



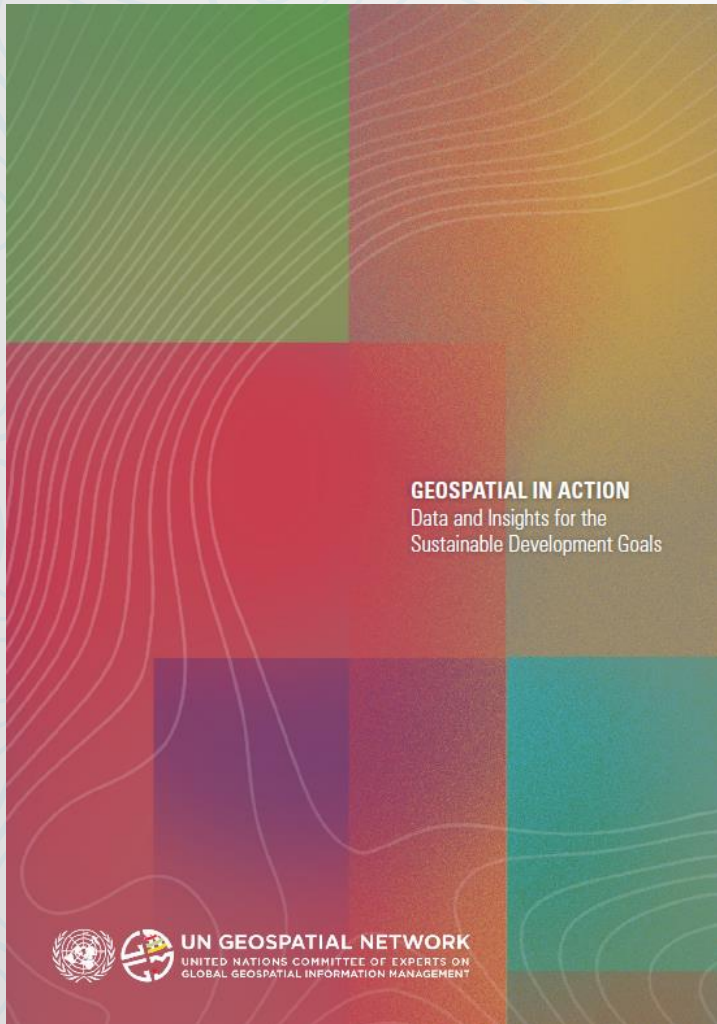
UN GEOSPATIAL NETWORK

UNITED NATIONS COMMITTEE OF EXPERTS ON
GLOBAL GEOSPATIAL INFORMATION MANAGEMENT

**Celebrating GIS day
UN Talking on Geospatial**

**Geospatial In Action: Data and Insights for the
Sustainable Development Goals**

GEOSPATIAL IN ACTION



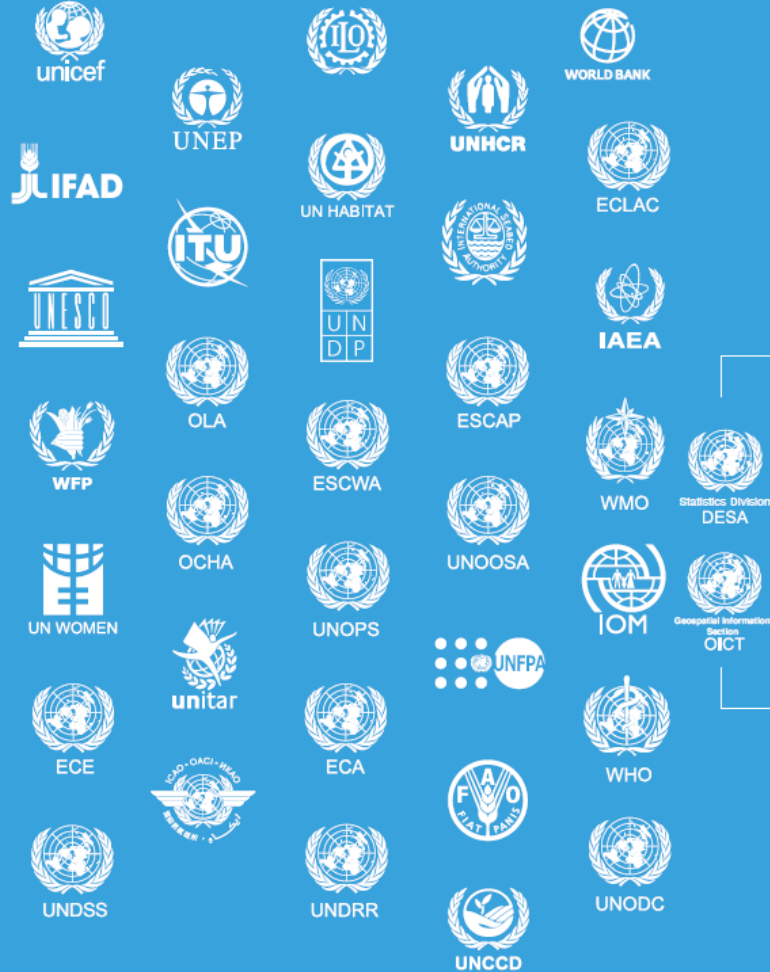
3 main objectives

- Overview of activities and projects on geospatial information management by the United Nations system
- Showcase the use and application of geospatial information management in the context of the Sustainable Development Goals
- Facilitate awareness and collaboration with UN-GGIM with the UN system

GEOSPATIAL IN ACTION

Address activities of the Blueprint:

- Promote demonstration projects to showcase best practices in the application and usage of geospatial data in the United Nations system
- Facilitate the establishment of partnerships by promoting the Network, its activities and activities of its Members in particular with other Networks
- Raise awareness on potential technical assistance to strengthen national capacities in geospatial information management
- Showcase the use and application of geospatial information management by the United Nations system
- Facilitate awareness and collaboration with UN-GGIM activities



SECRETARIAT

GEOSPATIAL IN ACTION: Data and Insights for the Sustainable Development Goals

FOREWORD

Chair of the UN Geospatial Network

We are at an inflection point in History. This is a time for Action. Humanity has never faced a need for such a global call for action. Our interconnected world intertwines the social, economic, and environmental dimensions in such a systemic way that one event happening in one sector crosses over all the others. Similarly, the borderlines from the global, through regional to national and local scales have been flattened. The exploration to its maximum of the potential of Geospatial information and technology is a must and critical contributor to this Call for Action, to contribute to our Common Agenda.

Moreover, we experience times where our lives have been shaken by yet another crisis, a triple crisis of health, with the global pandemic; of conflicts, spreading across and between countries; and of climate change, with raging devastation and threats to our societies. [The 2030 Agenda for Sustainable Development](#) is the global call for action for peace and prosperity for people, places and the planet, now and into the future in a global partnership. The 17 Sustainable Development Goals is our common compass that set the directions and priorities for our society, our economy, and our environment.

Geospatial is an enabling set of data, technologies, tools and services which can leverage the true potential of UN system, its Offices, Agencies, Funds and Programmes to effectively deliver their mandates in the nexus of human rights, development, and peace pillars. There has been no better time to abide by Geospatial for a better world, Transforming the Lives of People, Places and Planet.

A very interesting dimension of the current and future use of Geospatial it's the capacity development of organizations, countries and regions for the use and sharing of these data, technologies and services.

This exciting ambition to explore Geospatial to its maximum potential is strongly dependent on skills, competencies, and capacities of People. It is again the Technology, Processes and People paradigm which drives real change. Being Inclusive. Leaving no One Behind!

The geospatial community must rise in a global partnership to address the challenges our world is facing and is likely to face in the future. Member States, international organizations, the private sector, the academia, and the civil society must put their efforts in collective approach.

Much is already ongoing. This publication provides a kaleidoscopic view of the contribution of the UN Geospatial Network entities and their action to provide data and insights for a better world. This movement must be amplified. The progress made by the UN-GGIM in providing essential frameworks for the availability, quality and accessibility of geospatial information is underway. The United Nations Geospatial Network commits to contribute to these frameworks with its best abilities and to amplify their implementation at global, regional and national levels.

Our UN Geospatial Network prepared this publication to showcase what it is contributing to our global Call for Action in the context of the 17 Sustainable Development Goals.

Geospatial for a better world, impacting on People, Places and Planet, here's how... and where.

Alexandre Caldas
United Nations Environment Programme

GEOSPATIAL IN ACTION: Data and Insights for the Sustainable Development Goals

2 ZERO HUNGER



GEOSPATIAL INACTION: Data and Insights for the Sustainable Development Goals

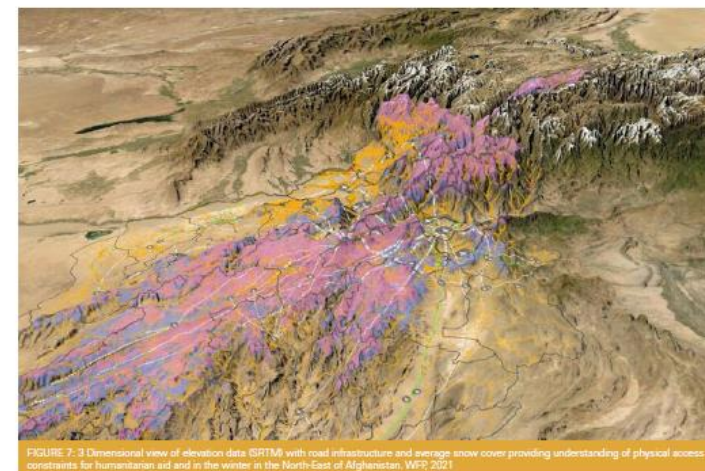
The Geospatial database covers five thematic areas: land and water resources, agro-climatic resources, suitability and potential yields for crops/land utilization, downscaled actual yields and production of main crop commodities, and yield and production gaps. This global methodology and resource is also supporting national capacity development.

Geospatial information and technology are critical for surge operations in bringing food supplies to populations affected by disasters or crises and for monitoring systems. The World Food Programme (WFP) uses geospatial analytics for the design of new rural developments, such as in Yemen when on-site visits are not possible. The combination of geospatial datasets helps determine the social, environmental and climate vulnerabilities of over 4,000 villages. It additionally helps identify intervention areas and preliminary intervention options to improve the livelihoods of 26,000 poor households. The AIMS satellite programme of WFP monitors and evaluates changes in the landscape induced by the Food Assistance for Assets programme. Since its launch in 2017, the programme has monitored 1,500 assets across 18 countries.

These programmes engage communities in the construction and rehabilitation of assets that stabilize and restore landscapes, reduce hardships on women and girls, reduce disaster risk, increase food production, and strengthen and diversify livelihoods—directly contributing to many SDGs.

The International Fund for Agricultural Development uses geospatial methodologies, tools and data to support decision-making in the formulation of its country strategies, and throughout its project investment cycle, that aim to reduce poverty and hunger in rural areas. Geospatial analysis supports identifying vulnerable areas, targeting poor rural communities, analyzing climatic hazards and impacts as well as assessing the state of natural resources. The Fund relies on using freely available global and national datasets including population estimates, social-economic and nutritional data, accessibility to urban centres, environmental datasets, climate data on rainfall and temperature, land cover and land use maps, etc. The Fund also collects geospatial information from its funded projects (e.g., locations of beneficiary households, infrastructure locations, and/or areas under improved management) and uses it to evaluate their impact on food security and agricultural productivity.

0015



GEOSPATIAL INACTION: Data and Insights for the Sustainable Development Goals

3 GOOD HEALTH AND WELL-BEING



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

3

GEOSPATIAL IN ACTION: Data and Insights for the Sustainable Development Goals

3

0017

GOOD HEALTH AND WELL-BEING

Before the COVID-19 pandemic, progress had been made in many health areas including improving maternal and children health, increasing immunization coverage and reducing communicable diseases—albeit not fast enough to meet the SDG 3 targets by 2030. The disruption caused by the pandemic has now halted or even reversed the progress made. Allegedly, one of the first geospatial applications was health when in 1854, John Snow demonstrated the correlation of a cholera outbreak to contaminated water pumps. Using geospatial representation and analysis for public health planning enable timely and reliable decisions that can save lives.

The COVID-19 crisis is inherently associated with geospatial location: its appearance associated to the proximity of cities and the zoosphere, the region where it appeared to its global spreading pattern around the

world in a wave from east to west, or the importance of social—or geographical—distancing of two metres between individuals. In the context of prevention, understanding the spatial patterns of diseases indeed can save lives if timely, as spreading factors can then be addressed, focusing on priority areas. For the response, the [World Health Organization \(WHO\)](#) the headquarters and regional centres have been leveraging geospatial technologies for vaccine distribution planning, monitoring and evaluation. Since the onset of the pandemic in January 2020, WHO regional offices have been deploying geo-enabled programmes to ensure equitable access to COVID-19 responses. [Geospatial information](#) provides a common operating framework to answer questions around equity and resource allocation, and coverage. Without such data, we cannot ensure universal health coverage for COVID-19 treatment or vaccine distribution.



FIGURE 8: COVID-19 dashboard presenting cases worldwide on an interactive map in April 2020. WHO, 2020

GEOSPATIAL IN ACTION: Data and Insights for the Sustainable Development Goals

4 QUALITY EDUCATION



FIGURE 12: Aerial view of a school with blue colored corrugated iron roof with children playing on the schoolyard during break located in Namche Bazar, Khumbu, Nepal. Shutterstock/E. Schneider

GEOSPATIAL INACTION: Data and Insights for the Sustainable Development Goals

Several tools and methodologies have been designed to provide customized and responsive educational offerings. The programme on resilient site classification informs the location of new educational facilities, and it helps to prioritize the maintenance, refurbishment or relocation of the existing infrastructure. The isochrone-based catchment areas support the better understanding and evaluation of travel time and travel distance. The geographically-weighted regression model aims to design targeted educational policies, and the spatialized school-age population estimates at the micro level help to better assess the location of children and youth to provide educational opportunities.

Connecting schools to the Internet would be indispensable to bridge the digital divide. Accurate information on school locations and Internet connectivity are not often readily available. Project Connect, a joint initiative by the [United Nations Children's Emergency Fund \(UNICEF\)](#) and the [International Telecommunication Union \(ITU\)](#) (part of [giga connect](#)), aims to build a global database of school locations and connectivity using Artificial Intelligence (AI) models with training and validation from governments, open-source and crowd-sourced platforms. AI models have been applied to extract useful insights from satellite imagery. For Colombia, Honduras, Sierra Leone, Niger, Rwanda, Kenya and Kazakhstan, more than 23,000 unmapped schools were detected with approximately 90 per cent overall accuracy.

Further research is required to successfully scale up in other parts of the world. An open-source data-sharing platform will soon be made available to join the wider effort to reduce inequalities and promote child well-being.

For quality education and raising awareness, promoting the use of geospatial information for solving societal challenges is also part of the mission of the United Nations. The UNESCO OPERANDUM Geospatial Information Knowledge Platform (GeoIKP) and the RURITAGE rural landscape mapping aim to promote education on geospatial information. Further, the [United Nations Institute for Training and Research \(UNITAR\)](#), through the [United Nations Satellite Centre \(UNOSAT\)](#), developed web-based and self-paced online courses on "Geospatial Information Technology in Fragile Contexts," with a focus on remote sensing and analysis. The [UN Geospatial Information Section](#) prepared a free and open educational publication entitled "[Mapping for a Sustainable World](#)" on best practices on cartography and to showcase how cartography can support the monitoring of the SDGs. This publication also provides a global showcase on integrating geospatial and statistical data.

0023

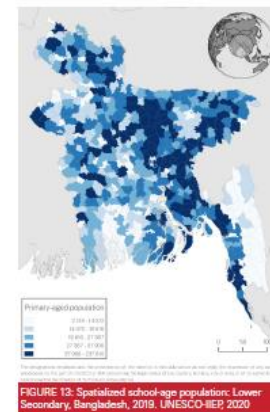


FIGURE 19: Spatialized school-age population: Lower Secondary, Bangladesh, 2019. UNESCO-IIEP, 2020

GEOSPATIAL INACTION: Data and Insights for the Sustainable Development Goals

5 GENDER EQUALITY



FIGURE 15: escoutkeeper Captain Nampumelelo Nteo, from South Africa, is checking her patrol movement on her Global Positioning System (GPS) and the map after a surveillance and verification mission at Camp Ndiombo, Democratic Republic of the Congo (DRC). UN Photo/Martine Perret, 2006

GEOSPATIAL INACTION: Data and Insights for the Sustainable Development Goals

The United Nations Population Fund (UNFPA) developed a geospatial dashboard on Intimate Partner Violence (IPV), featuring national data for 119 countries, sub-national data and disaggregated data on IPV by age, place of residence, employment, education and household wealth. The dashboard shows that young women face the greatest risk of IPV. It displays trends in sub-regions and sub-groups, enabling policymakers, advocates, service providers and journalists to better target their efforts. Ultimately, the dashboard is useful for everyone acting to end gender-based violence, including activists and other key players.

As part of gender equality mainstreaming, a priority set for the Organization, the United Nations Geospatial Network through its entities has conducted activities and events to both raise awareness and contribute to gender balance in the profession as well as prepared geospatial interfaces and analytical tools to address and monitor [gender equality topics](#).

Organizations such as the WFP, the work of which orients towards emergency and disaster response, collects large volumes of geospatial data related to vulnerability as it is critical to have preparedness towards Disaster Risk Reduction. Noting that vulnerability is also gender-based, an Integrated Contact Analysis (ICA) method will allow geographical targeting with better preparedness to combat gender-based vulnerability.



FIGURE 16: Drones are increasingly used to map flood damage to crops and properties and to provide relief to affected population, here Rhode Nkhambule holds a drone following a public demonstration of the technology to residents in Thepe village, Kasungu District, Malawi. UNICEF/Brown, 2018

GEOSPATIAL INACTION: Data and Insights for the Sustainable Development Goals

7 AFFORDABLE AND CLEAN ENERGY



FIGURE 22: Screen capture of the Story map from Map X on small-scale alluvial mining in Colombia: the mapping of El-Bagre-Zaragoza. UNEP, 2020

GEOSPATIAL INACTION: Data and Insights for the Sustainable Development Goals

Due to the geographic landscape of African countries, particularly rural communities, access to the national grid is very difficult and expensive. Cost-effective renewable energy such as solar panels or plants, therefore, becomes the most effective solution to rural and local electrification in Africa. The geospatial analysis of the irradiance co-developed by the World Bank shows the photovoltaic electricity potential and in particular one of the highest potentials over Africa.

The [United Nations Environment Programme \(UNEP\)](#) developed a technical background document and remote sensing analysis techniques to support national and regional artisanal and small-scale mining (ASGM). The [programme](#) contributes to the evaluation of the influence of mining on the aquatic environment, and on the benefits and challenges of using remote sensing technologies and in-situ environmental monitoring of mercury in water, sediment and selected biota. The programme also suggests a strategy and methods for ASGM site-identification and prioritization as well as environmental sampling, chemical analysis and data-treatment in support of the study's objectives.

0035



FIGURE 23: A family in Terelien, Uvss Province, Mongolia, uses a solar panel to generate power for their ger, a traditional Mongolian tent. UN Photo/Calander Detschen, 2018

GEOSPATIAL INACTION: Data and Insights for the Sustainable Development Goals



FIGURE 40: Lunge of the planet. UNEP-WCMC, Unsplash/Kamenz, 2021

GEOSPATIAL INACTION: Data and Insights for the Sustainable Development Goals

The [FAO Global Land Cover-SHARE \(GLC-SHARE\)](#) integrates the high-accuracy land cover information obtained at national level by local mapping agencies and/or national projects with the best synthesis of global satellite-based, but less validated, datasets in areas where no better national data are available. Mapping land cover allows for assessment and monitoring of terrestrial ecosystems and changes within them, which are crucial to the sustainable management of natural resources, environmental protection, food security and humanitarian programmes.

Geospatial technology also plays a central role in identifying important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type. UNEP together with partners created the Freshwater Ecosystems Explorer: an accurate, up-to-date, high-resolution geospatial data visualization platform depicting the extent to which freshwater ecosystems change over time. This tool can help decision-makers understand the dynamic ecosystem changes and drive action to protect and restore freshwater ecosystems.

UNEP works together with the [National Aeronautics and Space Administration \(NASA\)](#) on the [Global Learning and Observations to Benefit the Environment \(GLOBE\)](#), an international science and education programme that provides students and the public worldwide with the opportunity to participate in data collection and the scientific process, and to contribute meaningfully to our understanding of the Earth system and global environment.

While ensuring national ownership and retaining the flexibility for countries to use their national data, the [UN Convention to Combat Desertification \(UNCCD\)](#) has outlined a standardized approach for reporting on SDG Indicator 15.3.1 using geospatial information, which focuses primarily on the use of three sub-Indicators: Land Cover and Land Cover Change, Land Productivity, and Carbon Stocks above and below ground. The [GEO Land Degradation Neutrality \(GEO LDN\)](#) Initiative was launched in 2018 to enhance national capacities to use geospatial information to map and measure the extent of degraded lands and effectively report on SDG Indicator 15.3.1. GEO is well-placed to assist the UNCCD and its contracting parties with the rapid provision and deployment of EO datasets, in-country capacity building and training, along with guidance on the use and development of EO tools and platforms.

0067

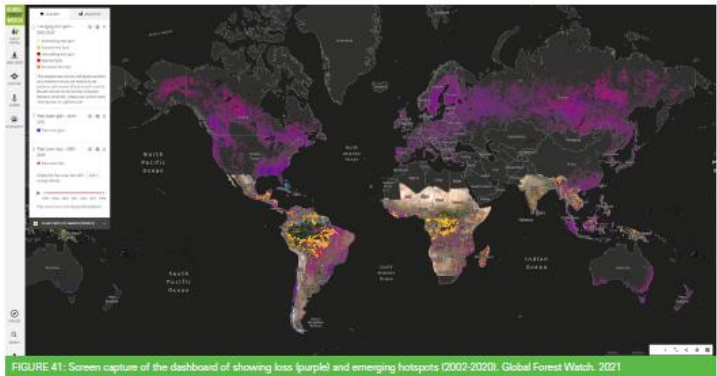


FIGURE 41: Screen capture of the dashboard of showing loss (purple) and emerging hotspots (2002-2020). Global Forest Watch, 2021

GEOSPATIAL INACTION: Data and Insights for the Sustainable Development Goals

16 PEACE, JUSTICE AND STRONG INSTITUTIONS



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

GEOSPATIAL INACTION: Data and Insights for the Sustainable Development Goals

16

0069

PEACE, JUSTICE AND STRONG INSTITUTIONS

Conflict, insecurity, weak institutions and limited access to justice remain a great threat to sustainable development. Every day, 100 civilians are killed in armed conflicts despite the protection under international law. The number of people fleeing war, persecution and conflict exceeded 79.5 million in 2019, the highest level recorded. The global pandemic of COVID-19 further exacerbated and threatened global peace and security.

The Department of Political and Peacebuilding Affairs (DPPA) applies Earth observation and imagery intelligence to support the work of the Security Council through the Sanctions Committees and Panels of Experts to investigate, research and monitor the implementation of sanctions. Geospatial information and intelligence are used to provide evidentiary support to experts on non-proliferation, threats and security, nuclear issues, armed groups, natural resources,

humanitarian and human rights violations. To provide innovative monitoring approaches, the DPPA Innovation Cell and its technical partners worked on a pilot project applying Earth observation analysis to advance water security-related forecasting. By examining supply- and demand-side water changes throughout history and creating a model to estimate future trends against conflict risk indicators, the methodology bolsters water-related conflict prediction.

A similar line of work is carried out by the Office of Independent International Commission of Inquiry on the Syrian Arab Republic, which reports to the United Nations Human Rights Council. In their 2021 report, they used geovisualization products to effectively communicate the spatio-temporal changes of the approximate areas of influence of the different groups and their human rights violation dimensions.



FIGURE 42: Officers of the United Nations Interim Force in Lebanon (UNIFIL) and members of the Lebanese Armed Forces verify the exact position of the Blue Barrel BP-12 in Rumaysh, South Lebanon. Blue Barrels determine the Blue Line, or line of withdrawal, marked between Israel and Lebanon after the pull-out of Israeli forces from South Lebanon in 2000. UN Photo/Pasqual Garriz, 2010

GEOSPATIAL INACTION: Data and Insights for the Sustainable Development Goals

17 PARTNERSHIPS FOR THE GOALS



FIGURE 44: Members of UN Police and the South Sudan Services, working in partnership to secure the country, taking part in a rope pulling competition, hold hands in camaraderie, during celebrations to mark the International Day of Peace. UN Photo, 2011

GEOSPATIAL INACTION: Data and Insights for the Sustainable Development Goals

Similarly, UNICEF developed a long-term agreement with six professional services companies to increase its readiness to address geospatial requirements and fill the gap. In-kind contributions from the private sector can be obtained to gain relevant knowledge, expertise, technologies, research and development or innovation. Public Earth observation conglomerates and government-led programmes such as NASA and the European Space Agency (ESA) are also engaged with specific United Nations programmes and mandates.

Finally, under an overall framework, the contribution of civil society can tremendously benefit from the availability of geospatial information, where geospatial data is scarce and voluntary geospatial information and crowdsourced data can support the mandates of the Organization.

WFP and UN Geospatial have put in place two programmes to use and leverage open-source geospatial data, the [Humanitarian Topographic Atlas](#) and the [UN Mappers](#) to increase contributions from civil society to create geospatial data, which is in turn beneficial for on-the-ground operations in countries and for the wider geospatial community.

Also, drawing from a wide variety of relevant data sources from scientists and other researchers worldwide as well as from its World Development Indicators database, the [World Bank](#) developed an [Atlas of Sustainable Development Goals](#) that presents interactive storytelling and data visualizations about the 17 Sustainable Development Goals.

0075



FIGURE 45: Seventh Session of the UN Committee of Experts on Global Geospatial Information Management (UN-GGIM) at the UN Headquarters in New York, USA. UN Photo, 2017

GEOSPATIAL INACTION: Data and Insights for the Sustainable Development Goals

GEOSPATIAL IN ACTION

In summary:

- Showcase on the variety of use of geospatial information, data and technology for the mandates of the Organization, in the context of the Sustainable Development Goals
- Promote cross-sectoral knowledge, cross-thematic analysis and collaboration
- Advocate to leverage the UN family's geospatial data potential and to mobilize governments, geospatial societies, academia and private sector
- Support Member States and promote capacity building and collaboration with UN-GGIM activities
- Delivering as One, in particular with other Networks and beyond

KRAAK, ROTH, RICKER, KAGAWA, and LE SOURD



MAPPING FOR A SUSTAINABLE WORLD



United Nations



ICA
ACI

Joint publication
United Nations &
International Cartographic Association

<https://www.un-ilibrary.org/content/books/9789216040468>

Celebrating
GIS day



Mapping

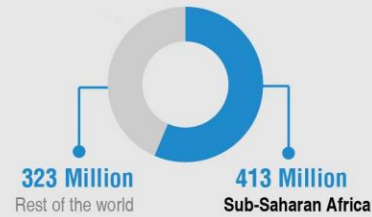
17 SDGs



By 2030, eradicate extreme poverty for all people everywhere
Proportion of population below international poverty line (%)

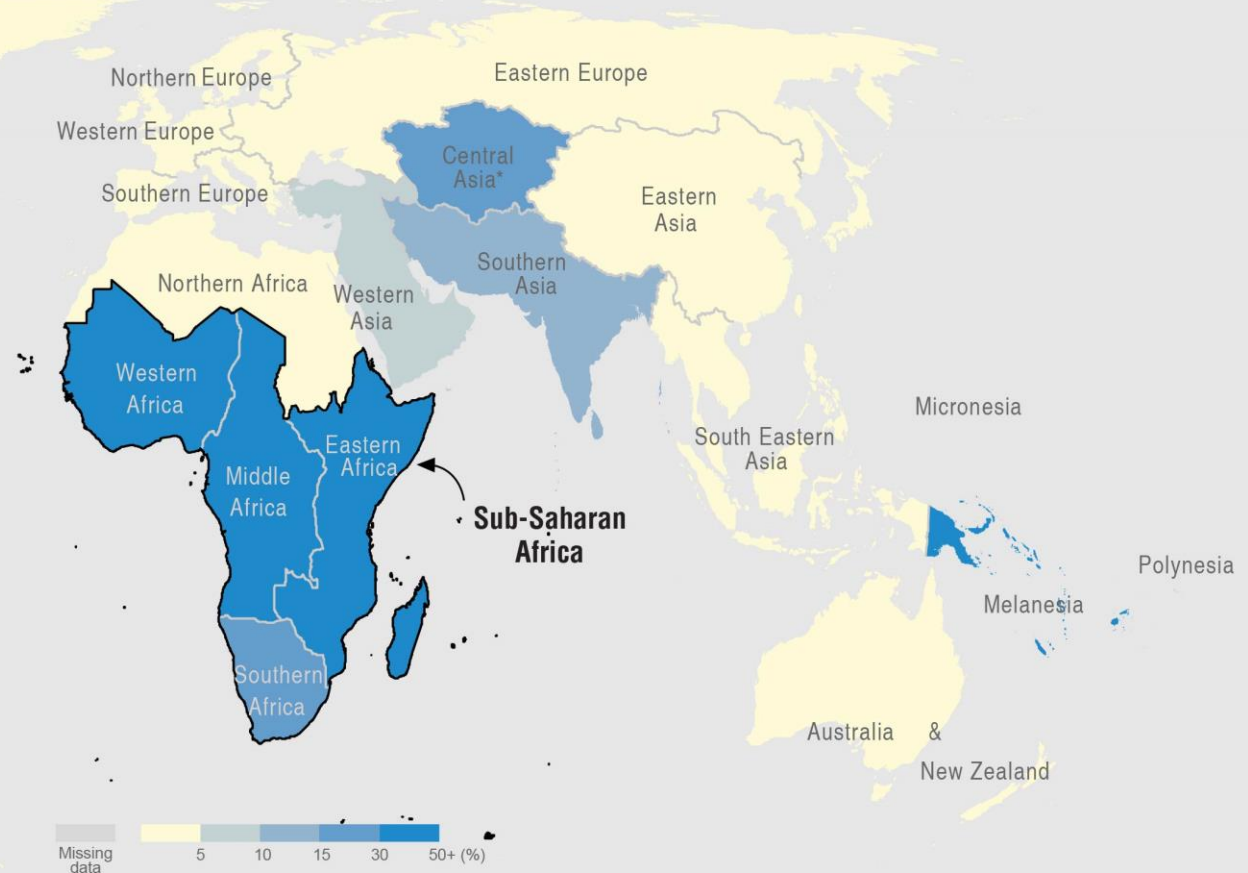
736 Million
People lived in extreme poverty in 2015

413 Million
in Sub-Saharan Africa



◀ UN Secretary-General meets people living in a camp for internally displaced persons (IDPs) in the town of Bangassou, Central African Republic.

UN Photo - Eskinder Debebe, 2017



Missing data | 5 | 10 | 15 | 30 | 50+ (%)
Source : UN Statistics Division, 2012-19 (*2006)

▲ Today, 10 per cent of the world population still live in extreme poverty. The majority of people living on less than \$1.90 a day live in sub-Saharan Africa. The map depicts indicator 1.1.1 (most current value 2012–2019) on the proportion of population living below the international poverty line by sub-regions and intermediary regions. These country groupings in larger regions are defined under the Standard Country or Area Codes for Statistical Use (known as M49 standard).



UN GEOSPATIAL NETWORK

UNITED NATIONS COMMITTEE OF EXPERTS ON
GLOBAL GEOSPATIAL INFORMATION MANAGEMENT