Responsible Land Governance:
Towards an Evidence Based Approach
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IDENTIFYING GEOSPATIAL DATA REQUIREMENTS FOR THE GOALS, TARGETS AND INDICATORS OF THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT

TIMOTHY TRAINOR
U.S. CENSUS BUREAU FOR UN-GGIM, USA
Timothy.f.trainor@census.gov

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Abstract

Geographic location is a basic precept to understanding the implications of data contributions for attaining the 17 Sustainable Development Goals outlined in the 2030 Agenda for Sustainable Development. The role of location relative to available statistics to measure the state and impacts of defined indicators for the 169 targets within the Sustainable Development Goals is vital. Determining the appropriate level of geography to meet indicator framework is needed. Once useful geographic levels are determined, the existence and/or availability of geospatial data for every nation is required as a next step in this process. From this effort, geospatial data gaps can be determined as well as serve as a guide on the availability of statistical data and gaps. These efforts align with tasks of a UN Interagency Expert Group on Sustainable Development Goal Indicators. One task is to review the agreed-upon indicators and metadata through a geographic location lens and identify existing geospatial data gaps, methodological and measurements issues. This presentation outlines current efforts within the Expert Group, offers suggestions for consideration by the audience, as well as a path forward to respond to the geospatial requirements for meeting the Sustainable Development Goals.

Key Words: geographic, geospatial, location, requirements, SDGs

INTRODUCTION

The 2030 Agenda for Sustainable Development is an ambitious and important initiative for people and the planet. There are 17 Sustainable Development Goals (SDGs) with 169 targets that outline the agenda. To attain the goals and targets, the UN Statistical Commission committed to specifying indicators that will be used to determine how the targets and goals will be achieved. After much effort, 230 indicators were proposed that now guide the process for each Member State to participate in the SDG effort.

In reaching the goals, one of the first steps is to inventory the current condition, which many Member States are currently undertaking. As that process unfolds, an evaluation of the feasibility for complying with the indicator framework is being reviewed by the Member States. Identifying data gaps and the lack of needed methodology are part of that process. Determinations will then be made on possible next steps that could include data gathering efforts, formulation of methodologies, or the recognition that the indicator may need further work.

Statistics are the most common evidence for measuring and proving in the majority of indicators. In many cases, the usefulness of the statistical information is made more clear by joining those results with geospatial data, whether it is the boundaries of administrative areas, the demarcation between forested and non-forested areas or the location of public and green spaces within a local community. These are a few examples of types of geospatial data that support the SDG indicator framework.

GEOGRAPHY IN SUPPORT OF THE SDGs

The targets cover a wide range of topics about people and the living environment that contribute to a theme of leaving no one behind. Statistical data are needed for many indicators to demonstrate that a target is met for a goal. In many cases, the statistical data are available at the appropriate level of geography to address the indicator. Oftentimes, the statistical data are geographically referenced using geospatial boundaries of known administrative areas that correspond to data that was tabulated as part of a census or statistical survey.

In a global context, a common unit of geography below national boundaries does not exist. There are second order and third order boundaries, but these vary among different countries and usually refer to levels of government within a country. Where more local governments choose to participate and get involved in the SDG process, the inconsistencies in any comparisons across national boundaries can be

problematic. For example, data for cities usually only account for the characteristics (i.e., population, economy) within the borders of those entities and do not include other areas of the country where more rural activity occurs or smaller centers of activity that may not be recognized as a city. While this paper does not focus on possible solutions for geographic coverage, extent, and criteria, geography plays an important part when applying statistical results.

GEOSPATIAL DATA

Just as geography is ubiquitous, there are different types of geospatial data that represent the various geographic features, their content, and form. Member States have interest in establishing National Spatial Data Infrastructures (NSDI or SDI) that includes geospatial data themes representing those features or similar classifications. Geospatial standards exist that help with definitions, structure, business rules, metadata, and other important aspects of the data. Geospatial standards are quite mature and generally respond quickly to evolving technology and new data types. Standards contribute to data consistency which, when comparing data from various Member States, the standards help in making that process work more effectively. Standards also contribute to data interoperability. The existence, use, and adherence to standards does not guarantee a work environment without challenges. While geospatial data are complex and multi-faceted, standards aid in greater understanding and reduce the burdens when working with the data.

Data quality is important for statistical and geospatial data. Statements about data quality are important and are often captured as part of the metadata. In trying to achieve the indicators, knowing what quality is needed and sufficient is important. There is a tendency to work toward perfection when something less meets the need. Knowing the limitations through documented data quality statements may aid in greater use of the data.

The UN Committee of Experts on Global Geospatial Information (http://ggim.un.org/) serves the purpose of communicating the importance of geospatial information; why it is important to each Member State, why it needs to be treated as a priority, and why it is important to invest in collecting and managing geospatial information. The UN-GGIM is also pursuing key global challenges and providing a platform for the development of effective strategies in the management of global geospatial information management.

EXAMPLES OF THE NEED FOR GEOSPATIAL REQUIREMENTS FOR TARGETS AND INDICATORS

This section offers some examples of indicators that potentially have underlying geospatial requirements. The selection of examples in no way suggests a preference or a statement of their importance with regard to all of the targets and indicators. Rather, examples are offered to show the diversity of geospatial data that can be used and is needed to effectively respond to the targets and indicators. At the same time, the few examples used represent a sample of what is needed and serve as a call to action on what is possible. Many other indicators have the need or the potential need for geospatial data to contribute toward successfully managing the indicator framework.

GOAL 2

"Prevalence of stunting…among children under 5 years of age" The term "prevalence" can be determined at a national level, however, to understand the root cause of stunting, there may be factors to contribute to the condition that are local in nature such as environmental factors, inaccessibility of adequate health care options and so forth. Reporting out results at a national level is important in realizing the existence of a condition. Being able to take action for improvement requires more data including the use of geospatial information for locating where the prevalence is and is not and providing a framework for conducting further geographic analysis for factors that can contribute to the prevalence.

"Proportion of agricultural area under productive and sustainable agriculture". In addition to a geospatial component, this indicator may include a temporal aspect based on growing seasons during the year. Crops that require large plots of land (wheat, corn) contrast with agriculture of a truck farm variety (vegetables like tomatoes, peppers, squash, melons, etc.). Urban areas are also a source for some forms of agriculture, which inevitably contribute to the economic prosperity of the people and the economy.

GOAL 3

Target 3.6, by 2020, halve the number of global deaths and injuries from road traffic accidents with an indicator 3.6.1 on the death rate due to traffic injuries. In order to take the necessary steps to meet the target, the location of injuries and deaths must first be known. In many countries, these events are captured by nearness to a mile/kilometer indicator along a road thoroughfare. Then other conditions are studied to determine factors beyond operator error (speed, drunken driving, seat belt use, etc.), if other

conditions contributed to the injury or death such as road conditions, lack of needed traffic safety including speed signs, traffic lights, and the like.

GOAL 4

Under education, indicator 4.5.1 specifies parity indices including rural/urban and conflict-affected. In the case of rural and urban, common definitions are required so there are reasonable comparisons of data from one country and region to another. One accepted approach when looking at population is to use density as a principal determinant for urban versus rural. However, a density threshold in one country where there is a prevalence of high populations in cities and other areas is not viewed the same way in another country where there is a tendency for low numbers of population in rural countries that have clusters of population with other "urban" characteristics, such as ties to economic activity. In the case of conflict-affected populations, there may be a need to delineate boundaries as the impact of conflict may be very local and the status could change. A temporal factor may also be required as the conflict moves or dissipates.

Target 4.a begins with "build and upgrade education facilities" followed by indicator 4.a.1 that stipulates access to: electricity, the Internet, basic drinking water sanitation facilities and other conditions begs the question of where each education facility is located. Having summary data to report national status on each condition is one thing; being able to take action to evaluate the current condition and take steps to improve it where needed requires location information for each facility as well as the measurement criteria for the indicator.

GOAL 5

In Goal 5 on gender equality, target 5a calls for undertaking reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources in accordance with national laws. In order to determine the indicator on the proportion of ownership by sex, records for each land parcel or cadaster are needed that indicate the size and extent as well as the use of the land. Geospatial data are needed to determine information about land use, parcel and cadaster boundary networks and agricultural activity. At the UN-GGIM High Level Forum in Addis Ababa in 2016, contributors offered that 70% of land area is without adequate information on land ownership. Target and indicator 5a provides an important opportunity to improve this basic governance need.

GOAL 6

The indicator for goal 6 on sustainable management of water and sanitation calls for the proportion of bodies of water with good ambient water quality. Knowing about the existence of water bodies implies one knows where they are. Hydrography is an elemental geospatial data theme that has many uses and cross purposes such as serving as a water source for drinking and sanitation, transportation, recreation, management of land use and so forth. Interest in the water levels of reservoirs is increasingly important in assuring adequate water supplies for growing populations and agriculture. Knowing the existence of water resources, where they are located, what serves as their source, and where their distributed uses occur all require hydrographic geospatial data.

GOAL 9

Goal 9 calls for building resilient infrastructure, promoting inclusive and sustainable industrialization and fostering innovation. The first indicator, 9.1.1, calls for the proportion of the rural population who live within 2 km of an all-season road. This collection of simple words has significant geospatial data implications if one is to meet the indicator. First is the need for a definition of rural to differentiate populations in urban communities. Living within 2 km of an all-season road implies that the location of living quarters and housing units is known. Few countries, especially in the developing countries, have housing unit location geospatial data. In the U.S., this information was collected on a national scope for the first time during the 2010 census. Knowing about an all-season road first implies that the digital geospatial road network exists and is maintained. Second, adequate attribution of the road data is needed to know if a road is deemed "all-season." This is another example of the importance of definitions being detailed so that users know the characteristics of the data they are using. In addition, this indicator requires a distance measurement which links the digital geospatial data with use of GIS technology to calculate the 2 km distance in any direction. While this appears straightforward, given the goal for infrastructure, industrialization, and innovation, assurance is needed that makes it possible to actually get to the nearest road. For example, if the shortest distance crossed an impassable ravine or mountain, another course would be required that may exceed the 2 km measurement by a sizable distance. Additional information such as the topography, elevation, slope, vegetation etc., contribute to greater understanding and benefit decisions made toward the objectives of the goal.

GOAL 11

Several indicators for Goal 11 on making cities and human settlements inclusive, safe, resilient and sustainable depend on geospatial information. For example, target 11.7 calls for providing universal access to safe, inclusive and accessible green and public spaces, particularly for women and children, older persons and persons with disabilities. Separating each condition, there are many different data sets that are needed to adequately meet this target. Universal access implies that information is available at the household level for those within population groups like women, children, older persons, and persons with disabilities. Clearly these can be aggregated at higher levels of geography. What is needed is a common understanding and agreement on the resolution of the information. What is safe on one street may not be safe on a nearby street. Green spaces include local neighborhood parks. Sources of geospatial data that can contribute to this target include remotely sensed data like satellite imagery for identifying green spaces, small area statistical geography for population characteristics, crime data that show areas where safety is prevalent, and some assumptions about distances from places where people live relative to the public and green spaces within a community.

GOAL 14

Conservation and sustainable use of oceans, seas, and marine resources in Goal 14 require marine and coastal geospatial data to meet the various indicators. This is an area that requires more attention as Spatial Data Infrastructures for Member States have focused extensively on geospatial data related to the land. While attention has recently been directed to water and coastal and marine geography, greater consideration is needed. The SDGs and the indicator framework contributes to that effort by implying geospatial data requirements that are necessary to conform to the targets and indicators.

GOAL 15

In reviewing indicator 15.1 on forest area as a proportion of total land area it is clear that earth observation geospatial data contributes to the required measurements. Once again, acceptable definitions of what constitutes a forest and the temporal aspects of changes based on different activities like deforestation and reforestation contribute to a common approach for monitoring results. While the first indicator is used as an example, virtually all indicators in Goal 15 have a dependence on geospatial information.

GOAL 16

Building effective, accountable, and inclusive institutions in Goal 16 benefit from using a combination of geospatial and statistical data that contribute to determining effective, accountable, and inclusive institutions at all levels. Knowing where good public service is experienced and where positions are held by different population groups in public institutions relative to a national distribution provides for a comparison for the public and their decision-makers.

IAEG-SDGs WORKING GROUP ON GEOSPATIAL INFORMATION

The Interagency Expert Group on SDG Indicators formed a Working Group on Geospatial Information to ensure that one of the key principles of the 2030 Agenda, to leave no one behind, is reflected in the Global indicator framework from a statistical and geographic location perspective. The Working Group met in December 2016 to determine if geospatial information could contribute to indicators that either lacked data or had no methodology to better ensure their use within the indicator framework. Three indicators were selected to prove in that premise: 6.6.1; 9.1.1; and 15.3.1 representing topics associated with water, rural population, and land respectively. Those efforts are currently in work and will continue. It appears very promising that geospatial information can elevate some indicators that lack data and/or a methodology.

A PATH FORWARD

One outcome of the impending need to make progress on the SDGs is the recognition that National Mapping and Geospatial Agencies need to work closely with National Statistical Offices. This is particularly important now with the 2020 Round of Censuses currently underway. Where new data and data types are needed, the close collaboration between these very different organizations contribute to a more successful outcome.

As stated earlier, Member States are conducting inventories of their data holdings to determine where they are in meeting the demands of the indicator framework. Bringing together government organizations and, in some cases, other contributing groups is an attempt to get the most relevant information in response to the call for action. New synergies and collaboration across organizational boundaries have longer term benefits beyond meeting the SDGs. For example, newly formed relationships oftentimes results in greater capacity development.

As the Working Group on Geospatial Information within the IAE-SDGs continues their efforts, there is a recognition that each Member State is taking steps to respond to the indicator framework. With that, one goal of the Working Group is to identify where existing global data sets can serve the purpose of Member States to reduce their efforts of data collection and management where appropriate. As discovery is realized, that information will be communicated.

CONCLUSION

Geospatial data and related information is a core component to the 2030 Agenda for Sustainable Development. Statistics are the facts for measuring compliance to the indicator framework. Location information through geospatial data offers perspective, greater understanding, and a view of the data through a geographic lens. Geospatial data complements statistical information and together they tell a Member State a story about their circumstances that helps with planning, programs, and decision-making.