastrophic events, which represent important outliers. UNISDR recommends Countries to report the data by event, so complementary analysis can be done by both including and excluding such catastrophic events that can represent important outliers.

Comments and limitations:

Not every country has a comparable national disaster loss database that is consistent with these guidelines (although current coverage exceeds 89 countries). Therefore, by 2020, it is expected that all countries will build/adjust national disaster loss databases according to the recommendations and guidelines by the OEIWG.

Methodology

Computation Method:

Note: Computation methodology for several indicators is very comprehensive, very long (about 180 pages) and probably out of the scope of this Metadata. UNISDR prefers to refer to the outcome of the Open Ended Intergovernmental Working Group, which provides a full detailed methodology for each indicator and sub-indicator.

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A short summary:

The original national disaster loss databases usually register physical damage value (housing unit loss, infrastructure loss etc.), which needs conversion to monetary value according to the UNISDR methodology*. The converted global value is divided by global GDP (inflation adjusted, constant USD) calculated from the World Bank Development Indicators.

Disaggregation:

By country, by event, by hazard type (e.g. disaggregation by climatological, hydrological, meteorological, geophysical, biological and extra-terrestrial for natural hazards is possible following IRDR classification)

By asset loss category (health/education/road etc.)

By transportation mode (for 11.5.2)

By service sector (for 11.5.2)

Treatment of missing values:

- At country level

  In National Disaster Loss database data missing values and 0 or null are considered equivalent. This is a consequence of the typical form of disaster situation reports, which account only for those impacts that occurred. Normally impacts that not occur are simply not reported (i.e. there are no explicit reports that something didn't happen, for example if no agricultural damage occurs in a disaster, the associated report simply does not have a section on agriculture, instead of a section stating no impact occurred).

- At regional and global levels

  NA

Regional aggregates:

See under Computation Method.

It will be calculated as the summation of Direct Economic Loss per country divided by the total global GDP.

Sources of discrepancies:

Threshold (e.g. including/excluding small/large scale disasters): International Data Sources record only events that surpass some threshold of impact. For example, EMDAT records only events with mortality greater than 10, affected greater than 100 or an international declaration. Private Insurance or Reinsurance global disaster databases record only events that have insured losses, which affects negatively countries with low insurance market penetration.

Methodology / definition: International data sources use secondary data sources to assemble their datasets. These data sources usually have non uniform or even inconsistent methodologies, producing heterogeneous datasets.

Observation (national level data is more comprehensive): International data collectors, due to limitations on access to information, do not record a large number of events that are not publicised internationally, or are never 'seen' by the secondary data sources used.

Data Sources

Description:

National disaster loss database, reported to UNISDR

Collection process:

The official counterpart(s) at the country level will build/adjust national disaster loss databases according to the recommendations and guidelines by the OEIWG.

Data Availability

Description:

Around 100 countries

The number of countries with national disaster loss databases using the DesInventar tools and methodology currently stands at 89 countries. Given the requirements for disaster loss data enshrined in reporting on the SDGs and the targets of the Sendai Framework, it is expected that by 2020, all member states will have built or adjusted their national disaster loss databases according to the recommendations and guidelines by the OEIWG.

Time series:

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Data compilers

UNISDR

References

URL:

http://www.preventionweb.net/documents/oiewg/Technical%20Collection%20of%20Concept%20Notes%20on%20Indicators.pdf

References:

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Related indicators

1.5; 11.5; 11.b; 13.1; 2.4; 3.6; 3.9; 3.d; 4.a; 6.6; 9.1; 9.a; 11.1; 11.3; 11.c; 13.2; 13.3; 13.a; 13.b; 14.2; 15.1; 15.2; 15.3; 15.9.

Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable
Target 11.6: By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management
Indicator 11.6.1: Proportion of urban solid waste regularly collected and with adequate final discharge out of total urban solid waste generated, by cities

Institutional information

Organization(s):

United Nations Human Settlements Programme (UN-Habitat)

Concepts and definitions

Definition:

Proportion of urban solid waste regularly collected and with adequate final discharge out of total urban solid waste generated

The goal of this indicator aims to generate the proportion of urban solid waste regularly collected and that is adequately discharged out of all the total urban waste generated by the city.

Rationale:

The target addressed, Target 11.6, is reducing the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management by 2030.

Waste collection is the collection and transportation of waste to the place of treatment or discharge by municipal services or similar institutions, or by public or private corporations, specialized enterprises or general government (United Nations, 1997).

A prosperous city seeks to collect and manage appropriately all its solid waste and improve standards of living, cleanliness and hence decrease the chances of having disease outbreaks related to the improper management of waste.

Urban households and businesses produce substantial amounts of solid waste, including industrial, construction and hazardous waste that must be collected regularly and disposed-off properly in order to maintain healthy and sanitary living conditions. Such waste collection is available through formal or informal means. Uncollected and improperly managed solid waste can end up in drains and dumps leading to blocked drainages and cause unsanitary conditions. Vectors such as mosquitos usually breed in blocked drainages and dumps that are not well managed. In summary, waste collection management is intended to reduce adverse effects of waste on health, the environment or aesthetics, and the entire ecosystems that support the city or urban area. Sustainable solid waste management is essential for the sustainability of cities especially if it includes waste reduction, reuse, recycling and composting, incineration, and disposal in landfills. Within a waste management hierarchy, waste prevention and reuse are the most preferred methods and should be promoted, as they reduce the demand on scarce environmental resources, reduce energy use, and minimize the quantity of waste that must eventually be recycled, incinerated or disposed in landfills.

Regardless of the context, managing solid waste is one of the important challenges of urban areas of all sizes. According to UN-Habitat's Solid Waste Management in the World's Cities, when the current modernization process started in developed countries during the 1970s, solid waste management was seen largely as a technical problem with engineering solutions. That changed during the 1980s and 1990s when it became clear that municipalities could not successfully collect and remove waste without active cooperation from the service users. Cities also learned that technologies depend on institutional, governance and policy frameworks, which are highly varied and complex, and directly related to local conditions. The way in which waste is produced and discarded gives us a key insight into how people live, and the quality of waste management services is a good indicator of a city's governance.

Target 11.6 also has linkages to the health, poverty, and water goals. For instance there are significant linkages to water targets, including sanitation and hygiene (6.2), water quality and wastewater management (6.3), water-related ecosystems (6.5) and integrated water resources management (6.5). Such links may be relevant to planning and implementation at the country level and it will be important to harness synergies and manage potential conflicts or trade-offs both within and between the targets. This will require collaboration across institutions that are traditionally structured in silos that focus on specific sectors. New ways of collaborative working in partnerships with either informal or formal mechanisms are needed to facilitate collaboration such that policy makers, managers and experts with different responsibilities are able to harness the synergies between goals and targets. This will be a major challenge in implementation of the 2030 Agenda.

Having in place an appropriate monitoring framework that is founded on the key components of the ISWM framework for the SDG 11 target 6.1, enhanced coordination amongst the relevant national and local institutions in the process of implementation, and a full engagement of particularly the national statistical entities and responsible governmental agencies in the process, will go a long way to assist national governments to be able to rationalise their efforts to collect, analyse, validate data and information and report on a regular basis within a context that facilitates comparisons among countries.

An integrated solid waste management system is strongly connected to three dimensions: urban environmental health, the environment and resource management. Moreover, a regular solid waste management strategy is clear indicator of the effectiveness of a municipal administration [2]. Good waste governance that is inclusive, financially sustainable and based on sound institutions is one of the key challenges of the 21st century, and one of the key responsibilities of a city government.

Moving towards modern disposal has generally followed a step-by-step process: first phasing out uncontrolled disposal, then introducing, and gradually increasing, environmental standards for a disposal facility. In the process, controlling water pollution and methane emissions from sanitary landfills, and air pollution from incinerators, receive increasing attention.

Many developing and transitional country cities still have an active informal sector and micro-enterprise recycling, reuse and repair; often achieve recycling and recovery rates comparable to those in the west, resulting in savings to the waste management budget of the cities. There is a major opportunity for the city to build on these existing recycling systems, reducing some unsustainable practices and enhancing them to protect and develop people’s livelihoods, and to reduce still further the costs to the city of managing the residual wastes. The formal and informal sectors need to work together, for the benefit of both.

Concepts:

It will be necessary to define the following components to compute the proportion of urban solid waste regularly collected that is adequately discharge out of all the total urban waste generated by the city.

Urban Solid waste or municipal solid waste is generally composed of waste from households, offices, shops, schools and industries. These include food waste, garden (yard) and park waste, paper and cardboard, wood, textiles, nappies (disposable diapers), rubber and leather, plastics, metal, glass (and pottery and china), health-care waste, electronic waste (such as discarded computers, printers, mobile phones, TVs and refrigerators) and refuse such as ash, dirt, dust, soil construction and demolition waste. It excludes waste water [1]. The aggregate tonnes of all the solid waste from all the sources mentioned above give us the total solid waste generated by the city.

Municipal Solid Waste is waste generated by households, and waste of a similar nature generated by commercial and business establishments, industrial and agricultural premises, institutions such as schools and hospitals, public spaces such as parks and streets and construction sites. Generally it is non-hazardous wastes composed of food waste, garden waste, paper and cardboard, wood, textiles, nappies (disposable diapers), rubber and leather, plastics, metal, glass, and refuse such as ash, dirt and dust. Sewage sludge and faecal sludge is also included in the category of municipal solid waste but it excludes wastewater.

Other Solid Waste is waste that require special treatment such as hazardous waste from industrial processes, agricultural activities and mining wastes, hospital waste, end of life vehicles, construction and demolition waste and WEEE (Waste Electrical and Electronic Equipment). Cities in developed countries in general have special treatment and disposal system that are designed to collect and handle these separately from municipal solid waste, while it is not uncommon that these are mixed and dumped in an uncontrolled manner in cities in developing countries.

Regularly Collected Waste refers to waste that is routinely collected from specific addresses or designated collection points. Waste collection is conducted directly by municipal authorities or private contractors licensed/commissioned by municipal authorities with a regular schedule of the day of the week and time of collection. In some cases private waste collection companies have contracts with clients individually and provide collection services.

Uncollected Waste refers to waste generated in a city but uncollected due to the lack of collection services. In many cities informal settlements areas do not have access to this basic services. The amount of uncollected waste can be estimated by waste generation per capita in the city multiplied by the population who does not have access to the solid waste collection service.

Total Waste Generated by the City is sum of municipal solid waste and other solid waste, or the sum of regularly collected waste and uncollected waste. This excludes some portion that was taken and recycled before the solid waste collection.

Adequate Final Discharge refers to waste that is recycled in regulated recycling facilities, composted or incinerated in regulated composting and incineration facilities and disposed in sanitary landfills in environmentally adequate ways. It excludes waste handled in recycling, composting, incineration facilities that do not have necessary pollution control systems and labour safety standards required by international guidelines or national and local legislations such as waste water treatment and air pollution prevention systems and provision of necessary equipment for workers. It also excludes solid waste that is incinerated and burned openly or disposed to open dumb without leachate facility.

Recycling is defined as the process by which materials otherwise destined for disposal are collected, processed, and remanufactured or reused except reuse as fuel. Direct recycling within industrial plants at the place of generation should be excluded.

Composting is defined as a biological process that involves aerobic biological decomposition of organic materials to produce stable humus-like product. Biodegradation is a natural, ongoing biological process that is a common occurrence in both human-made and natural environments.

Incinerating is thermal treatment of waste during which chemically fixed energy of combusted matters is transformed into thermal energy. Combustible compounds are transformed into combustion gases leaving the system as flue gases. Incombustible inorganic matters remain in the form of slag and fly ash. Incinerating includes incinerating with or without energy recovery.

Landfilling is the environmentally sound disposal of waste that cannot be reduced, recycled, composted, incinerated or processed in some other manner. A landfill is needed for disposing of residues from recycling, composting, incinerating or other processing facilities and can be used if the alternative facilities break down.

The concept of integrated and sustainable (solid) waste management, known as Integrated solid waste management (ISWM), is designed to improve the performance of solid waste system and to support sound decision-making. It comprises three key physical elements that all need to be addressed for an ISWM system to work well and to work sustainably over the long term. These are:
1. Public health: maintaining healthy conditions in cities, particularly through a good waste collection service;
2. Environment: protection of the environment throughout the waste chain, especially during treatment and disposal; and
3. Resource management: 'closing the loop' by returning both materials and nutrients to beneficial use, through preventing waste and striving for high rates of organics recovery, reuse and recycling

These three key physical elements require appropriately designed governance strategies to deliver a well-functioning system. Three interrelated requirements for a "good waste governance" system are to:
1. Be inclusive, providing transparent spaces for stakeholders to contribute as users, providers and enablers;
2. Be financially sustainable, which means cost-effective and affordable; and
3. Rest on a base of sound institutions and pro-active policies.

Comments and limitations:

In many countries and sub-national governments, solid waste collection and management data are currently incomplete or not available. Countries have varying policies that define appropriate waste management, with different levels of treatment and data collection. Cities and countries that have more advanced systems should report other aspects of waste management such as recycling that can be disaggregated by different components.

Since this indicator has two points of reporting, i.e., the source for establishing if waste is collected regularly or not regularly, and the final discharge point and its level of adequacy, there is a need to integrate them in the monitoring. Some countries/cities have the data and monitoring systems needed to report and others may require training and capacity development to enhance their capacities.

Feasibility

Collection of indicators and data cannot be said infeasible but it might require training and capacity development. The data for the indicator such as total solid waste generation is globally available although the precision of data is disputable. This means that many countries have some data collection system but there are rooms for improvement. Also the collection of the data such as amount of waste adequately discharged will be a challenge for many of national and local governments. Introducing this data collection system globally is not only feasible since they usually have basic data collection system but will also contribute to enhance the solid waste monitoring capacity both at the national and local level.

Suitability

Many cities generate more solid waste than they can dispose of. Even when municipal budgets are adequate for collection, the safe disposal of collected wastes often remains a problem. Dumping and uncollected landfills are sometimes the main disposal methods in many developing countries; sanitary landfills are the norm in only a handful of cities [2]. While, regular solid waste collection is a clear indicator of the effectiveness of a municipal administration, appropriate waste management is an excellent mechanism to reduce the adverse per capita environmental impact of cities and in this sense, the indicator is very suitable.

This indicator is used in many countries and can also be tracked and monitored in many local governments or cities globally. Solid waste management is essential for the sustainability of cities especially if it includes: waste reduction, reuse, recycling and composting, incineration, and disposal in landfills. Within a waste management hierarchy, waste prevention and reuse are the most preferred methods and should be promoted, as they reduce the demand on scarce environmental resources, reduce energy use, and minimize the quantity of waste that must eventually be recycled, incinerated or disposed in landfills.

Relevance

Waste collection is the collection and transportation of waste to the place of treatment or discharge by municipal services or similar institutions, or by public or private corporations, specialized enterprises or general government (United Nations, 1997). A prosperous city seeks to collect and manage appropriately all its solid waste and improve standards of living, cleanliness and hence decrease the chances of having disease outbreaks related to the improper management of waste.

Urban households and businesses produce substantial amounts of solid waste, including industrial, construction and hazardous waste that must be collected regularly and disposed-off properly in order to maintain healthy and sanitary living conditions. Such waste collection is available through formal or informal means. Uncollected and improperly managed solid waste can end up in drains and dumps leading to blocked drainages and cause unsanitary conditions. Vectors such as mosquitos usually breed in blocked drainages and dumps that are not well managed. In summary, waste collection management is intended to reduce adverse effects of waste on health, the environment or aesthetics, and the entire ecosystems that support the city or urban area.

Limitations

Countries have varying policies that define appropriate waste management, with different levels of treatment and data collection. To ensure comparability the indicator should limit to the methodology and definitions presented above. However some countries/cities have the data and monitoring systems able to report the indicator here but others may require training and capacity development to enhance their capacities.

Methodology

Computation Method:

In order to generate the proportion of urban solid waste regularly collected and that is adequately discharged out of all the total urban waste generated by the city, there is a need to define the two components that are core to this indicator i.e. what constitutes urban waste and appropriate final discharge.

A two stage process is proposed for computing this indicator. First, cities will have to monitor the total waste generated by the city. Out of this tonnage, they will have to compute the proportion of the waste that was regularly collected from the various sources that generate city waste.

Solid waste regularly collected = Summation in tonnes of all regularly collected waste for all sources

Total solid waste generated = Sum of all waste generated by the city or urban area including collected and uncollected solid waste

At the second stage, cities will have to estimate the proportion of all waste that was regularly collected and was adequately discharged.

Adequately discharged solid waste = Regularly collected Solid waste that is reported as adequately discharged

Solid waste regularly collected and with adequate final discharge
=100[((Adequately discharged urban solid waste)/(total tonnage of waste generated by the city))]

Disaggregation:

Data for this indicator can be disaggregated at the city and town levels. Information from municipal records, service providers, community profiles and household surveys allow collecting the information. However, in many cities, solid waste collection and recycling data are currently incomplete or not available. The development of adequate data collection systems may require a significant effort in some jurisdictions.

- Disaggregation by location (intra-urban)
- Disaggregation by Income group
- Disaggregation by source of waste generation e.g. residential, industrial, office, etc.
- Disaggregation by type of final discharge

Treatment of missing values:

- At country level

  Missing values may arise at the reporting of the city level estimates. At the national level, estimates will be derived from the nationally representative sample of cities, in which case then there will be very few missing entries.

- At regional and global levels

  NA

Regional aggregates:

Population survey sheet are used for the data collection
Population served by solid waste collection sheet is also used
Population unserved by solid waste collection sheet
Total population in the jurisdiction is also collected.

Sources of discrepancies:

Data on formal solid waste collection and management may be available from municipal bodies and/or private contractors. Informal collection data may be available from NGOs and community organizations. It is important that all data sources are used for reporting, otherwise discrepancies are likely to introduce inconsistencies in reported figures.

Data Sources

Description:

UN-Habitat is collecting information on this indicator in more than 400 cities that are part of the City Prosperity Initiative. Data for this indicator is available and can be disaggregated at the city and town levels. Information can be from municipal records, service providers, community profiles and household surveys. However, in many cities, solid waste collection and recycling data are currently incomplete or not available. The development of adequate data collection systems may require a significant effort in some jurisdictions.

For instance, the responsible national governmental agencies or statistical entities can utilise the existing survey format and distribute it to local authorities to collect data. Also a check sheet to inspect environmental appropriateness of different types of facilities (recycling, composting, incineration, etc.) should be distributed together with the survey format. To further ensure the environmental appropriateness of solid waste management facilities, responsible national government officials can conduct a regular short-notice inspection to facilities together with introduction of this data collection system. Introducing this data collection system also is expected to contribute to enhance the monitoring capacity on solid waste management both at the national and local level in many countries that currently does not have such system.

Collection process:

National level estimates and reporting will be done by the national governments/statistical agencies. UN-Habitat and other partners will lead the reporting at the regional and global levels.

Data Availability

Description:

Data is available for over 140 countries and over 1000 cities based on the latest update. The database will be further populated with new city-level data that has recently become available via the UN-Habitat led City prosperity Initiative.

Time series:

The indicator is updated annually, depending on new data that becomes available in the reference year, time series data will be generated over the course of the SDGs

Calendar

Data collection:

The data can be released annually and the monitoring of the indicator can be repeated at annual interval, allowing for several (fifteen) reporting points until the year 2030.

Data release:

Initial data is planned for release at the city level in April 2017. Thereafter annul releases of data will be undertaken every April.

Data providers

Name:

UN-Habitat

Description:

UN-Habitat will lead the process for data analysis, and compilation. UN-Habitat will work directly with the national statistical agencies to build the capacity and skills required for global reporting on this indicator. Other strategic partners such as city management teams will be included in the steering committees of the various countries.

Data compilers

Name:

UN-Habitat, National statistical agencies and city management teams

Description:

UN-Habitat, National statistical agencies and city management teams will lead the compilation and reporting. Global reporting will be done by UN-Habitat. UN-Habitat is collecting information on this indicator in more than 1000 cities that are part of the City Prosperity Initiative. The collection of the data is possible through the collaboration of international institutions (UN-Habitat, UNEP, The World Bank, AfDB, IDB, EBRD and ADB) and bilateral donors (JICA, GDZ, etc.) by conducting survey and capacity development on data collection system.

References

URL:

http://unhabitat.org/urban-knowledge/global-urban-observatory-guo/

References:

1. D-Waste (n.d.) Waste Atlas.[3]
2. Guerrero, L., Maas, G., Hogland, W., (2013). Solid waste management challenges for cities in developing countries. Waste Management 33(1), 220–232.
3. IPCC, 2007. Climate Change (2007) Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Chapter 10 — Waste management. J. Bogner, Coordinating Lead Author. B. Metz, a. O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer (eds). Cambridge University Press.

4. Tacoli, C., (2012). Urbanization, Gender and Urban Poverty: Paid Work and Unpaid Carework in the City. International Institute for Environment and Development: United Nations Population Fund, London, UK.
5. The Economic Intelligence Unit (2010). Latin American Green City Index: Assessing the environmental performance of Latin America's major cities. [1]
6. UNEP (2013) Global Environmental Alert Service. Bulletin October 2013. United Nations Environment Programme. Nairobi [7]
7. UN-Habitat (2009) Urban Indicators Guidelines, Monitoring the Habitat Agenda and the Millennium Development Goals-Slums Target. United Nations Human Settlements Programme, Nairobi.[8]
8. UN-Habitat (2010) Solid Waste Management in the World's Cities: Water and Sanitation in the World's Cities 2010. United Nations Human Settlements Programme, Nairobi.[2]
9. UN-Habitat, (2010) Collection of Municipal Solid Waste in Developing Countries. United Nations Human Settlements Programme Nairobi.[4]
10. United Nations (1997). Glossary of Environment Statistics, Studies in Methods, Series F, No. 67, New York.
11. World Bank (2012). What a Waste: A Global Review of Solid Waste Management. Urban Development Series Knowledge Papers. [6]
12. http://www.siemens.com/press/pool/de/events/corporate/2010-11-lam/Study-Latin-American-Green-City-Index.pdf, accessed May 16, 2016.
13. http://mirror.unhabitat.org/pmss/listItemDetails.aspx?publicationID=2918
14. http://www.atlas.d-waste.com/
15.http://mirror.unhabitat.org/downloads/docs/Recycling%20and%20disposal%20of%20solid%20waste%20in%20low%20and%20middle-income%20countries.pdf
16.http://www.un.org/esa/sustdev/natlinfo/indicators/methodology_sheets/consumption_production/waste_treatment_disposal.pdf
17. http://siteresources.worldbank.org/INTURBANDEVELOPMENT/Resources/336387-
18. 1334852610766/What_a_Waste2012_Final.pdf
19. http://www.unep.org/pdf/UNEP_GEAS_oct_2013.pdf
20. http://unhabitat.org/urban-indicators-guidelines-monitoring-the-habitat-agenda-and-the-millennium-development-goals/
21. World Bank, Urban Solid Waste Management Glossary http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTURBANDEVELOPMENT/EXTUSWM/0,,contentMDK:20241717~pagePK:148956~piPK:216618~theSitePK:463841,00.html#m Accessed on 30 May 2016
22. UN-Habitat (2010). Solid Waste management in the World Cities Water and Sanitation in the World's Cities 2010, Earthscan, London, ISBN 978-1-84971-169-2
http://mirror.unhabitat.org/pmss/listItemDetails.aspx?publicationID=2918 Accessed on 30 May 2016
23. US EPA (1992). Decision-Makers Guide to Solid Waste Management. Report No. 530-R-95-023, Second Edition, Office of Solid Waste and Emergency Response, US Environmental Protection Agency.
24. United Nations Sustainable Development Knowledge Platform http://Www.Un.Org/Esa/Sustdev/Natlinfo/Indicators/Methodology_Sheets/Consumption_Production/Waste_Treatment_Disposal.Pdf, Accessed on 30 May 2016
25. United Nations Country Classification http://www.un.org/en/development/desa/policy/wesp/wesp_current/2014wesp_country_classification.pdf Accessed on 31 May 2016

Related indicators

2.2.2:
Prevalence of malnutrition (weight for height >+2 or <-2 standard deviation from the median of the WHO Child Growth Standards) among children under 5 years of age, by type (wasting and overweight)

3.2.1:
Under-five mortality rate

3.9.1:
Mortality rate attributed to household and ambient air pollution

6.1.1:
Proportion of population using safely managed drinking water services

6.2.1:
Proportion of population using safely managed sanitation services, including a hand-washing facility with soap and water

6.3.1:
Proportion of wastewater safely treated

6.3.2:
Proportion of bodies of water with good ambient water quality

6.6.1:
Change in the extent of water-related ecosystems over time

Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable
Target 11.6: By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management
Indicator 11.6.2: Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)

Institutional information

Organization(s):
World Health Organization (WHO)

Concepts and definitions

Definition:
The mean annual concentration of fine suspended particles of less than 2.5 microns in diameters (PM2.5) is a common measure of air pollution. The mean is a population-weighted average for urban population in a country, and is expressed in micrograms per cubic meter [$\mu g/m^3$].

Rationale:
Air pollution consists of many pollutants, among other particulate matter. These particles are able to penetrate deeply into the respiratory tract and therefore constitute a risk for health by increasing mortality from respiratory infections and diseases, lung cancer, and selected cardiovascular diseases.

Comments and limitations:
Urban/rural data: while the data quality available for urban/rural population is generally good for high-income countries, it can be relatively poor for some low- and middle income areas. Furthermore, the definition of urban/rural may greatly vary by country.

Methodology

Computation Method:
The annual urban mean concentration of PM2.5 is estimated with improved modelling using data integration from satellite remote sensing, population estimates, topography and ground measurements (WHO, 2016a; Shaddick et al, 2016)

Disaggregation:
The indicator is available by 0.1° x 0.1° grid size for the world.

Treatment of missing values:

- At country level

  Missing values are left blank.

- At regional and global levels

  Missing values are excluded from the regional and global averages.

Regional aggregates:
The regional and global aggregates are population -weighted figures of the national estimates.

Cagg=SUM (Cnat * Pnat)/ SUM (Pnat)

where Cagg is the regional/global estimate, Cnat is the national estimate, Pnat is the country population. The sum is done over the countries in the region (regional aggregate) or all countries (global aggregate).

Sources of discrepancies:
The source of differences between global and national figures: Modelled estimates versus annual mean concentrations obtained from ground measurements.

Methods and guidance available to countries for the compilation of the data at the national level:
Countries which have air quality monitoring networks in places in urban areas can use the annual mean concentrations from the ground measurements and the corresponding number of inhabitants to derive the population-weighted exposure to particulate matter in cities.

Quality assurance
Data inputs to the model are official or published data on air quality or other relevant topics. Modelled estimates are carefully crossed-checked and compared with official ground measurements.

Consultation/validation process with countries for adjustments and estimates
Data inputs, methods and final estimates are shared with countries prior to publication via WHO official communication channels with WHO Member States.

Data Sources

Description:
Sources of data include ground measurements from monitoring networks, collected for 3,000 cities and localities (WHO 2016) around the world, satellite remote sensing, population estimates, topography, information on local monitoring networks and measures of specific contributors of air pollution (WHO, 2016b)

Collection process:
Data collection process for ground measurements include official reporting from countries to WHO (after request), and web searches. Measurements of PM10 or PM2.5 from official national/sub-national reports and websites or reported by regional networks such as Clean Air Asia for Asia and the European Environment Agency for Europe or data from UN agencies, development agencies, articles from peer reviewed journals and ground measurements compiled in the framework of the Global Burden of Disease Project.

Data Availability

Description:
The indicator is available for 178 countries. Missing countries include mostly small states islands in the Western Pacific and in the Latin American and the Caribbean regions.

Time series:
Forthcoming

Calendar

Data collection:
During 2017

Data release:
2017-2018

Data providers

Ministry of Health, Ministry of the Environment

Data compilers

WHO

References

URL:

www.who.int/gho/phe

References:

Shaddick G et al (2016). Data Integration Model for Air Quality: A Hierarchical Approach to the Global Estimation of Exposures to Ambient Air Pollution. Royal Statistical Society, arXiv:1609.0014.

WHO (2016a). Ambient air pollution: a global assessment of exposure and burden of disease, WHO Geneva.
WHO (2016b). WHO Urban ambient air quality database, WHO Geneva.

Related indicators

3.9.1:
Mortality rate attributed to household and ambient air pollution

Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable
Target 11.7: By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities
Indicator 11.7.1: Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities

Institutional information

Organization(s):

United Nations Human Settlements Programme (UN-Habitat)

Concepts and definitions

Definition:

Average share of the built-up area of cities that is open space for public use for all

The 'Built-up area' of a city is defined as the contiguous area occupied by buildings and other impervious surfaces including the urban vacant areas in and around them but excluding rural areas beyond the urban fringe. The 'population' of a city is defined as the sum of the population in the set of administrative districts that together encompass the 'built-up area' of that 'city' in the year that measurements are taken.

Rationale:

This indicator provides information about the amount of open public areas in a city. Cities that improve and sustain the use of public space, including streets, enhance community cohesion, civic identity, and quality of life. Having access to open public spaces does not only improve the quality of life: it is also a first step toward civic empowerment and greater access to institutional and political spaces.

Cities function in an efficient, equitable, and sustainable manner only when private and public spaces work in a symbiotic relationship to enhance each other. In optimal conditions, they need to be secured and laid out in advance of urbanization to ensure orderly urban expansion. In existing cities, there is a need to revise and expand the ratio of public space in cities to make them more efficient, prosperous and sustainable. And they are needed in adequate amounts. Uncontrolled rapid urbanization creates disorderly settlement patterns with dangerously low shares of public space. Many cities in developed countries are also experiencing a dramatic reduce of public space.

The road network is the integrative tissue that binds cities together. It organizes the geographic space of cities, integrates them both as job markets and as local political spaces.

Cities that are walkable and transit-friendly require a highly connected network of paths and streets around small, permeable blocks. A tight network of paths and streets offering multiple routes to many destinations also make walking and cycling trips varied and enjoyable. This has clear implications in making cities more energy efficient.

Adequate public spaces in cities contribute to the achievement of other targets of Goal 11 and have positive implications in various Sustainable Development Goals. Notably public spaces increase social cohesion, networks and human exchange.

Concepts:

The method to estimate the area of public space is based on three steps: a) spatial analysis to delimit the built-up area of the city; b) estimation of the total open public space and; c) estimation of the total area allocated to streets.

a. Spatial analysis to delimit the built-up area. Delimit the built-up area of the urban agglomeration and calculate the total area (square kilometers). Land use maps, inventories to be locally generated to identify public spaces if possible complemented by fieldwork.

b. Computation of total area of open public space. Map and calculate the total areas of open public space within the defined urban boundaries based on the built-up area. The inventory of open public spaces is digitalized and vectorised using GIS software to allow computation of surfaces. The total of open public area is divided by the total built-up area of the city to obtain the proportion of land allocated to public spaces.

c. Estimation of the land allocated to streets. Calculation of the total area allocated to streets based on sampling techniques with a random sample of 10 hectares locales is selected out of a complete listing of the all hectares locales that form the city, using the built-up area definition indicated above.

Comments and limitations:

Cities vary considerably in size, history, development patterns, designs, shapes and citizen's attitudes towards public spaces. Measuring how much public space a city has is only one part of measuring whether residents actually benefit from the space.

Gaps in the currently available data for monitoring target 11.7 along with some recommendations of upcoming opportunities for filling such gaps are provided below. As a new and innovative indicator, data availability may be scarce. Many cities do not have an inventory of public space, or have one that is not up-to date. Efforts should be done to expand the availability of data in the developing world. UN-Habitat has developed tools, programmes and guidelines to assist cities in measuring, and expanding the availability of public space in cities. Some cities in the developing world lack of formal recognized public space that are publicly maintained. Innovative tools like the use of satellite imagery, and community-based mapping can support the identification of open space in public use.

The indicator quantifies the amount of open space in public use in cities, but does not capture the quality of the space that may impede its proper use. However, it is a precondition that open space is existing, and that its public use is guaranteed, to allow city authorities and other stakeholders to further improve its quality and increase its use.

Methodology

Computation Method:

The sampling relies on a Halton Sequence of coordinates that, when repeated, always selects the same points.

Locales are defined as a set of city blocks surrounded by streets, and bounded by the medians of all blocks that intersect the randomly selected 10-hectare circle. Blocks are considered built-up if more than half of the block is built-up.

The share of the land in streets in the locale is then calculated as the ratio of the area of the locale in streets and boulevards and the total built-up area in the locale.

The share of the land occupied streets in the locale is then calculated as the ratio of the area of the locale occupied by streets and boulevards and the total built-up area in the locale.

The average share of land in streets in a given city is then calculated by sampling more and more locales until the variance between the shares of land in streets declines below an agreed-upon value. Using this stopping rule, it becomes possible to obtain a statistically reliable average value.

Share of the built up area of the city that is open space in public use (%)
= (Total surface of open public space + Total surface of land allocated to streets) / (Total surface of built up area of the urban agglomeration)

Disaggregation:

Disaggregation by location (intra-urban)
- Disaggregation by qualities of the open public space (safe, inclusive, accessible, green)
- Using qualitative data tagged to the public spaces it will be possible to disaggregate information by the share of built-up area is safe open space in public use
- The share of built-up area is green open space in public use
- The share of built-up area is universally accessible open space in public use, particularly for disable persons.

Treatment of missing values:

- At country level

  All countries are expected to fully report on this indicator more consistently following implementation of several technical workshops where the methodological guide and tools will be introduced. In majority of the cases, missing values will be available to reflect a non-measurement of the indicator for the city. However, because national statistical agencies will report national figures from a sample of cities, we expect fewer missing values at the national level over the years. Global figures will be derived from nationally reported estimates.

- At regional and global levels

  Most cities lack a clear protocol or standard guide for how they might measure public spaces, let alone an existing inventory or understanding of the public agencies involved in public space (e.g. cities can have both city-owned parks and national parks). Google maps might have a better inventory of a city's public space than the city itself. These differences in knowledge and understanding are expected to create some inconsistencies in reporting.

Regional aggregates:

Regional and global estimates will be derived from national figures with an appropriate disaggregation level. Specialized tools will be developed and agreed upon with local and international stakeholders. Systems of quality assurance on the use of the tools, analysis and reporting will be deployed regionally, and globally to ensure that standards are uniform and that definitions are universally applied.

Sources of discrepancies:

Applying the proposed methodology to an entire globe of different cities will be challenging, but there are some basic principles that cities can use to measure public space. Cities can inventory the spectrum of spaces, from natural areas to small neighborhood parks owned by different government entities. For example, in some cities, cemeteries are publicly available spaces run by the city park and recreation department. The team will work on a basic methodological guide and tools that will enable national statistical agencies apply these methods with a standard and define and collect information on an inventory of spaces that will be used for reporting on this indicator for all cities.

Data Sources

Description:

Satellite imagery (open sources), legal documents outlining publicly owned land, and community-based maps are the main sources of data.

For estimating the total Surface of Built-up area. Satellite imagery: Use of existing layers of satellite imagery ranging from open sources such as Google Earth and US Geological Survey/NASA imagery Landsat to more sophisticated and higher resolution land cover data sets. Images are to be analyzed for the latest available year.

For the Inventory of open public space. Information can be obtained from legal documents outlining publicly owned land and well-defined land use plans. In some cases where this information is lacking, incomplete or out-dated, open sources, informants in the city and community-based maps, which are increasingly recognized as a valid source of information, can be a viable alternative.

The share of land in public open spaces cannot be obtained directly from the use of high-resolution satellite imagery, because it is not possible to determine the ownership or use of open spaces by remote sensing. But additional meta-data that helps to describe the land use patterns in the locale is additionally required to map out land that is for public and non-public use.

Collection process:

It is expected that investments in improved data collection and monitoring at country level will produce incentives for governments to improve monitoring of the public spaces in cities and also offer more opportunities to engage with multiple stakeholders in data collection and analysis and in achieving better understanding of the strengths and weaknesses of existing public space management policies and practices. This will ensure that internationally comparable data for global monitoring improved over time in terms of quality and timeliness of reporting. Where applicable, appropriate population weighting schemes will be used at the stage of computing regional and global estimates for this indicator. This will include catering for adjustments where public space definitions are different.

Data Availability

Description:
Data for this indicator is already available for 200 cities which are part of the UN-Habitat's city prosperity initiative. More cities are joining this initiative and hence data is expected to be available for over 300 cities by the end of 2016. The indicator is classified as Tier 2, and hence more work in the first year will go into refining the methodology and providing technical support to national statistical agencies to build the capacity to collect, analyze and report on this indicator.

Time series:

Available time series runs at the city and national level for selected countries

Calendar

Data collection:

The monitoring of the indicator can be repeated at regular intervals of 5 years, allowing for three reporting points until the year 2030. Monitoring in 5-years intervals will allow cities to determine whether the shares of open public space in the built-up areas of cities is increasing significantly over time, as well as deriving the share of the global urban population living in cities where the open public space is below the acceptable minimum.

Data release:

Every five years around April.

Data providers

Name:

UN-Habitat

Description:

UN-Habitat will take the lead in global reporting which will follow efforts of directly working with national statistical agencies for reporting at national levels. UN-Habitat and other partners including other private and regional commissions will lead the efforts of building national capacities to monitor and report on this indicator.

Data compilers

UN-Habitat

References

URL:

http://unhabitat.org/urban-knowledge/global-urban-observatory-guo/

References:

Axon Johnson Foundation, Public Spaces and Place making, Future of Places, http://futureofplaces.com/
UN-Habitat (2013) Streets as Public Spaces and Drivers of Urban Prosperity, Nairobi
UN-Habitat (2014) Methodology for Measuring Street Connectivity Index
UN-Habitat (2015) Spatial Capital of Saudi Arabian Cities, Street Connectivity as part of City Prosperity Initiative

Related indicators

3.9.1:
Mortality rate attributed to household and ambient air pollution

6.1.1:
Proportion of population using safely managed drinking water services

6.2.1:
Proportion of population using safely managed sanitation services, including a hand-washing facility with soap and water

6.3.1:
Proportion of wastewater safely treated

7.1.1:
Proportion of population with access to electricity

11.1.1:
Proportion of urban population living in slums, informal settlements or inadequate housing

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

11.3.1:
Ratio of land consumption rate to population growth rate

11.5.1:
Number of deaths, missing persons and persons affected by disaster per 100,000 people [a]

11.6.1:
Proportion of urban solid waste regularly collected and with adequate final discharge out of total urban solid waste generated, by cities

11.6.2:
Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)

11.7.2:
Proportion of persons victim of physical or sexual harassment, by sex, age, disability status and place of occurrence, in the previous 12 months

15.1.2:
Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type