

# Mapping the Sustainable Development Goals: Challenges facing the understanding of our world through maps

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\*\* The views expressed are those of the author(s) and do not necessarily reflect those of the United Nations.  
(ST/AI/189/Add.6/Rev.5)

**Keywords:** geospatial information, data, cartography, sustainable development

## Abstract:

The United Nations (UN) 2030 Agenda for Sustainable Development, often referred to as the Sustainable Development Goals (SDGs), set out a shared global vision to end poverty, rescue the planet, and build a peaceful world. To achieve these goals, it is essential to leverage data to measure progress, inform decision-making and to ensure effective and inclusive national and sub-national programs. The challenges our world faces in achieving the SDGs require better use and availability of reliable, timely, accessible, and disaggregated geospatial information and data as called by the Secretary-General of the UN (United Nations, 2018). Evidence-based decision-making must guide priorities for specific areas to place interventions to bring value to people who need it most, to progress toward achieving the SDGs.

Understanding data, however, remains a challenge to many including decision and policymakers. Decision makers face a deluge of data, statistics, news feeds, big data, algorithms processing results, automated tools, dashboards, social media, from a host of different sources, at different scales. These data are often in separate data silos of specific ministries, that reflect their unique priorities and are typically inaccessible to others. This can lead to data collection and storage duplication. Making sense of these data pose a significant challenge. Efforts are ongoing worldwide, including within the UN, to increase access to data and improve data literacy to turn these data into meaningful information. In this context, cartography has a role to play in facilitating the understanding of data particularly for decision-making and action. To achieve this, data is prepared, processed, and visualized to provide an overview of a situation or phenomenon that decision makers can use for information driven decision making. These resulting maps and diagrams can assist governments and people to better understand, monitor progress, and act upon these insights to meet the SDGs.

To ensure that cartography plays its intended role in unveiling locations where challenges persist and locate where progress toward the SDGs can be made, we pose a call to action for all mappers. Cartographers can realize creative solutions, to generate maps for collective understanding of our world. Maps that provide compelling stories displaying where progress is needed can be used to advocate for achieving the SDGs. In 2020, the joint open access publication between UN and the International Cartographic Association titled *Mapping for A Sustainable World* (Kraak et al., 2020) intended to contribute to democratize access to cartographic understanding and provide considerations, and techniques to craft maps, to share knowledge. Further in 2021 and 2022, the Mapping 17 Sustainable Development Goals cartographic campaigns by the UN Geospatial team (see examples: UN Geospatial, 2021a; 2022a) aimed to showcase the power of cartography to illuminate the status of achievement toward the SDGs. Using the official SDG indicator database, the campaign's intention is to use analytics and geovisualization to transform complex situations and statistics to an understandable visualization of the global trends. While the 2021 campaign focused on world maps and global trends, the 2022 campaign was designed to examine and reveal regional dynamics and challenges, at continental or sub-regions. These campaigns intended to reach a similar overall objective of story maps presented in the SDG Geospatial Roadmap which is highlight existing data and related gaps, and "telling stories generates an attractive shared understanding at [...] regional and global levels" (UN-GGIM, 2022).

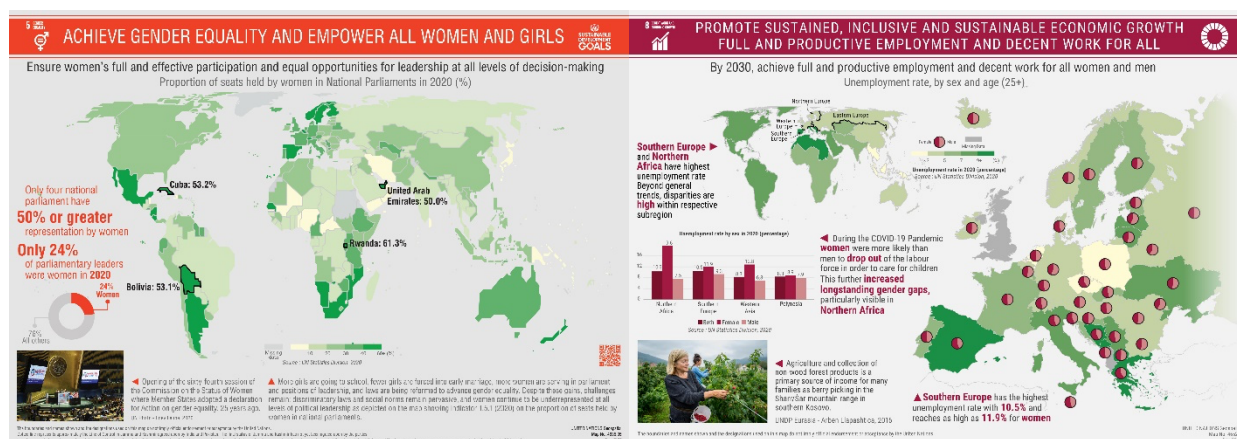


Figure 1. On the right is an example of a global map from the 2021 cartographic campaign related to **SDG 05 Gender Equality** (UN Geospatial, 2021) and the left is a regional example from regional level **SDG 08: Decent Work and Economic Growth** (UN Geospatial, 2022)

Cartography can be used to utilized to convey opportunities and/or challenges related to the SDGs. Cartographic decision making is influenced by data availability. During both the making of the publication on *Mapping for A Sustainable World* and the Mapping the 17 SDGs campaigns, gaps in available data from official source of the SDG indicator became obvious. First, the absence of (spatial) data for all countries and of data during extended periods (time) makes it challenging to prepare maps to compare values and reflect data which are truly current. Another challenge is that many phenomena and trends are only tangentially legible in the SDG indicators, meaning there are mismatches between the goals, targets, and indicators. The use of manually collected statistics for the indicators works well for socio-economic trends, yet for environmental indicators, such as 13 on Climate Change, 14 on Life on Land, or 15 Life below Water, earth observation data from satellites could be more widely utilized to aggregate these indicator data. Remote sensing could be more effectively used to quantify values reputable source of data to quantify challenges of our time such as temperature changes, ice melt, deforestation, or ocean acidification (Hakimdavar et al., 2020; Kussul et al., 2020). For all these reasons, the Mapping for 17 Sustainable Development Goals campaigns leveraged many and diverse datasets to tell current and compelling stories on the challenges we face. Progressively, other sources of reliable data need to be explored beyond the global SDG Indicator database to provide a more complete picture of current world phenomenon. These data sources can augment missing data and fill in gaps created by unforeseeable events that shake our world and that could not have been predicted at the time the 2030 Agenda was drafted and adopted (United Nations, 2015). Local agencies could use datasets outside the official SDG indicator data or metadata to make local calculations. For example reputable and reliable data sources such as those from the Water Resource Institute on water stress related to SDG 6 see [SDG06 \(Geospatial, 2021b\)](#), from the Global Forest Watch calculating global forest coverage change over time including tree cover loss (Hansen et al., 2013); or from the [Armed Conflict Location & Event Data](#) project (ACLED) which was recently secured as a common good by [the Complex Risk Analytics Fund](#) and can be used for mapping SDG 16 related to promoting peace and justice (Geospatial, 2022b). Finding reliable, timely, accessible, and disaggregated geospatial information and data remains a challenge to understand our world, at global, national, subnational, and local levels. To achieve the SDGs and to improve the next set of global goals, it is vital to promote democratized and inclusive data, cartographic literacy, and access, to generate communicative visualizations of challenges to the SDGs, to facilitate understanding of official data especially for policy makers, and to go further in using all reliable data available to increase our knowledge of the challenges our world.

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