Chapter 21
Sustainable Development Goals and Cities

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Abstract The sustainable development goals (SDGs) proposed by the United Nations seek the transformation of society, in order to achieve sustainable development for all the inhabitants of the Earth. Cities are an important part of this effort, as they are the nucleus for the generation of plans and actions for the fulfillment of many of the SDGs. Including resilience in global plans can help cities succeed in spite of their particular complications. The advantages and disadvantages that artificial intelligence can bring to the SDGs, as well as the various results that have been achieved, are raised. Monitoring of the SDG Index and the Tier Classification for Global SDG Indicators are presented as reference tools for actions oriented towards the SDGs. Finally, progress on SDG compliance is described. The SDGs need coordinated efforts to record and measure the progress made.

Keywords Sustainability · Sustainable development goals · Cities · United Nations

21.1 The Sustainable Development Goals

The sustainable development goals (SDGs), illustrated in Fig. 21.1, are a call for action by all countries—developed and developing—in a global partnership. The SDGs were adopted by all United Nations Member States in 2015, for the 2015–2030

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Fig. 21.1 Sustainable development goals adopted at the 70th Session of the UN General Assembly in 2015 (public domain material provided by United Nations at http://www.un.org/sustainabledevelopment/news/communications-material/)

period. 17 goals were established that focused on addressing persistent and profound problems such as poverty, health, and education. The SDGs also encompass actions to reduce inequalities and promote economic growth. At the same time, measures are proposed for tackling climate change and preserving the world's oceans and forests. Finally, the SDGs also encourage states and companies to formulate fair work for the citizens of the world and global collaboration. The SDGs are not only an environmentally focused set of goals, as many think, but rather a multidimensional approach to sustainable development. This approach has been accepted and endorsed at the governmental level in most UN countries, but its practical execution in a given country requires efforts related to the economic-commercial activities of companies and the individual conduct of people.

Cities are where it is expected that the SDGs will be able to achieve the most visible changes. Citizens have an active role in contributing to the SDGs, both in their individual activities and at the group level such as via state institutions, NGOs, companies, and social groups.

21.1.1 How Were the SDGs Developed?

In 2012, the United Nations Rio + 20 summit in Brazil committed governments to create a set of sustainable development goals (SDGs) that would be integrated into the follow-up to the millennium development goals (MDGs) after their 2015 expiry. Taking into account the projected growth of the world population to 9 billion by 2050, it was sug-

gested that the SDGs focus on various aspects of life on earth: addressing poverty, reducing environmental pollution, and enhancing sustainable social/business development.

The resulting SDGs are focused on addressing the many components of sustainability through their 17 objectives, which represent a multidimensional approach to sustainable development. Due to the complex natures of the goals, several of them are complementary to each other. Some may conflict regarding their simultaneous fulfillment. For example, managing hunger through agricultural or marine productivity may lead to problems like deforestation or the disappearance of marine fauna.

21.2 SDGs and Cities

A city is considered to be a complex, multidimensional, and dynamic system in which constant changes occur, physically, socially, economically and, increasingly, environmentally. Given this complexity, cities require planning that supports projects needed by cities to contribute successfully to the sustainable development goals. In line with this need, the participating States in the United Nations (UN) Conference on Housing and Sustainable Urban Development (Habitat III) set a series of objectives that contribute to making cities inclusive, safe and, finally, sustainable.

The concept of urban resilience is increasingly used for the planning and development of public policies as well as the carrying out of activities coordinated by international agencies seeking the sustainable development of cities. The term resilience refers to the ability to cope with borderline situations and, at the same time, to adapt to changing circumstances. From the perspective of urban areas, this concept refers to the ability of cities to resist and overcome the various challenges they face. Some of these are extremely harmful, leading to the destruction of homes, killing people, and causing large financial damages. The poorest people are often the most affected by these problems. The approaches to urban resilience are transversal to what is established by the 17 SDGs, with SDG 1 (poverty), SDG 2 (hunger), SDG 9 (infrastructure), and SDG 11 (sustainable cities) being particularly relevant. In relation to resilience, UN-Habitat has developed various guidelines, indexes, methods, and instruments that allow monitoring of the Resilience Program; likewise, international actors such as the World Bank and the Inter-American Development Bank have developed similar guidelines to achieve urban resilience, especially in cities that have suffered the most damage. Urban growth occurs mostly in emerging economies and developing countries, but a common feature of this growth is that it is unplanned and informally carried out (OECD, 2017). Making the situation more challenging is the report that 1.4 million people move daily to urban areas, and that a growing number of people are subject to wars and climate impact.

In relation to the resilience of cities, it has been recommended that coordinating agencies should (IEG, 2019):

1. Identify and track urban resilience—building efforts
2. Systematically incorporate resilience characteristics in projects
3. Use analytical work to inform support in areas of crime and violence

4. Ensure that urban resilience interventions in a country are complementary and coordinated
5. Articulate long-term, client-oriented financing plans.

One important initiative is the creation of the 100 Resilient Cities (100RC) network. From 2013 to 2019, the network planned and executed technical and financial assistance to cities interested in building resilience and developed the City Resilience Framework (CRF) and the City Resilience Index (CRI). The Cape Town Resilience Strategy was recently launched (Capetown, 2019), composed of five pillars, 20 objectives, and 75 actions. Croese, Green, and Morgan (2020) point out that these are planned to be aligned with the SDGs, as described in Table 21.1.

21.3 SDGs, Cities, and Artificial Intelligence

The amount of data handled in a country, a city, and even a district needs proper management to achieve planning and to execute actions that contribute to the SDGs. Likewise, these data need to be controlled and interconnected, making the use of artificial intelligence (AI) necessary. For example, it has been shown that AI augments the productivity of some workers, and can replace the work done by others. AI will likely transform almost all occupations at least to some degree (Frank et al., 2019), as observed in, for instance, the extensive use of chatbots (Luo, Tong, Fang, & Qu, 2019). AI is expected to affect human resource management (Kreutzer & Sirrenberg, 2020), education (Duong et al., 2019; Mohammed, 2019), entrepreneurship, and other activities. Due to its potential positive impact on human and business activities, AI is expected to play an important role in the development and implementation of the SDGs. This is in part because AI software technology facilitates tasks such as perception (facial recognition), business decision making (purchase of shares of the stock market), prediction (sale of homes in an area of the city), and information evaluation (impact of research published by government research institutes), among others.

When analyzed in greater detail, AI can have a transcendent role in critical aspects of cities such as health. Chen, Joshi, and Ghassemi (2020), for instance, suggest healthcare, as currently practiced, is not equitable, and that disparities that follow the biases of society have been consistently demonstrated. How can AI help correct these disparities? Consciously used, AI can be leveraged as a tool to help highlight and erase the numerous and well-documented inequities in health. However, AI can be advantageous or disadvantageous, since biases existing in the care of minorities can be taken as "normal" and extended in the health system.

But what about the impact of AI on the other SDGs? Vinuesa et al. (2020) describe how AI can act as both an inhibitor and an enabler. Several SDGs have a social impact, which is why we refer to them collectively as social SDGs. Table 21.2 shows the target numbers for each goal and groups them, based on available evidence, into those for which AI is an enabler or an inhibitor.

Several SDGs have an economic impact and are referred to collectively here as economic SDGs. Table 21.3 shows the target numbers for each goal and groups them, based on available evidence, into those for which AI is an enabler or an inhibitor.

Table 21.1 Sustainable development goals and Cape Town Resilience Strategy parallelism

Cape Town's Resilience Strategy	SDGs	
Pillars and goals	*Goals*	*Targets*
Pillar 1: Compassionate, holistically healthy city		
Goal 1.1: Increase awareness of, access to, and uptake of mental health support Goal 1.2: Embrace a more holistic approach to policing and crime prevention to break the cycle of violence and to lower recidivism rates and trauma Goal 1.3: Combat discrimination and build social cohesion Goal 1.4: Promote a culture of health that increases well-being and decreases trauma	SDG 2: Hunger SDG 3: Health SDG 5: Gender SDG 10: Inequality SDG 16: Peace and justice	Target 2.1 Target 3.4–3.5 Target 5.2 Target 10.2–10.3 Target 16.1–16.2
Pillar 2: Connected, climate-adaptive city	*Goals*	*Target*
Goal 2.1: Grow partnerships that strengthen transportation systems and improve mobility. Goal 2.2: Engage communities and the private sector to improve public spaces Goal 2.3: Build climate resilience Goal 2.4: Innovate for improved conditions, service delivery, and well-being in informal settlements	SDG 6: Water SDG 11: Cities SDG 13: Climate action SDG 14: Life below water	Target 6.4–6.5–6.6 Target 11.2–11.3–11.7 Target 13.3 Target 14.2
Pillar 3: Capable, job-creating city	*Goals*	*Target*
Goal 3.1: Foster green economic growth Goal 3.2: Enable enterprise development in the informal economy Goal 3.3: Connect the workforce with a changing economy Goal 3.4: Partner with businesses to achieve a resilient local economy	SDG 4: Education SDG 8: Decent work and economic growth SDG 9: Infrastructure SDG 11: On cities SDG 12: Responsible consumption and production SDG 17: On partnerships	Target 4.4 Target 8.2–8.3–8.5–8.9 Target 9.4 Target 11.6 Target 12.7 Target 17.17
Pillar 4: Collectively, shock-ready city	*Goals*	*Target*
Goal 4.1: Future-proof urban systems Goal 4.2: Strengthen individual, household, and community resilience Goal 4.3: Encourage responsible investment in household and business resilience Goal 4.4: Explore funding mechanisms for shock events	SDG 1: On poverty SDG 6: Water SDG 7: Energy SDG 9: Infrastructure SDG 11: On cities SDG 13: Climate action	Target 1.5 Target 6.b Target 7.2 Target 9.4 Target 11.5–11.b Target 13.3
Pillar 5: Collaborative, forward-looking city	*Goals*	*Target*
Goal 5.1: Develop and approve portfolios of projects that maximize the resilience dividend Goal 5.2: Mainstream resilience in decision-making Goal 5.3: Enhance knowledge management and data-use Goal 5.4: Monitor and evaluate resilience outcomes	SDG 11: On cities	Target 11.b-11.3

Source: Croese et al. (2020)

Table 21.2 Assessment of the impact of AI on social SDGs

Social SDGs	Targets of each goal for which AI acts as an enabler	Targets of each goal for which AI acts as an inhibitor
Goal 1	1.1, 1.2, 1.3, 1.4, 1.5, 1.A, 1.B	1.1, 1.2, 1.3, 1.4, 1.A, 1.B
Goal 2	2.1, 2.2, 2.3, 2.4, 2.A, 2.C	2.3, 2.A
Goal 3	3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.9, 3.B, 3.D	3.9
Goal 4	4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.A, 4.B, 4.C	4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4C

Source: Vinuesa et al. (2020)

Table 21.3 Assessment of the impact of AI on economic SDGs

Economic SDGs	Targets of each goal for which AI acts as an enabler	Targets of each goal for which AI acts as an inhibitor
Goal 13	13.1, 13.2, 13.3, 13B	13.2
Goal 14	14.1, 14.2, 14.3, 14.4, 14.5, 14.7, 14.A, 14.B, 14.C	14.2, 14.5, 14.7
Goal 15	15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7, 15.8, 15.9, 15.A, 15.B, 15.C	15.2, 15.4, 15.5, 15.7

Source: Vinuesa et al. (2020)

Several SDGs have an environmental impact and are referred to collectively here as environmental SDGs. Table 21.4 shows the target numbers for each goal and groups them, based on available evidence, into those for which AI is an enabler or an inhibitor.

21.4 Monitoring of the SDG Index

The annual SDG Index provides a standardized, quantitative, transparent, and scalable composite measure of SDG baselines for 149 countries, with sufficient data across the goals. According to the Sustainable Development Report 2019 (Sachs, Schmidt-Traub, Kroll, Lafortune, & Fuller, 2019), the SDG Index data leads to seven main findings.

1. High-level political commitment to the SDGs is falling short of historic promises

In September 2019, out of 43 countries surveyed on SDG implementation efforts, 33 have endorsed the SDGs in official statements since January 1, 2018 but only 18 of them claimed that their central budget documents mentioned the SDGs. This gap between rhetoric and action must be closed.

2. The SDGs can be operationalized through six SDG transformations

SDG implementation can be organized along the following transformations: a. education, gender, and inequality; b. health, well-being, and demography; c. energy decarbonization and sustainable industry; d. sustainable food, land, water, and oceans; e. sustainable cities and communities; and f. digital revolution for sustainable development.

Table 21.4 Assessment of the impact of AI on environmental SDGs

Environmental SDGs	Targets of each goal for which AI acts as an enabler	Targets of each goal for which AI acts as an inhibitor
Goal 1	1.1, 1.2, 1.3, 1.4, 1.5, 1.A, 1.B	1.1, 1.2, 1.3, 1.4, 1.A, 1.B
Goal 2	2.1, 2.2, 2.3, 2.4, 2.A, 2.C	2.3, 2.A
Goal 3	3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.9, 3.B, 3D	3.9
Goal 4	4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.A, 4.B, 4.C	4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4C
Goal 5	5.1, 5.2, 5.5, 5.6, 5B	5.1, 5.6, 5B
Goal 6	6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.A, 6.B	6.1, 6.4, 6.5, 6A, 6B
Goal 7	7.1, 7.2, 7.3, 7A, 7B	7.1, 7.2
Goal 11	11.1, 11.2, 11.3, 11.4, 11.5, 11.6, 11.7, 11.A, 11.B, 11.C	11.2, 11.3
Goal 16	16.1, 16.2, 16.3, 16.4, 16.5, 16.7, 16.A	16.1, 16.2, 16.3

Source: Vinuesa et al. (2020)

3. Trends on climate (SDG 13) and biodiversity (SDG 14 and SDG 15) are alarming

Countries have not achieved relevant results in SDG 13, even if efforts against climate change appear to be effective. The same applies for SDG 14 and SDG 15, as reported by the Intergovernmental Panel on Climate Change (IPCC, 2019) and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES, 2018).

4. Sustainable land-use and healthy diets require integrated agriculture, climate, and health policy interventions

78% of world nations for which data are available obtain a "red rating" on sustainable nitrogen management. One-third of food is wasted, 800 million people remain undernourished, 2 billion are deficient in micronutrients, and obesity is on the rise.

5. High-income countries generate high environmental and socioeconomic spill-over effects

Domestic implementation of the SDGs should not undermine the ability of other countries to achieve the goals. Tolerance for poor labor standards in international supply chains harms the poor, and particularly women, in many developing countries.

6. Human rights and freedom of speech are in danger in numerous countries

Conflicts in many parts of the world continue to lead to reversals in SDG progress. Modern slavery and the share of unsentenced detainees in prisons remain high, particularly in low-income countries.

7. Eradicating poverty and strengthening equity remain important policy priorities

In middle- and high-income countries, rising income inequalities and persistent gaps in access to services and opportunities by income or territorial areas remain important policy issues. Women in OECD countries continue to spend an average of two hours more than men a day doing unpaid work.

21.5 Tier classification for global SDG indicators (UN, 2019a)

This classification is established to differentiate the indicators according to:

1. If a methodology has been established internationally.
2. If the data is produced continuously by at least 50% of countries and the population.

The tier classification for global SDG indicators can be expressed as follows:

Tier 1: Indicator is conceptually clear, has an internationally established methodology and standards are available, and data are regularly produced by countries for at least 50 percent of countries and of the population in every region where the indicator is relevant.

Tier 2: Indicator is conceptually clear, has an internationally established methodology and standards are available, but data are not regularly produced by countries.

Tier 3: No internationally established methodology or standards are yet available for the indicator, but methodology/standards are being (or will be) developed or tested.

The current classification contains 116 Tier I indicators, 92 Tier II indicators, and 20 Tier III indicators. In addition to these, there are four indicators that have multiple tiers (different components of the indicator are classified into different tiers). Due to the clarity of Tier I indicators, they should be the ones that are mainly addressed and monitored.

The indicators for each of the sustainable development goals classified as Tier I are as follows:

Goal 1. End poverty in all its forms everywhere

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

1.2.1 Proportion of population living below the national poverty line, by sex and age.

1.4.1 Proportion of population living in households with access to basic services.

Goal 2. End hunger, achieve food security and improved nutrition, and promote sustainable agriculture

2.1.1 Prevalence of undernourishment.

2.1.2 Prevalence of moderate or severe food insecurity in the population, based on the Food Insecurity Experience Scale (FIES).

2.2.1 Prevalence of stunting (height for age < -2 standard deviation from the median of the World Health Organization (WHO) Child Growth Standards) among children under 5 years of age.

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).
2.5.1 Number of plant and animal genetic resources for food and agriculture secured in either medium- or long-term conservation facilities.
2.a.1 The agriculture orientation index for government expenditures.
2.a.2 Total official flows (official development assistance plus other official flows) to the agriculture sector.
2.b.1 Agricultural export subsidies.

Goal 3. Ensure healthy lives and promote well-being for all at all ages

3.1.1 Maternal mortality ratio.
3.1.2 Proportion of births attended by skilled health personnel.
3.2.1 Under-5 mortality rate.
3.2.2 Neonatal mortality rate.
3.3.1 Number of new HIV infections per 1000 uninfected population, by sex, age and key populations.
3.3.2 Tuberculosis incidence per 100,000 population.
3.3.3 Malaria incidence per 1000 populations.
3.3.4 Hepatitis B incidence per 100,000 populations.
3.3.5 Number of people requiring interventions against neglected tropical diseases.
3.4.1 Mortality rate attributed to cardiovascular disease, cancer, diabetes or chronic respiratory disease.
3.4.2 Suicide mortality rate.
3.5.2 Harmful use of alcohol, defined according to the national context as alcohol per capita consumption (aged 15 years and older) within a calendar year in liters of pure alcohol.
3.6.1 Death rate due to road traffic injuries.
3.7.1 Proportion of women of reproductive age (aged 15–49 years) who have their need for family planning satisfied with modern methods.
3.7.2 Adolescent birth rate (aged 10–14 years; aged 15–19 years) per 1000 women in that age group.
3.8.1 Coverage of essential health services (defined as the average coverage of essential services based on tracer interventions that include reproductive, maternal, newborn and child health, infectious diseases, non-communicable diseases and service capacity and access, among the general and the most disadvantaged population).
3.8.2 Proportion of population with large household expenditures on health as a share of total household expenditure or income.
3.9.1 Mortality rate attributed to household and ambient air pollution.
3.9.2 Mortality rate attributed to unsafe water, unsafe sanitation, and lack of hygiene (exposure to unsafe Water, Sanitation and Hygiene for All (WASH) services).
3.9.3 Mortality rate attributed to unintentional poisoning.

3.a.1 Age-standardized prevalence of current tobacco use among persons aged 15 years and older.
3.b.1 Proportion of the target population covered by all vaccines included in their national programme.
3.b.2 Total net official development assistance to medical research and basic health sectors.
3.c.1 Health worker density and distribution.
3.d.1 International Health Regulations (IHR) capacity and health emergency preparedness.

Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

4.1.1 Proportion of children and young people (a) in grades 2/3; (b) at the end of primary; and (c) at the end of lower secondary achieving at least a minimum proficiency level in (i) reading and (ii) mathematics, by sex.
4.2.2 Participation rate in organized learning (one year before the official primary entry age), by sex
4.b.1 Volume of official development assistance flows for scholarships by sector and type of study.

Goal 5. Achieve gender equality and empower all women and girls

5.3.1 Proportion of women aged 20–24 years who were married or in a union before age 15 and before age 18.
5.3.2 Proportion of girls and women aged 15–49 years who have undergone female genital mutilation/cutting, by age.
5.5.1 Proportion of seats held by women in (a) national parliaments and (b) local governments.
5.5.2 Proportion of women in managerial positions.

Goal 6. Ensure availability and sustainable management of water and sanitation for all

6.4.1 Change in water-use efficiency over time.
6.4.2 Level of water stress: freshwater withdrawal as a proportion of available freshwater resources.
6.5.1 Degree of integrated water resources management implementation (0–100).
6.5.2 Proportion of transboundary basin area with an operational arrangement for water cooperation.
6.6.1 Change in the extent of water-related ecosystems over time.
6.a.1 Amount of water- and sanitation-related official development assistance that is part of a government-coordinated spending plan.
6.b.1 Proportion of local administrative units with established and operational policies and procedures for participation of local communities in water and sanitation management.

Goal 7. Ensure access to affordable, reliable, sustainable, and modern energy for all

7.1.1 Proportion of population with access to electricity.
7.1.2 Proportion of population with primary reliance on clean fuels and technology.
7.2.1 Renewable energy share in the total final energy consumption.
7.3.1 Energy intensity measured in terms of primary energy and GDP.
7.a.1 International financial flows to developing countries in support of clean energy research and development and renewable energy production, including in hybrid systems.

Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

8.1.1 Annual growth rate of real GDP per capita.
8.2.1 Annual growth rate of real GDP per employed person.
8.4.2 Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP.
8.5.2 Unemployment rate, by sex, age, and persons with disabilities.
8.6.1 Proportion of youth (aged 15–24 years) not in education, employment, or training.
8.10.1 (a) Number of commercial bank branches per 100,000 adults and (b) number of automated teller machines (ATMs) per 100,000 adults.
8.10.2 Proportion of adults (15 years and older) with an account at a bank or other financial institution or with a mobile-money service provider.
8.a.1 Aid for trade commitments and disbursements.

Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation

9.1.2 Passenger and freight volumes, by mode of transport.
9.2.1 Manufacturing value added as a proportion of GDP and per capita.
9.2.2 Manufacturing employment as a proportion of total employment.
9.3.2 Proportion of small-scale industries with a loan or line of credit.
9.4.1 CO_2 emission per unit of value added.
9.5.1 Research and development expenditure as a proportion of GDP.
9.5.2 Researchers (in full-time equivalent) per million inhabitants.
9.a.1 Total official international support (official development assistance plus other official flows) to infrastructure.
9.b.1 Proportion of medium and high-tech industry value added in total value added.
9.c.1 Proportion of population covered by a mobile network, by technology.

Goal 10. Reduce inequality within and among countries

10.5.1 Financial soundness indicators.
10.6.1 Proportion of members and voting rights of developing countries in international organizations.
10.a.1 Proportion of tariff lines applied to imports from least developed countries and developing countries with zero-tariff.
10.c.1 Remittance costs as a proportion of the amount remitted.

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

11.1.1 Proportion of urban population living in slums, informal settlements, or inadequate housing.
11.6.2 Annual mean levels of fine particulate matter (e.g., PM2.5 and PM10) in cities (population weighted).

Goal 12. Ensure sustainable consumption and production patterns

12.2.2 Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP.
12.4.1 Number of parties to international multilateral environmental agreements on hazardous waste, and other chemicals that meet their commitments and obligations in transmitting information as required by each relevant agreement.
12.c.1 Amount of fossil-fuel subsidies per unit of GDP (production and consumption) and as a proportion of total national expenditure on fossil fuels.

Goal 14. Conserve and sustainably use the oceans, seas, and marine resources for sustainable development

14.4.1 Proportion of fish stocks within biologically sustainable levels.
14.5.1 Coverage of protected areas in relation to marine areas.
14.6.1 Degree of implementation of international instruments aiming to combat illegal, unreported, and unregulated fishing.
14.7.1 Sustainable fisheries as a proportion of GDP in small island developing states, least developed countries, and all countries.
14.b.1 Degree of application of a legal/regulatory/policy/institutional framework which recognizes and protects access rights for small-scale fisheries.

Goal 15. Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

15.1.1 Forest area as a proportion of total land area.
15.1.2 Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type.
15.2.1 Progress towards sustainable forest management.
15.3.1 Proportion of land that is degraded over total land area.
15.4.1 Coverage by protected areas of important sites for mountain biodiversity.
15.4.2 Mountain Green Cover Index.
15.5.1 Red List Index.
15.6.1 Number of countries that have adopted legislative, administrative, and policy frameworks to ensure fair and equitable sharing of benefits.

Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable and inclusive institutions at all levels

16.1.1 Number of victims of intentional homicide per 100,000 population, by sex and age.

16.3.2 Unsentenced detainees as a proportion of overall prison population.
16.5.2 Proportion of businesses that had at least one contact with a public official and that paid a bribe to a public official, or were asked for a bribe by those public officials during the previous 12 months.
16.8.1 Proportion of members and voting rights of developing countries in international organizations.
16.9.1 Proportion of children under 5 years of age whose births have been registered with a civil authority, by age.
16.10.2 Number of countries that adopt and implement constitutional, statutory, and/or policy guarantees for public access to information.
16.a.1 Existence of independent national human rights institutions in compliance with the Paris Principles.

Goal 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

17.1.1 Total government revenue as a proportion of GDP, by source.
17.1.2 Proportion of domestic budget funded by domestic taxes.
17.2.1 Net official development assistance, total and to least developed countries, as a proportion of the Organization for Economic Cooperation and Development (OECD) Development Assistance Committee donors' gross national income (GNI).
17.3.1 Foreign direct investment (FDI), official development assistance, and South-South cooperation as a proportion of total domestic budget.
17.3.2 Volume of remittances (in United States dollars) as a proportion of total GDP.
17.4.1 Debt service as a proportion of exports of goods and services.
17.6.2 Fixed Internet broadband subscriptions per 100 inhabitants, by speed.
17.8.1 Proportion of individuals using the Internet.
17.9.1 Dollar value of financial and technical assistance (including through North-South, South-South and triangular cooperation) committed to developing countries.
17.10.1 Worldwide weighted tariff-average.
17.11.1 Developing countries' and least developed countries' share of global exports.
17.12.1 Average tariffs faced by developing countries, least developed countries, and small island developing states.

21.6 What is the progress of SDG compliance?

According to The Sustainable Development Goals Report 2019 (UN, 2019b), the main progress regarding SDG compliance is as follows:

SDG 1

- 55% of the world's population have no access to social protection.

- 736 million people lived in extreme poverty in 2015, 413 million in sub-Saharan Africa.
- More than 90% of deaths due to disasters occur in low and middle-income countries.

SDG 2

- 821 million were undernourished in 2017, up from 784 million in 2015.
- Two-thirds of undernourished people worldwide live in two regions: sub-Saharan Africa (237 million) and southern Asia (277 million).
- 22% (149 million) of children under 5 are stunted.
- 7.3% (49 million) of children under 5 are affected by wasting.
- 5.9% (40 million) of children under 5 are overweight.

SDG 3

- Under-5 deaths dropped from 9.8 million in 2000 to 5.4 million in 2017.
- The tuberculosis incidence rate declined by 21% between 2000 and 2017; nonetheless 10 million people developed tuberculosis in 2017.
- Vaccinations resulted in an 80% drop in measles deaths between 2000 and 2017.
- The incidence of HIV among adults 15–49 years old in sub-Saharan Africa declined by 37% between 2010 and 2017.
- There were an estimated 3.5 million more malaria cases in the ten highest-burden African countries in 2017 compared to 2016.

SDG4

- 617 million children and adolescents lack minimum proficiency in reading and mathematics.
- 750 million adults still remain illiterate. Two-thirds of them are women.
- More than half of the schools in sub-Saharan Africa do not have access to:
- Basic drinking water
- Handwashing facilities
- The Internet
- Computers.
- 1 out of 5 children between 6 and 17 years are not attending school.
- In Central Asia, 27% more girls than boys of primary school age are not attending school.

SDG 5

- 18% of ever-partnered women and girls aged 15–49 years have experienced physical and/or sexual partner violence in the previous 12 months.
- 24% of national parliamentarians are women 24%, an increase from 19% (2010).
- In Southern Asia, a girl's risk of marrying in childhood has decreased by 40% since 2000.
- 30% of women aged 20–24 years were married before age 18 (2018).
- At least 200 million girls and women have been subjected to female genital mutilation, half of them in west Africa.

SDG6

- 785 million people remain without even basic drinking water services (2017).
- 2 out of 5 people worldwide do not have basic handwashing facility with soap and water at home (2017).
- 1 out of 4 health-care facilities worldwide lack basic drinking water services (2016).
- By 2030, 700 million people could be displaced by intense water scarcity.
- 673 million people (9% of the global population) still practice open defecation (2017). The majority of them are in southern Asia.

SDG 7

- 9 out of 10 people worldwide have access to electricity.
- On average, 2.3% less energy was needed to create a unit of economic output each year (2010–2016).
- 87% of the 840 million people without electricity live in rural areas.
- 17.5% of total final energy consumption comes from renewable energy.
- 3 billion people lack clean cooking fuels and technology.

SDG 8

- Real GDP grew by 4.8% annually in the least developed countries (LDC) (2010–2017), well less than the 7% SDG target.
- In 2018, labor productivity increased by 2.1% from 2017, the highest annual growth since 2010.
- The median hourly pay of men is 12% higher than that of women.
- The global unemployment rate is 5% (2018).
- One fifth of young people have education, employment, or training

SDG 9

- Medium-high and high-tech sectors account for 45% of the global manufacturing value added (2016), but the share is only 15% in sub-Saharan Africa.
- Global investment in research and development is $2 trillion (2016), up from $739 billion (2000).
- 90% of people live within range of a 3G or higher quality mobile network (2018), but not all can afford to use it.

SDG 10

- In more than half of the 92 countries having data, income of the bottom 40% of the population grew faster than the national average (2011–2016).
- Most countries have policies to facilitate safe and orderly migration, but more work remains to be done to protect migrants' rights and socioeconomic well-being.
- 66% of products exported from the LDCs receive duty-free treatment (2017), compared to 51% for developing regions.

SDG 11

- 2 billion people do not have access to waste collection services.

- 1 out of 4 urban residents live in slum-like conditions (2018).
- Only half (53%) of urban residents have convenient access to public transport (2018).
- 9 out of 10 urban residents breathe polluted air.
- 150 countries have developed national urban plans, with almost half of them in the implementation phase.

SDG 12

- The material footprint per capita in high-income countries is 60% higher than in upper-middle-income countries and more than 13 times the level of low-income countries.
- Developed countries use one-fifth of natural resources to produce the same amount of economic output as developing countries.
- Nearly 100 countries are actively adopting policies and measures to promote sustainable consumption and production.

SDG 13

- The global mean temperature in 2018 is approximately 1 °C above the pre-industrial baseline.
- Climate-related and geophysical disasters claimed an estimated 1.3 million lives between 1998 and 2017.
- 186 Parties have ratified the Paris Agreement.
- To limit global warming to 1.5 °C, global carbon emissions need to fall to 55% of 2010 levels by 2030 and continue a steep decline to zero net emissions by 2050.
- The previous point occurred despite an increase in global climate finance flows of 17% (2015–2016), compared with 2013–2014.
- Investment in fossil fuels continues to be higher than investment in climate activities.

SDG 14

- Ocean acidity has increased by 26% since pre-industrial times.
- Ocean acidity is expected to increase rapidly, by 100–150%, by 2100.
- 104,220 coastal regions improved their coastal water quality (2012–2018).
- The proportion of fish stocks within biologically sustainable levels declined from 90% (1974) to 67% (2015).
- 87 countries signed the Agreement on Port State Measures, the first binding international agreement on illegal, unreported, and unregulated fishing.
- 17% of waters under national jurisdiction are covered by protected areas, more than double the 2010 coverage level.

SDG 15

- Red List Index: Biodiversity loss is happening at an accelerated rate. The risk of species extinction has worsened by almost 10% over the last 25 years.

- 116 Parties have ratified the Nagoya Protocol, which addresses access to genetic resources and their fair and equitable use.
- Land degradation is affecting one-fifth of the Earth's land area and the lives of 1 billion people.

SDG 16

- Men make up around 80% of homicide victims overall. But women constitute 64% of homicide victims of intimate partner/family-related homicide.
- 70% of detected victims of human trafficking are women and girls, most of whom are trafficked for sexual exploitation.
- The UN recorded and verified 397 additional killings of human rights defenders, journalists and trade unionists across 41 countries (Jan–Oct, 2018). 91 journalists and bloggers were among the victims.

SDG 17

- Net official development assistance (ODA) totalled $149 billion in 2018, down by 2.7% from 2017.
- In 2018, bilateral ODA to the LDCs fell by 3% in real terms from 2017.
- Aid to Africa fell by 4%.

21.7 Steps for SDG implementation

The steps for SDG implementation are (UNGC, 2019):

1. Understand the SDGs and their targets.
2. Conduct principled prioritization of SDG targets.
3. Define your SDG-related report content.
4. Set business objectives.
5. Select appropriate disclosures.
6. Collect and analyze data.
7. Consider general features of good practice when reporting on the SDGs.
8. Consider data users' information needs.
9. Report and implement change.

Closing Remarks

The United Nations Sustainable Development Goals have been developed to motivate and help countries to make sincere efforts to contribute to the sustainable development of the world, with consequent benefits to their citizens, economically, socially, and environmentally. The indicators are increasingly leading to actions that contribute to the sustainable development. It is important to be able to monitor and assess at the city level the level of SDG compliance, and to identify and demonstrate the corresponding effects of actions. Cities need to able to become more sustainable, and this can be achieved by the relevant authorities in a manner framed by the SDGs.

Various tools are available to assist SDG monitoring. However, knowing in detail the damage that is generated by inaction helps raise awareness of the pending planning and execution. The activities that people, companies, and governments carry out to address the SDGs are important and require indexes or scales through which the effort of all can be reflected. A balanced score card is needed for micro and macro sustainability management at global, regional, local, and individual levels.

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