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GEOMATICS FOR SUSTAINABLE DEVELOPMENT IN THE REPUBLIC OF MOLDOVA

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Abstract: *The 2030 Agenda for Sustainable Development, adopted by United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet. And its 17 Sustainable Development Goals (SDGs) cover a vast range of issues, including ending poverty and hunger, ensuring quality education and healthcare, achieving gender equality, promoting sustainable energy all with the aim of leaving no one behind and is monitored through a number of indicators at global, regional and national level. Indicators are classified into three levels based on the methodology and availability of data for their calculation. A numer of indicators supporting SDGs are based on geospatial data. Geomatics significally contribute to the develpment of SDGs and provide essential geospatial data and tools for sustainable development by enabling precise monitoring and management of Earth's systems, supporting informed decision-making in climate action, resource management, urban planning, and infrastructure resilience. Technologies like satellite positioning, remote sensing, and Geographic Information Systems (GIS) are used to monitor environmental changes, document land ownership, manage natural resources, and ensure the sustainable development of infrastructure and communities, directly contributing to achieving the United Nations' Sustainable Development Goals (SDGs). This research aims to present the role of Geomatics in the achievement and monitoring of SDGs through the measuring, processing and use of geospatial data.*

Keywords: *Geomatics, Geospatial Data, Geographic Information Systems (GIS), Sustainable Development Goals (SDGs), SDG indicators.*

INTRODUCTION

The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries - developed and developing - in a global partnership (Figure 1).

The SDGs build on decades of work by countries and the UN, including the UN Department of Economic and Social Affairs (UN DESA), wich is a core body of the UN Secretariat that supports the development pillar of the United Nations, focusing on the 2030 Agenda for Sustainable Development Goals (SDGs) https://www.un.org/en/desa.

The United Nations Statistical Commission (UNSC) adopted a global indicator framework for the Sustainable Development Goals (SDGs), which initially contained 232 unique indicators but now stands at 231 unique indicators as of 2024/2025 after reviews and refinements.

This framework, developed by the Inter-Agency and Expert Group on SDG Indicators (IAEG-SDGs), was officially adopted by the UN General Assembly in 2017 and serves to monitor progress towards the 2030 Agenda for Sustainable Development. From the perspective of geomatics, a large number of indicators are based on geospatial data. In this paper, it is discribed the role of geomatics in the calculation of the indicators and implementation of the 2030 Agenda for Sustainable Development https://unstats.un.org/UNSDWebsite/statcom/ .

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Figure 1. The Sustainable Development Goals (UN 2015)

GEOMATICS IN THE SUPPORT OF SDGs

Geomatics has long been recognized as an information-technology-oriented discipline whose objective is to integrate and deliver multiple sources of geolocated data to a wide range of environmental and urban sciences. The geomatics involves collecting, analyzing, interpreting, and managing spatial data to create maps, 3D models, and Geographic Information Systems (GIS) for various industries like urban planning, construction, environmental management, and natural resource exploration. Professionals use advanced technology like GPS, drones, LiDAR, and satellite imagery to solve complex problems and inform decision-making about the Earth's physical and man-made features (Figure 2).

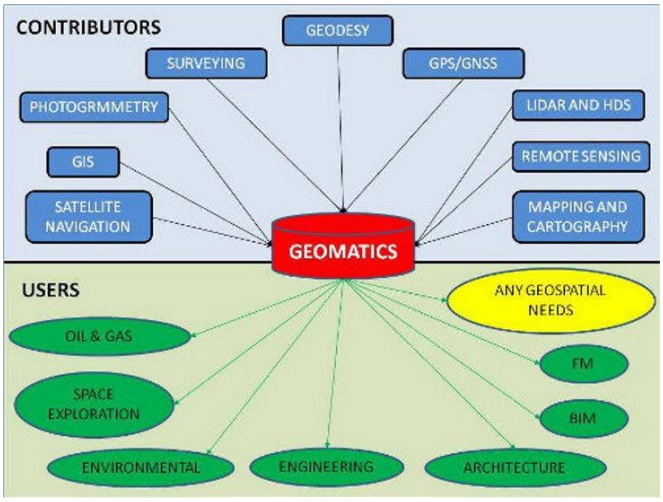

Figure 2. Geomatics

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The importance of geomatics was recognized by United Nations Committee of Experts on Global Geospatial Information Management (UN- GGIM). UN-GGIM is one of the nine expert groups of the United Nations Economic and Social Council (ECOSOC) to foster the global development of geospatial information. Led by United Nations Member States, UN-GGIM aims to address global challenges regarding the use of geospatial information, including in the development agendas, and to serve as a body for global policymaking in the field of geospatial information management https://ggim.un.org/ .

Geomatics supports the UN Sustainable Development Goals (SDGs) by providing, analyzing, and visualizing geospatial data to monitor progress on SDG indicators, inform evidence-based policy-making, and optimize resource allocation for issues such as climate change, urban planning, agriculture, health infrastructure and disaster risk reduction. Technologies like Earth observation (EO), satellite imagery, Geographic Information Systems (GIS) and Global Navigation Sattelite Systems (GNSS) offer comprehensive, standardized, and accurate data, enabling a deeper understanding of complex systems and facilitating international collaboration to achieve a sustainable future.

Key Contributions to the SDGs

- **Monitoring and Data Collection:**
  Geomatics, encompassing remote sensing and GIS, provides tools to capture, analyze, and disseminate georeferenced data essential for measuring SDG progress.
- **Environmental Management (SDG 13, 14, 15):**
  - Monitor and measure impacts like desertification, deforestation, and biodiversity loss.
  - Map fire hotspots, assess damage, and plan ecosystem restoration.
  - Evaluate and respond to challenges of climate change and environmental degradation.
- **Disaster Management (SDG 11):**
  - Enable effective planning for disaster risk reduction through detailed mapping and spatial analysis.
  - Provide crucial data for damage assessments and response efforts.
- **Urban Planning and Infrastructure (SDG 9, 11):**
  - Facilitate urban planning and manage sustainable infrastructure development.
  - Integrate geospatial data into infrastructure planning for transportation, agriculture, and construction.
- **Agriculture and Land Use (SDG 2):**
  - Support optimal land use and crop production by integrating geo-information data.
  - Monitor biomass development and optimize irrigation systems.
- **Policy and Decision-Making:**
  - Provide geospatial measurements that support sustainable development policymaking.
  - Facilitate the development of new and improved geospatial indicators for monitoring SDG progress.
  - How Geomatics Works for SDGs:
- **Integration of Data:**

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Geomatics integrates various sources of geospatial data from sources like high-resolution satellites, airborne laser systems, and location-based sensors.

- **Geospatial Tools:**
  Technologies such as GIS, remote sensing, and GNSS provide the framework for collecting, storing, analyzing, and presenting this spatial information.
- **Collaboration and Capacity Building:**
  The effective use of geospatial data requires collaboration among stakeholders and building capacity in data literacy to ensure its widespread utilization in advancing the SDGs.

MONITORING THE SDGs INDICATORS

Monitoring the SDG indicators involves a multi-layers system at global, national, and locallevels tot rack progress toward the Sustainable Development Goals (SDGs). This system uses a comprehensive set of global indicators, supplemented by national-level data and localized indicators to ensure relevance to specific national and subnational context. Data is collected and analyzed by national governments and UN Agencies, wich serve as "custodian agencies", working with National Statistical Offices (NSOs) to provide the data needed for both national reporting and global assessments.

Eurostat monitors the EU's progress towards the SDGs along a set of 102 indicators. The EU indicator set has been carefully selected in cooperation with a large number of stakeholders based on criteria of statistical quality and relevance in an EU policy context. The indicators are assessed annually over a short-term (past five years of available data) and over a long-term (15 years) period. Monitoring report on progress towards the SDGs in the EU context includes a section on the EU in the world and spillover effects of EU consumption. In addition, the report also covers regional differences within countries for selected SDG indicators https://ec.europa.eu/eurostat/web/products-flagship-publications/w/KS-01-24-018.

Monitoring the SDGs in the Republic of Moldova

Nationalization of Sustainable Development Goals (SDG) implies not only their integration into the national strategic framework, but also the establishment of a system of reporting and assessing the progress in achieving each relevant goal for the Republic of Moldova.

In April 2024 the National Bureau of Statistics launched the national platform for data dissemination on monitoring indicators for the implementation of the Sustainable Development Goals (SDGs) in order to be used by the general public https://statisticamd.github.io/sdg-site-moldova/ (Figure 3).

According to the Government Decision no.953/2022 on the approval of the national framework for monitoring the implementation of the 2030 Agenda for Sustainable Development, the National Bureau of Statistics is the authority that coordinates the process of production and dissemination of Sustainable Development Goals (SDGs) monitoring indicators and ensures the centralized dissemination of data on the dynamics of SDG monitoring indicators on a national dissemination platform. The platform contains information for the 337 indicators approved by Government Decision 953/2022. Data for the SDG platform is provided by more than 40 central authorities and institutions according to the responsibilities in the Decision. The National Bureau of Statistics produces data for about one third of all indicators.

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Figure 3. National platform for data dissemination on monitoring indicators for the implementation of SDGs in the Republic of Moldova

The portal allows to see the status of each individual indicator for a specific target, data sources and metadata. Indicators for which data are available (more than 70% of all indicators) are presented in graphical and tabular form, contain various disaggregations and are accompanied by metadata (including calculation formula, unit of measurement, data source, comparability with overall indicator, etc.). The status of proportion of the population living below the international poverty line by sex, age, employment status and geografic location (urban/rural) is reflected in Indicator 1.1.1 (Figure 4).

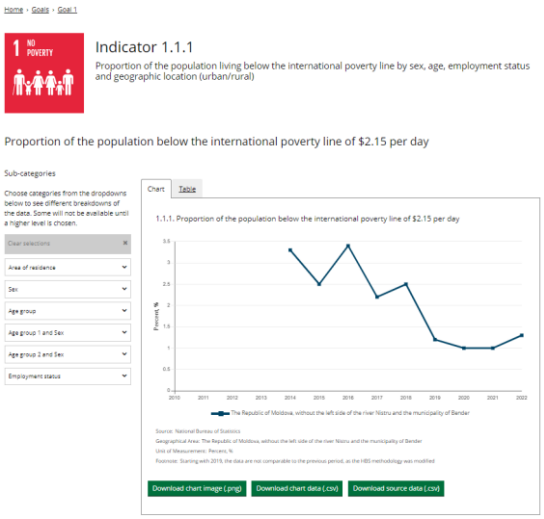

Figure 4. Indicator 1.1.1

The SDG platform can be accessed at https://statisticamd.github.io/sdg-site-moldova/ or on the National Bureau of Statistics website www.statistica.gov.md , under

Sustainable Development Goals https://statistica.gov.md/en/sustainable-development-goals-183.html.

CONCLUSIONS

The United Nations adopted the 2030 Agenda for Sustainble Development, which includes 17 Sustainable Goals (SDGs) and 169 associeted targets, in 2015, aiming to create a blueprint for peace and prosperity for all by 2030. These interconnected goals address global challenes such poverty, inequality, climate change, and promote sustainable economic growth, social well-being, and environmental protection.

Many SDG goals and targets rely on the geospatial data needed to be able to determine or calculate an individual indicator. The geomatics proffesion is essential for achieving the United Nations Sustainable Development Goals (SDGs) by providing the spatial data analysis needed to monitor progress, understand environmental changes, and inform policymaking at local, and global scales. Geomatics professionals use geospatial technologies like GIS, remote sensing, and GNSS to measure, map, and manage resources, directly contributing to nearly all 17 SDGs, from combating poverty and land degradation to promoting sustainable cities and climate action.

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