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.

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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.

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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