



**UN-GGIM**  
UNITED NATIONS  
COMMITTEE OF EXPERTS ON  
GLOBAL GEOSPATIAL  
INFORMATION MANAGEMENT

# ISO Advisory Group 13 on Land Cover and Land Use

## Land Cover and Land Use in the Global Geospatial Information Management Community

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*UN-GGIM Secretariat*



**UN-GGIM**

United Nations Secretariat  
Global Geospatial Information Management

*Positioning geospatial information to address global challenges*

[ggim.un.org](http://ggim.un.org)

# The Architecture of UN-GGIM - Led By Member States

Bureau: Co-Chairs: Belgium, Mexico, and Tonga Rapporteur: Morocco

UN  
Secretariat

- Geospatial Societies
- Academic Network
- Private Sector Network
- UN Geospatial Network
- International Standards Development Organizations (*OGC, IHO and ISO/TC 211*)

## Capacity Development

- High-Level Group on the Integrated Geospatial Information Framework
- Subcommittee on Geodesy
- EG on the Integration of Statistical and Geospatial Information
- EG on Land Administration and Management
- WG on Geospatial Information and Services for Disasters
- WG on Policy and Legal Frameworks for Geospatial Information Management
- WG on Marine Geospatial Information
- IAEG-SDGs WG on Geospatial Information

Thematic  
Groups &  
International  
Networks

Regional  
Committees

UN-GGIM Asia-Pacific - Chair: **Australia**  
UN-GGIM Americas - Chair: **Mexico**  
UN-GGIM Arab States - Chair: **Saudi Arabia**  
UN-GGIM Europe - Chair: **Slovenia**  
UN-GGIM Africa - Chair: **Senegal**

## International Events

International Seminars  
High-Level Forums  
United Nations World Geospatial  
Information Congress

Working Groups

Publications &  
Frameworks

Integrated Geospatial Information Framework  
COVID-19: Ready to Respond  
Global Statistical Geospatial Framework  
Framework for Effective Land Administration  
Global Fundamental Geospatial Data Themes  
Future Trends in Geospatial Information Management  
Policy and Legal Frameworks for Geospatial Information Management  
Guide to the Role of Standards in Geospatial Information Management  
Strategic Framework on Geospatial Information and Services for Disasters

Annual Plenary  
Session

# Land Use and Land Cover Across UN-GGIM – At a Glance

2013	2014	2015	2016	2017	2018	2019	2020	2021
<a href="#">1<sup>st</sup> Report on Future Trends</a>	<a href="#">GlobeLand30 Donation by China</a>  <a href="#">3<sup>rd</sup> HLF on UN-GGIM + Beijing Declaration</a>	<a href="#">1<sup>st</sup> Guide to the Role of Standards in Geospatial Information Management</a>  <a href="#">2<sup>nd</sup> Report on Future Trends</a>	<a href="#">GEO-XII Side Event: Land Cover – Harmonized Pathways Towards Policy Needs</a>  <a href="#">Training Workshop at the 4<sup>th</sup> HLF on UN-GGIM</a>	<a href="#">Minimum List of Global Fundamental Geospatial Data Themes</a>	<a href="#">Agreement on the Global Fundamental Data Themes</a>  <a href="#">Adoption of the IGIF</a>  <a href="#">1<sup>st</sup> UNWGC: Session on Global Land Cover</a>  <a href="#">2<sup>nd</sup> Guide to the Role of Standards in Geospatial Information Management</a>	<a href="#">Report on Global &amp; Complementary Geospatial Data for SDGs</a>	<a href="#">3<sup>rd</sup> Report on Future Trends</a>	<a href="#">Draft of the SDGs Geospatial Roadmap</a>  <a href="#">3<sup>rd</sup> Guide to the Role of Standards in Geospatial Information Management</a>

Underpinned by the substantive program of UN-GGIM's Functional Groups (ie. through its Expert- and Working Groups) and Thematic Groups (including the UN Geospatial Network, UN-GGIM Academic Network etc)



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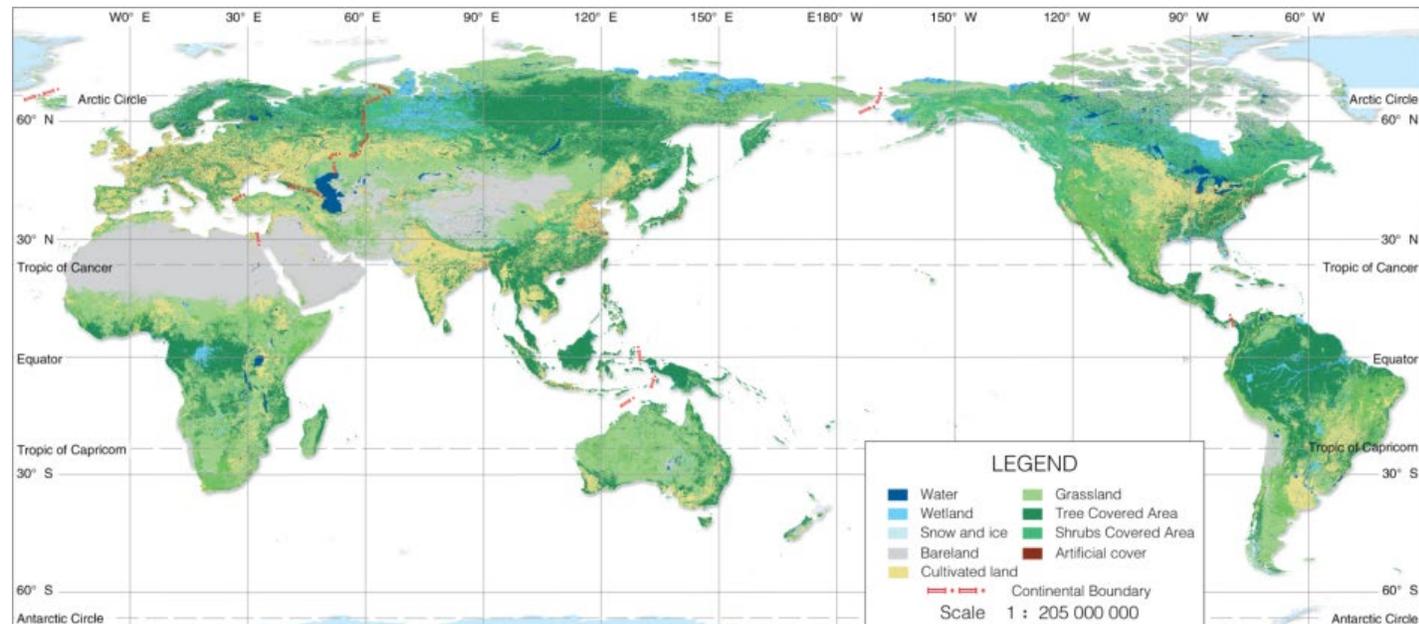
# GlobeLand30

- Comprises of data sets collected at 30-metre resolution
- 10 Classes: Open Water, Wetland, Artificial Cover, Cropland, Forest, Shrubland, Grassland, Bare Land, Tundra, Permanent Snow and Glaciers
- Derived from LandSat

“The World needs solid, science-based information for making wise decisions for sustainable development”

***Ban Ki Moon, UN Secretary General***

***22 September 2014***



Vice Premier H.E. Mr. Zhang Gaoli, People's Republic of China, and United Nations Secretary-General Ban Ki-moon

# GEO-XII Land Cover Side Event Mexico, November 2015



- National governments need control over the dataset and its generation. Governments want control over the information they provide to an international treaty... they do not want to use information developed by an outside source with unknown details or of unknown consistency, even if it is “better”. **Ownership often goes hand in hand with capacity-building.**
- **Regularity.** To understand change repeat datasets are needed. To monitor change these must be provided on a regular, reliable basis with sufficient frequency. A growing demand is change detection, not just status; note that the temporal frequency can be more important than spatial resolution.
- **Consistency.** In addition to being available on a regular basis, to understand land cover change the datasets need to be generated using a consistent methodology.
- **Accuracy.** Obviously, sufficient accuracy is needed. This has implications for validation

- Non-technical challenges and the need for more dialog. Many of the challenges to more harmonization are not technical ones—they are social. More dialog among the players would lead to improvement.
- Change is more useful than state. This implies a need for regular, consistent datasets.
- Need appropriate infrastructure to support operationalization (of user needs).
- National governments need control over the dataset and its generation. Governments want control over the information they provide to an international treaty, for example—they do not want to use information developed by an outside source with unknown details or of unknown consistency, even if it is “better”. This has very important implications. Ownership often goes hand in hand with capacity-building.
- Regularity. To understand change repeat datasets are needed. To monitor change these must be provided on a regular, reliable basis with sufficient frequency. A growing demand is change detection, not just status; note that the temporal frequency can be more important than spatial resolution.
- Consistency. In addition to being available on a regular basis, to understand land cover change the datasets need to be generated using a consistent methodology.
- Accuracy. Obviously, sufficient accuracy is needed. This has implications for validation.
- Legend must meet user needs. This is obvious, but the implication is that a single legend will not meet the needs of all users. However, a finer-grained, multi-level class structure would facilitate cross-mapping at higher levels and so support generation of a variety of global maps with different legends that meet a variety of user needs. Pathfinder project(s). Often the best way to foster interaction, engagement, dialog, and progress is to find a “do-able” project and get started on it. This may be a good way to address some of the needs that UNSD has, for example.



# The Global Fundamental Geospatial Data Themes



- Land Cover represents the physical and biological cover of the Earth's surface. Land Use is the current and future planned management, and modification of the natural environment for different human purposes or economic activities.
- Land cover represents the physical and biological cover of the earth's surface including artificial surfaces, agricultural areas, forest, semi-natural areas, wetlands and waterbodies. The theme also includes Land Use which is the current and future planned management and the modification of the natural environment into built environment for different human purposes or economic activities.
- Land Cover is required, for example, for developing land management policy, understanding spatial patterns of biodiversity and predicting effects of climate change and may also help to forecast other phenomena, such as coastal erosion and flooding. It is critical data in national assessments of biodiversity, conservation efforts, and water quality monitoring.



# Interlinkages to the SDGs



# The IAEG-SDGs Working Group on Geospatial Information

## SDGs Geospatial Roadmap



The vision of the SDG Geospatial Roadmap is to see geospatial and location-based information being recognised and accepted as official data for the SDGs and their global indicators.

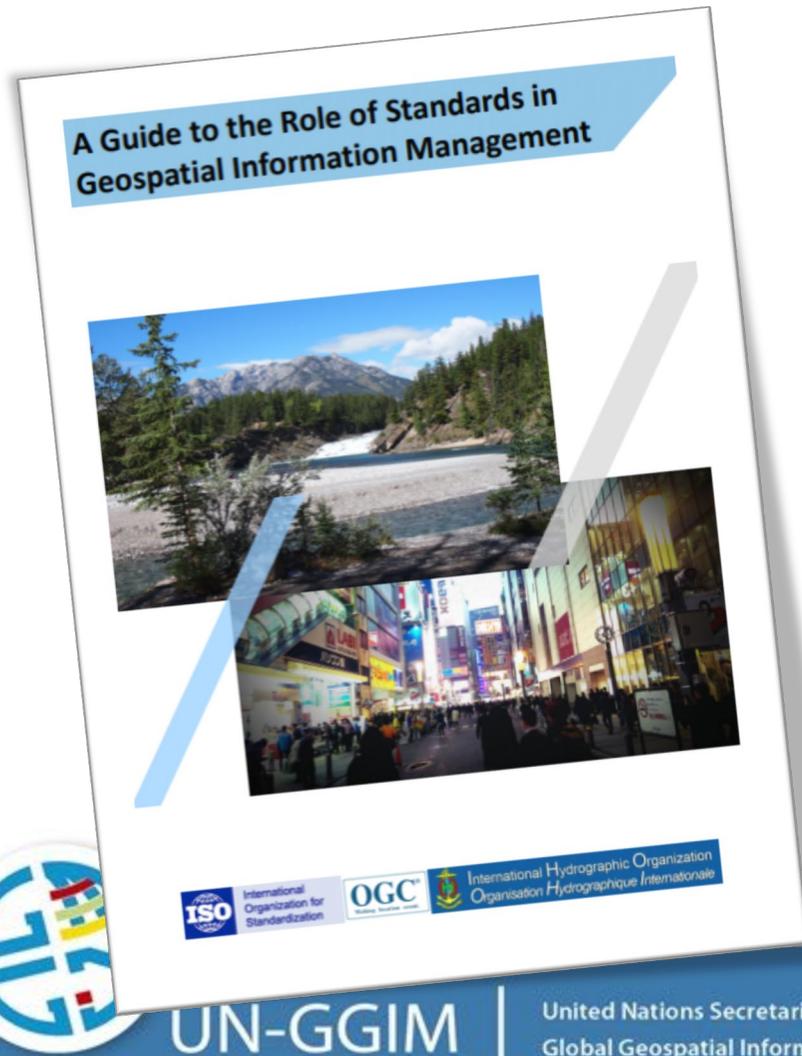
The SDGs Geospatial Roadmap communicates, guides and enhances the awareness of geospatial information, Earth observations, and related data sources, products, and enabling tools and methods, to inform and support the implementation of the SDGs, according to national circumstances.

## Report on Global and Complementary (Non-authoritative) Geospatial Data for SDGs: Role and Utilisation

Product	Spatial resolution	Coverage of years	Contents/ overall reported accuracy	Source
GlobeLand30	30 m	2000, 2010	10 classes/ 80.3%	<a href="http://www.globeLand30.com">http://www.globeLand30.com</a>
Global tree cover	30 m	Annual (2000-)	One class (forest but with percentage cover)/ unknown	<a href="http://glcf.umd.edu/data/landsatTreecover/">http://glcf.umd.edu/data/landsatTreecover/</a> FCC: <a href="http://glcf.umd.edu/data/landsatFCC/">http://glcf.umd.edu/data/landsatFCC/</a>
Global forest change	30 m	Annual (2000-)	Forest canopy cover % / gains / losses	<a href="https://earthenginepartners.appspot.com/science-2013-global-forest/download_v1.5.html">https://earthenginepartners.appspot.com/science-2013-global-forest/download_v1.5.html</a>
Copernicus land service: dynamic Land Cover	100 m	Annual (2015-)	10 classes / 74% (2015)	<a href="https://land.copernicus.eu/global/products/lc">https://land.copernicus.eu/global/products/lc</a>
Forest and non-forest global map	25m	Every year 1993-1998, 2007-2010, 2015-2016	Two classes (forest/non-forest)/ 84% accuracy /L-band SAR	<a href="http://www.eorc.jaxa.jp/ALOS/en/palsar_fnf/fnf_index.htm">http://www.eorc.jaxa.jp/ALOS/en/palsar_fnf/fnf_index.htm</a>
ESA Land Cover CCI	300 m -1 km	1992-2015 (annual)	22 classes/ 74% (2008-2012)	<a href="http://maps.elie.ucl.ac.be/CCI/viewer/download.php">http://maps.elie.ucl.ac.be/CCI/viewer/download.php</a>
GUF	12 m	2010-2013	3 classes: urban fabric, non-built up land surface, water / unknown	German Aerospace Center (DLR) <a href="https://www.dlr.de/eoc/en/desktopdefault.aspx/tabid-9628/16557_read-40454/">https://www.dlr.de/eoc/en/desktopdefault.aspx/tabid-9628/16557_read-40454/</a>
GHSL – built up	38 – m	1975, 1990, 2000, 2014	Scale from 0-98 / unknown	Joint Research Center (JRC) of the EU <a href="https://ghsl.jrc.ec.europa.eu/datasets.php">https://ghsl.jrc.ec.europa.eu/datasets.php</a>
GHSL - population grids	250 – m	1975, 1990, 2000, 2014	Number of people per cell / unknown	Joint Research Center (JRC) of the EU <a href="https://ghsl.jrc.ec.europa.eu/datasets.php">https://ghsl.jrc.ec.europa.eu/datasets.php</a>
GHSL settlement model	1 –km	1975, 1990, 2000, 2014	Rural, Urban Cluster, Urban Centre/ unknown	Joint Research Center (JRC) of the EU <a href="https://ghsl.jrc.ec.europa.eu/datasets.php">https://ghsl.jrc.ec.europa.eu/datasets.php</a>



# Implementation and adoption of standards for the global geospatial information community



The Guide to the Role of Standards in Geospatial Information Management provides detailed insights on the standards and good practices necessary to establish and maintain geospatial information management systems that are compatible and interoperable with other systems within and across organizations.

The Guide also underscores the importance of standards in facilitating the application of the FAIR (Findable, Accessible, Interoperable, and Reusable) data principles.

Other resources and reports of the Standards Development Organisations - OGC, IHO and ISO TC/211 to UN-GGIM Sessions detail advancements in this area, including ISO 19144 on Land Cover Land Use

# Musings on the Challenge



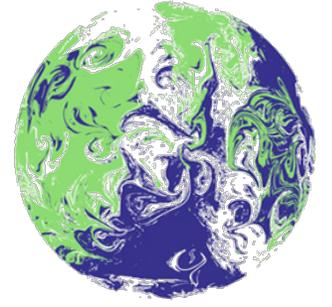
The SDGs are highly dependent on the understanding of geographic location, and this can be provided by the inclusion and use of geospatial information, Earth observations and other forms of data.

The vision of seeing geospatial and location-based information being recognised and accepted as official data for the SDGs and their global indicators is no longer a nice-to-have but is essential to enable countries to make the transformation needed to get back on track towards 2030 and the SDGs

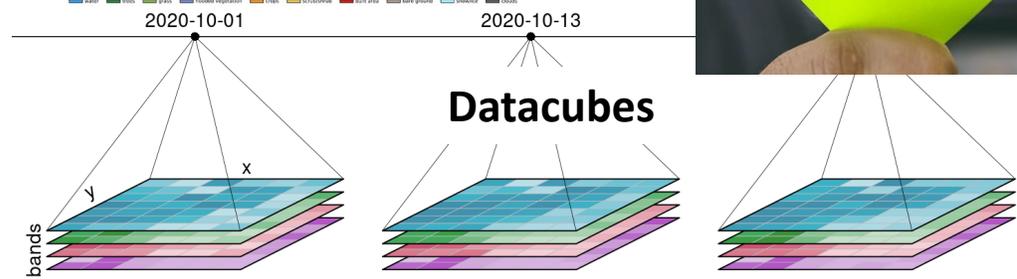
- So which data sources should be used?
- Where is the data?
- How can we put it, and its downstream analysis into the hands of policy- and decision-makers?



# Harnessing Now / Future Trends



System of Environmental Economic Accounting



DEGURBA  
Degree of Urbanisation



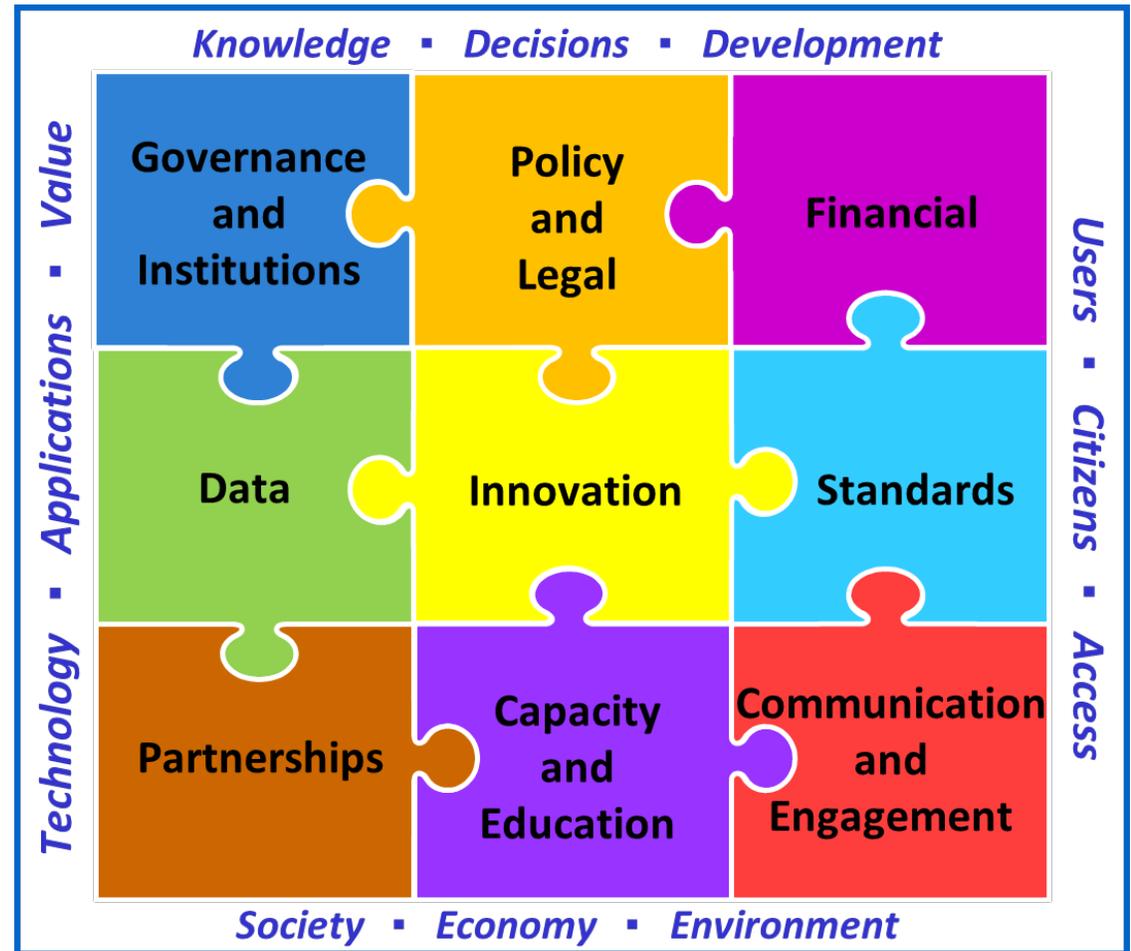
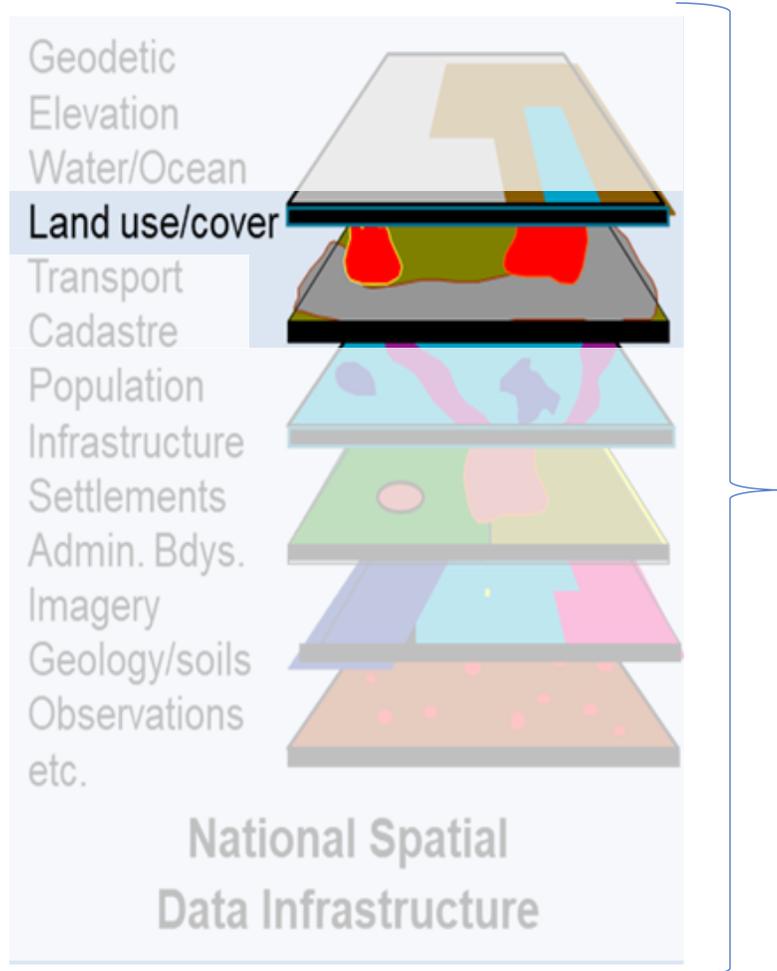
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# The need for an Integrative Data Ecosystem



# Looking Forward

We must ensure that we are guided by the needs of countries, not just the technological opportunity.

Who are our users?

What do they want and need?

How should we advance?

*'A sustainable operational system that generates land cover datasets according to specific user requirements for geographic scope and the number and types of classes; datasets can be generated on a regular basis using consistent methods and with needed accuracy'*

[Report on the Determination of Global Fundamental Geospatial Data Themes](#)

Sixth Session on UN-GGIM  
August 2016



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