

The Global Fundamental Geospatial Data Themes Journey

April 2018



UN-GGIM

UNITED NATIONS
COMMITTEE OF EXPERTS ON
GLOBAL GEOSPATIAL
INFORMATION MANAGEMENT

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WG Chair



The Road to here

- Why Global?
- Why Geospatial?
- Why Fundamental?
- Why Themes?

- The route we took

- Where does the road go now?





Why Global?



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Global Development Agenda



TRANSFORMING OUR WORLD:



THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT



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Positioning geospatial information to address global challenges

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Why Geospatial?



Geospatial?

geospatial

/ˌdʒiːəʊˈspeɪʃ(ə)l/

adjective GEOGRAPHY

relating to or denoting data that is associated with a particular location.

Source: Oxford English Dictionary



Sustainable data for sustainable development

The monitoring of the MDGs taught us that data are an indispensable element of the development agenda:

- Despite improvement, critical data for development policymaking are still lacking.
- Real-time data are needed to deliver better decisions faster.
- Geospatial data can support monitoring in many aspects of development, from health care to natural resource management.
- New technology is changing the way data are collected and disseminated.
- Global standards and an integrated statistics system are key elements for effective monitoring.
- Data should be open, easily accessible and effective for decision-making.



<http://www.un.org/millenniumgoals/>



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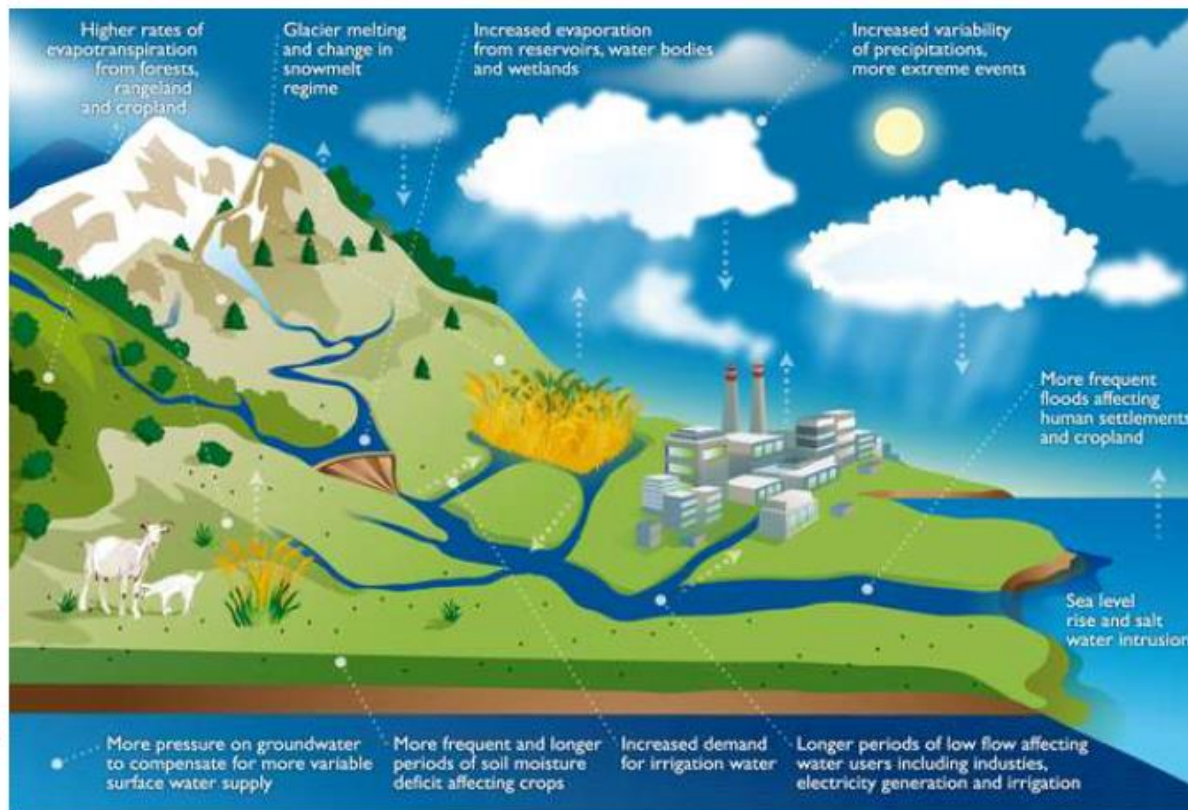
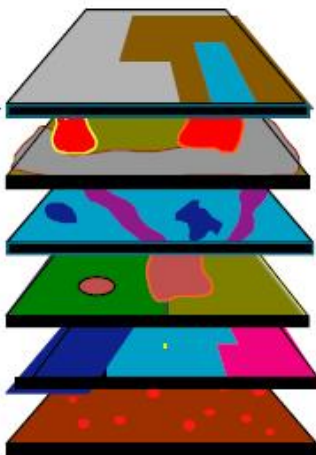
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National Spatial Data Infrastructure



High quality, timely and reliable data

- Geodetic
- Elevation
- Water/Ocean
- Land use/cover
- Transport
- Cadastral
- Population
- Infrastructure
- Settlements
- Admin. Bdys.
- Imagery
- Geology/soils
- Observations
- etc.



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short-term debt) in
terest.
fun·da·men·tal /f
forming a foundation
as a starting-point
which must be lea

Why Fundamental?



We all use different words ...

- Fundamental?
- Foundation?
- Basic?
- Reference?
- Core?
- Base level?
- Referential?
- Critical?



Possible Characteristics

Common link
between
applications

Required across
many sectors

Uses global
standards

Will form a
common
information
framework

Maintained

Custodian or
Trusted source

Enables linking
of spatial and
non-spatial data

Not domain
specific

Data others use
to reference
their own data

Required for
many
applications

Not very
volatile

Adds value to
other data

Defined,
endorsed and
used by all or
many data users

Applies to all or
most regions

Underpins other
information



Fundamental?

Conclusion:

'Fundamental' in this context does not have a definition, but a non-exclusive and non-exhaustive list of characteristics.

As such we cannot produce a definitive list of fundamental data themes – only a consensus view on what is important for the applications we have in mind – i.e. achieving the SDGs.



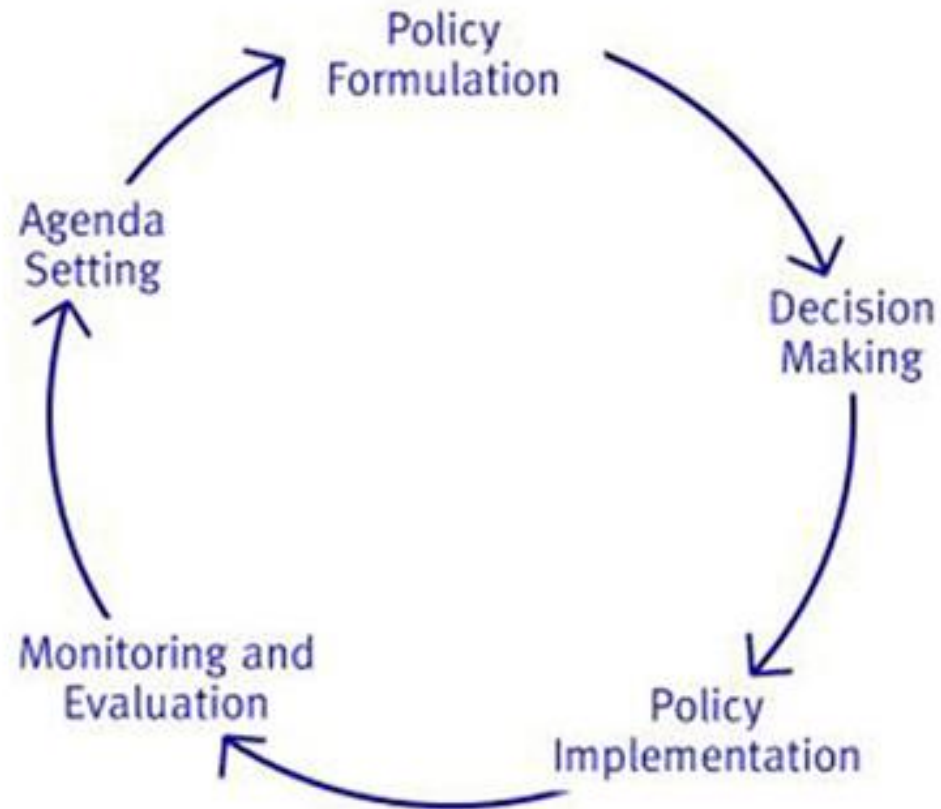
Fundamental for what?

SDG requirements:

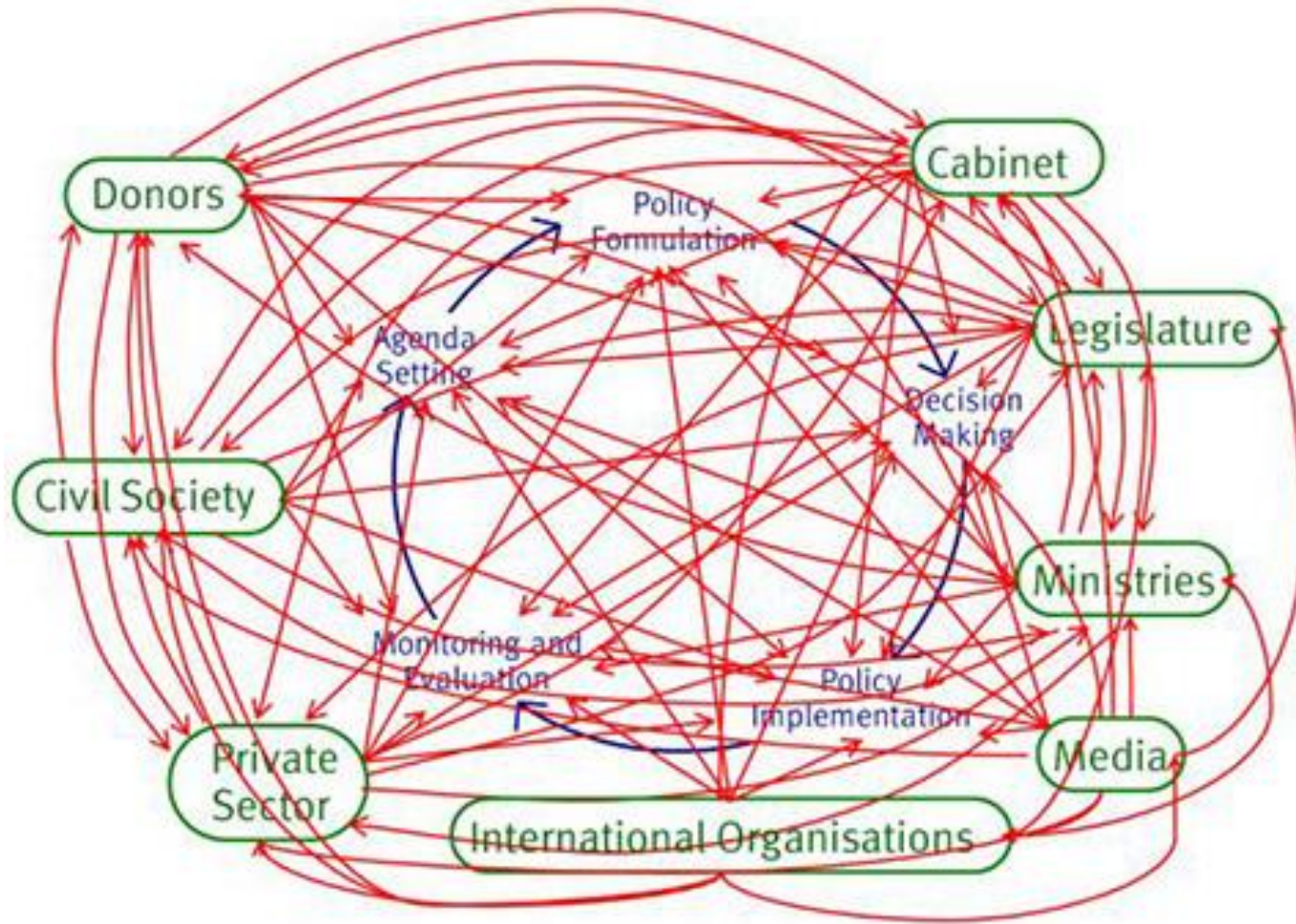
- ✓ Baseline measurement
- ✓ Evidence-based policy making
- ✓ Implementation of actions
- ✓ Monitoring and reporting



Policy Cycle



Policy Cycle



analysis

Assess current resources ; forecast future ones

Forecast propagation of flood, tsunami, pollutions

Understand influence of water on ecosystems, climate change, transport...

Locate where the water is

operational

decision

Decide on protection measures (against pollution ...)

Decide on exploitation measures (drinking water, energy, industry, agriculture...)

communication

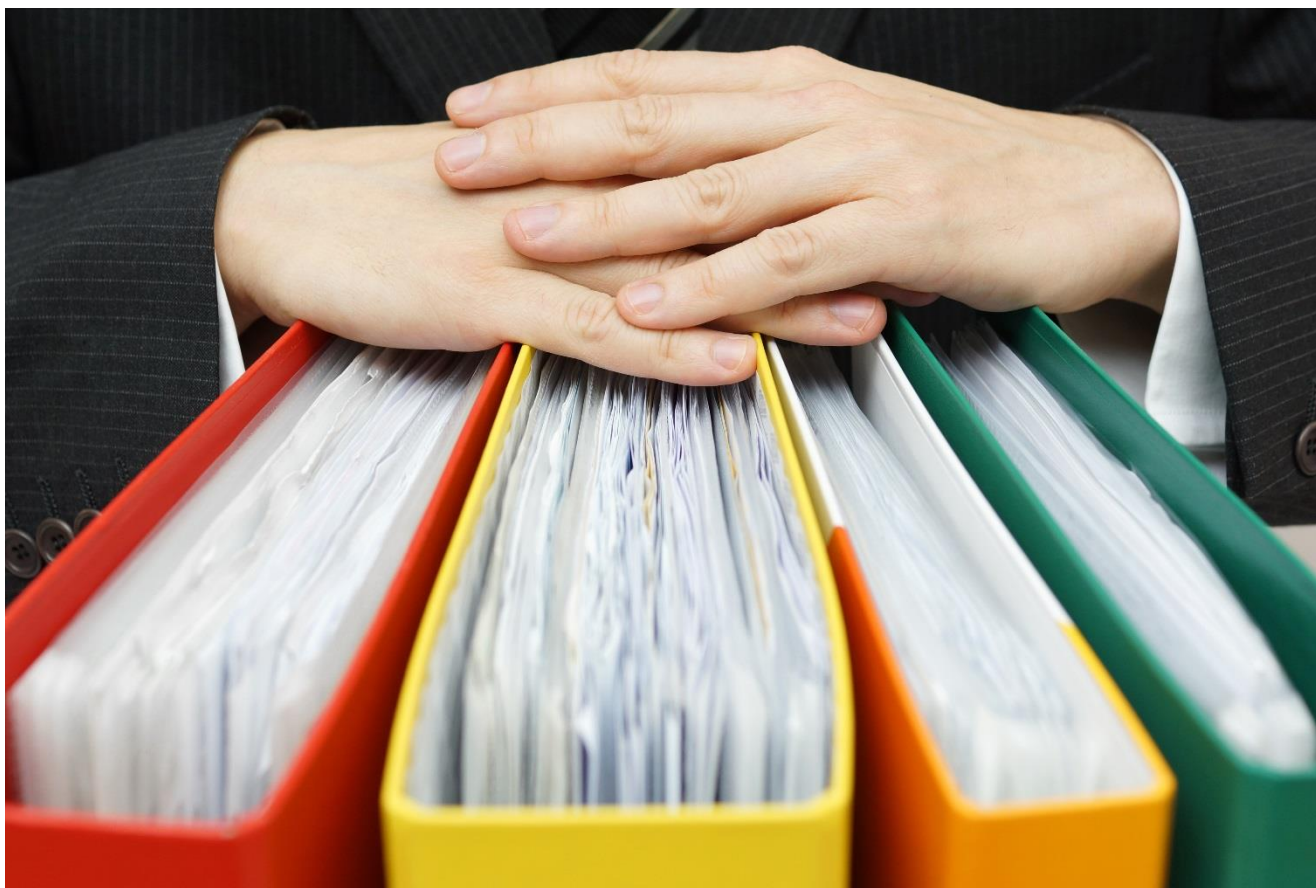
Background 2D map

3D models (risk, projects...)

monitoring

Water abstraction permits, water police

Reporting for European Directive (WFD ...)



Why Themes?



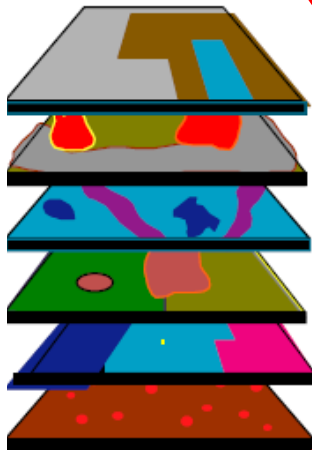
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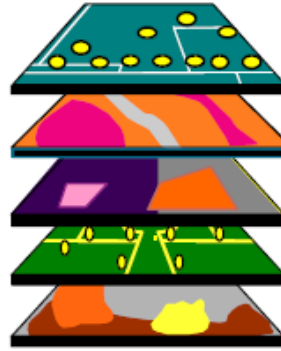
High quality, timely and reliable data

- Geog Names
- Addresses
- Functional Areas
- Settlements
- Land parcels
- Transport Networks
- Elevation/Depth
- Popn distribution
- Land Cover/Use
- Geology/Soils
- Physical infrastructure
- Imagery
- Water



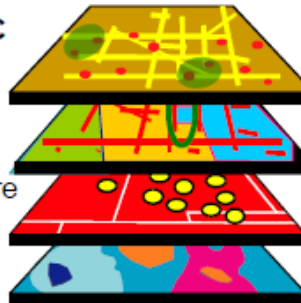
SOCIAL

- Society
- Poverty
- Education
- Health
- Population
- Employment
- Water
- Sanitation
- Equality
- Gender
- Governance



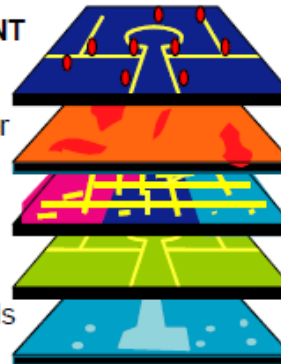
ECONOMIC

- Well-being
- Cities
- Water
- Energy
- Infrastructure
- Industry
- Sanitation
- Economy



ENVIRONMENT

- Water
- Seas/oceans
- Land use/cover
- Ecosystems
- Forests
- Agriculture
- Climate
- Biodiversity
- Natural hazards
- Pollution



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Themes – or datasets?

Subject matter	something about which data can be collected
Theme	a high level categorisation of subject matter which can be further broken down into sub-themes
Dataset	a collection of data about specific features

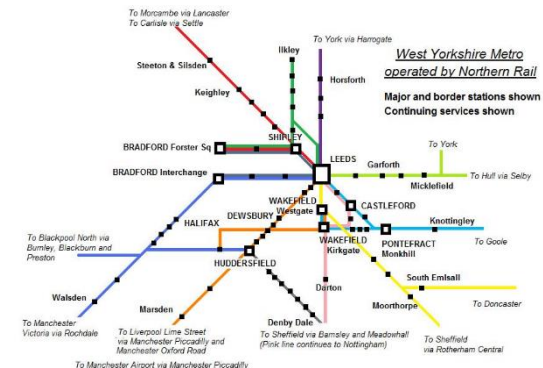


Example 1

Theme: Transport Network

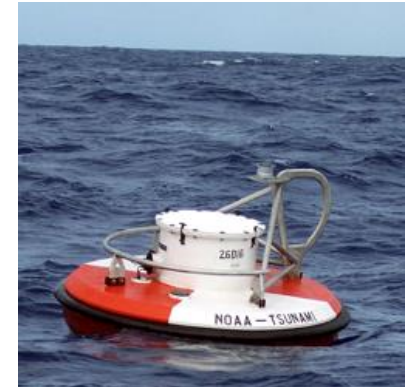
Sub-theme: Road, Water, Rail ...

Dataset: Rail Network, Bus stops, Road surface



Example 2

Theme: Water
Sub-theme: Rivers, Sea, groundwater ...
Dataset: Water quality (data integration)
Wave height (sensors)
Sea ice (imagery interpretation)



CC BY 2.0 NASA Ice



We need fundamental geospatial data about:

People

Built Environment

Natural Environment

To locate this subject matter we need data which:

- can be about the actual subjects, and/or
- use proxies for them e.g. an address as a proxy for a person or a phone track as a proxy for a road





The route we took ...



Background to the FDWG

GGIM 5 – A report on fundamental data themes prepared by GGIM:Europe.

GGIM5 agreed that there is:

*'an urgent need for a set of **global fundamental geospatial data themes** that could be harmonized in order to enable the measurement, monitoring and management of sustainable development in a consistent way over time and to facilitate evidence-based decision-making and policy-making'*



UN GGIM: Europe asked to take lead to:



- Produce a recommendation for a minimum list of **global fundamental geospatial data themes**. Each data theme should be supported by a description and guidelines.
- Take account of **existing activity** being undertaken by UN-GGIM regional committees, ensuring that where possible **existing resources** are used.
- Consider the prioritisation of the data themes and how they **link to other data needs** within the UN-GGIM programme of work.
- Consider the specific needs and vulnerabilities of small island developing States.
- Ensure that the data themes should be technical in nature so as not to raise political concerns.



Methodology

Regions



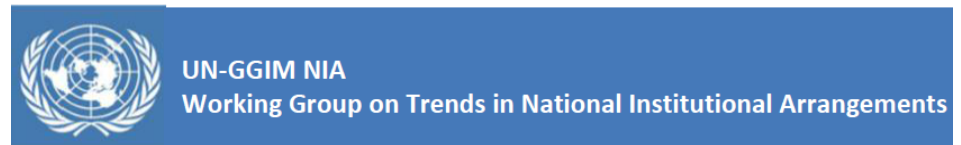
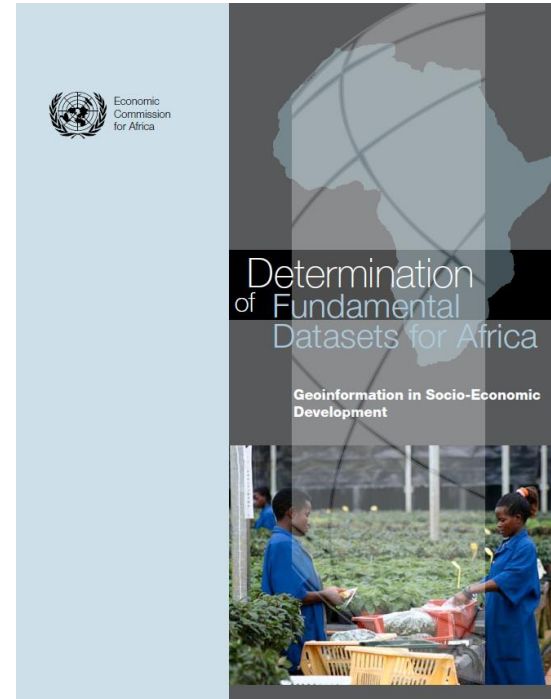
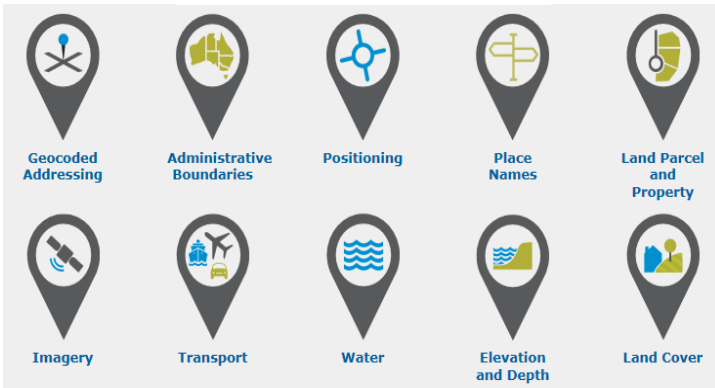
WG Members



It's not difficult to find existing work ...



Fundamental Geospatial Data



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'Common Denominator' approach

UN-GGIM: Europe	GGIM: Africa (UNECA and GSDR)	GGIM: AP (ANZLIC)	UN-GGIM: Arab States	UN GGIM: Americas (PAIGH)	WG - NIA
Geographical names	Geographic names	Place names	Names	Geographic names	Geographical names
Administrative units	Boundaries	Administrative boundaries	Administrative Boundaries	Administrative Units	Administrative units
Transport networks	Transportation	Transport	Transport Networks	Communications networks	Transport networks
Hydrography	Hydrography Drainage	Water	Hydrography	Hydrography	Hydrography
Orthoimagery	Imagery	Imagery	Imagery	Images	Imagery
Elevation	Hypsography	Elevation and depth	Elevation	Relief	Elevation
Land cover	Natural environment	Land cover	Land cover	Land cover	Land Cover
Cadastral parcels	Tenure/parcels (part of land management theme)	Land parcel and property	Land parcels	Cadastral records	Cadastral parcels
Addresses	Street addresses (part of land management theme)	Geocoded addressing	Addresses	Addresses	
Buildings	Populated places (part of Boundaries theme)			Population	Settlements
Utilities and government services	Utilities and services		Utilities		
Area Management	Land management units/areas				
Statistical Units					
Land Use					

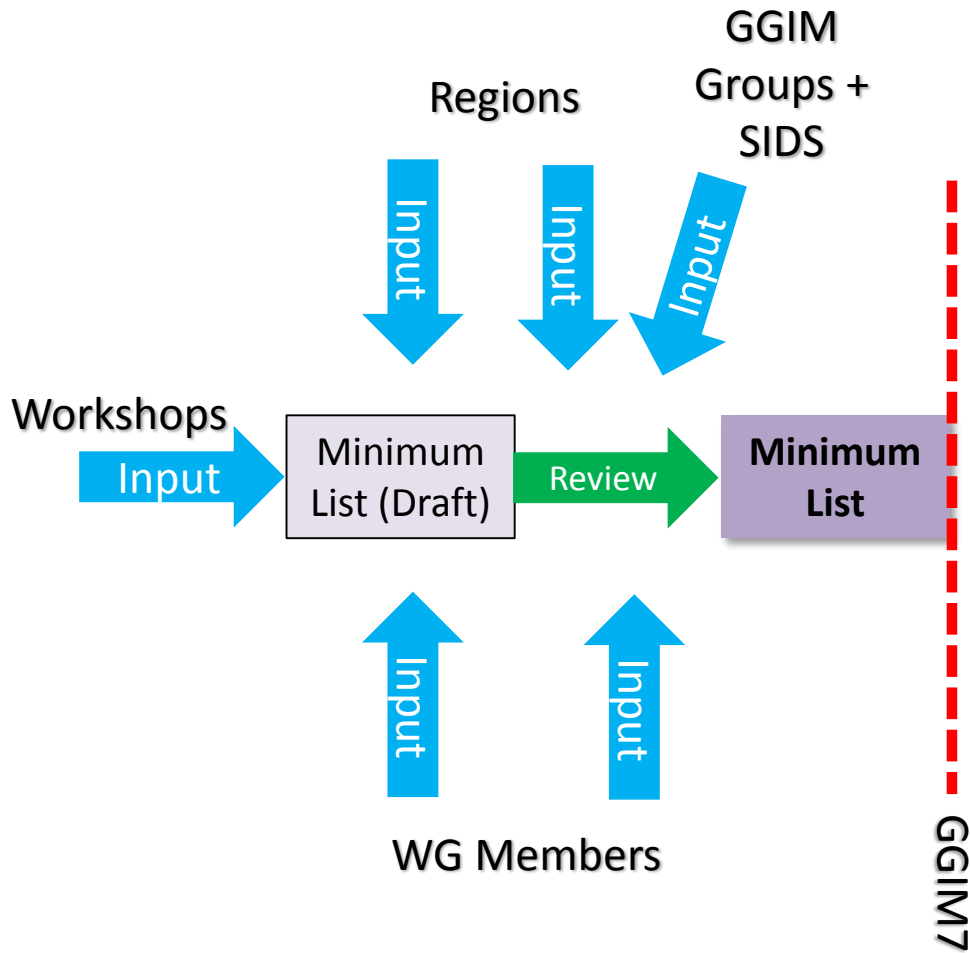


SDG Requirements approach

INSPIRE Theme	Sustainable Development Goal													
	1	2	3	5	6	7	8	9	11	12	13	14	15	
Address														
Administrative units														
Cadastral parcels														
Geographical Names														
Hydrography														
Transport networks (road, rail, water, air, cable)														
Protected sites														
Elevation														
Land cover														
Ortho-Imagery														
Geology														
Buildings														
Land use (existing , planned)														
Soils														
Human health														
Governmental services and utilities														
Environmental Monitoring facilities														
Production facilities														
Agricultural facilities														
Population distribution/ Statistical Units														
Area management - Regulated areas														
Natural risk zones														
Sea regions														
Oceanographic features														
Atmospheric conditions – meteorologic features														
Biogeographical regions														
Habitats and biotope														
Species distribution														
Energy resources														
Mineral resources														



Methodology

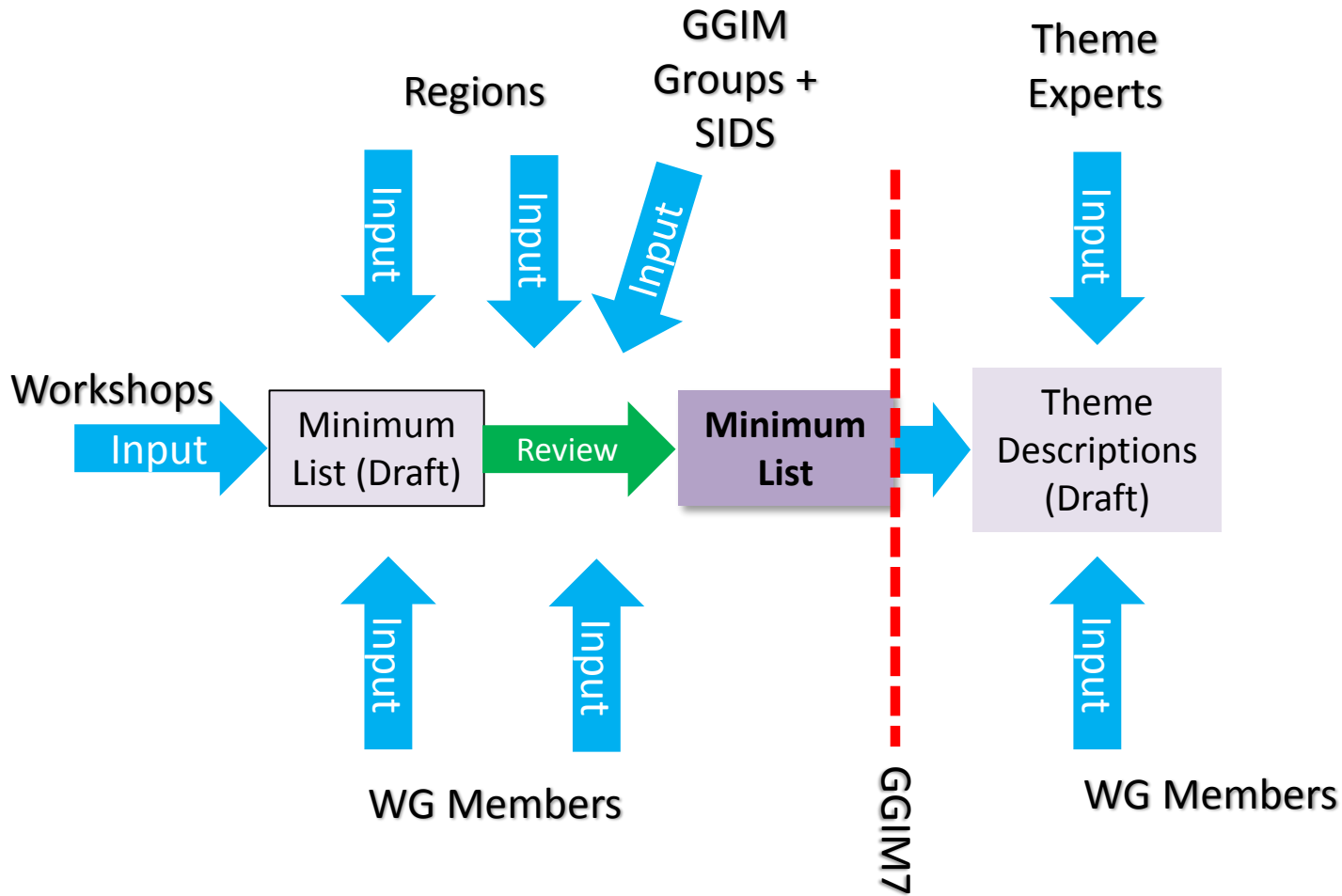


Data Themes and Reference Frame

- Addresses
- Buildings and Settlements
- Elevation and depth
- Functional Areas
- Geographical Names
- Geology and Soils
- Land Cover and Land Use
- Land Parcels
- Orthoimagery
- Physical infrastructure
- Population distribution
- Transport Networks
- Water
- Reference Frame: Global Geodetic Reference Framework



Methodology



Theme Description – One side A4 only

Theme title
Description
Why this theme fundamental?
Which sustainable development goals (SDGs) will it help to meet?
Geospatial data features in more detail
Longer description of data features included in the theme
Possible sources of geospatial data
Existing geospatial data standards



Example - Addresses

Theme title:

Addresses

Description

An address is a structured label, usually containing a property number, a street name and a locality name. It's used to identify a plot of land, a building or part of a building, or some other construction, together with coordinates indicating their geographic position. Addresses are often used as a proxy for other data themes such as Land Parcels.

Why is this theme fundamental?

Addresses underpin government administration at all levels; and good administration is a prerequisite for achieving sustainable development goals. An address is often the unit to which a public service, such as water, is provided. Addresses also enable effective communication with citizens; informing them of policies applying to them, and notifying them of relevant incidents. The theme also helps in managing buildings and properties, and supports social surveys. Datasets relating to individuals or households are often linked to addresses, which can therefore play a role in connecting otherwise-unrelated information. Geocoding addresses relates such information to geographic location. This allows for location-based data analytics and data mining.

Which sustainable development goals (SDGs) will it help to meet?

Addresses have been identified as playing a key role in the achievement of SDGs 4,6,7, 9 and 11.

Geospatial data features in more detail

The addresses theme comprises a single feature type, address, to which a variable number of attributes may be attached. Typically, in urban areas these comprise at least one locator (building, floor or apartment number and/or name), a two-dimensional geographic position and a number of address components which place the address within other features such as a road, a locality, an administrative unit or postal code. In rural areas the locator may be less precise.

Possible sources of geospatial data

Address datasets are usually maintained by public authorities. While data may be created and maintained at local level, it should ideally be compiled into a single national register.

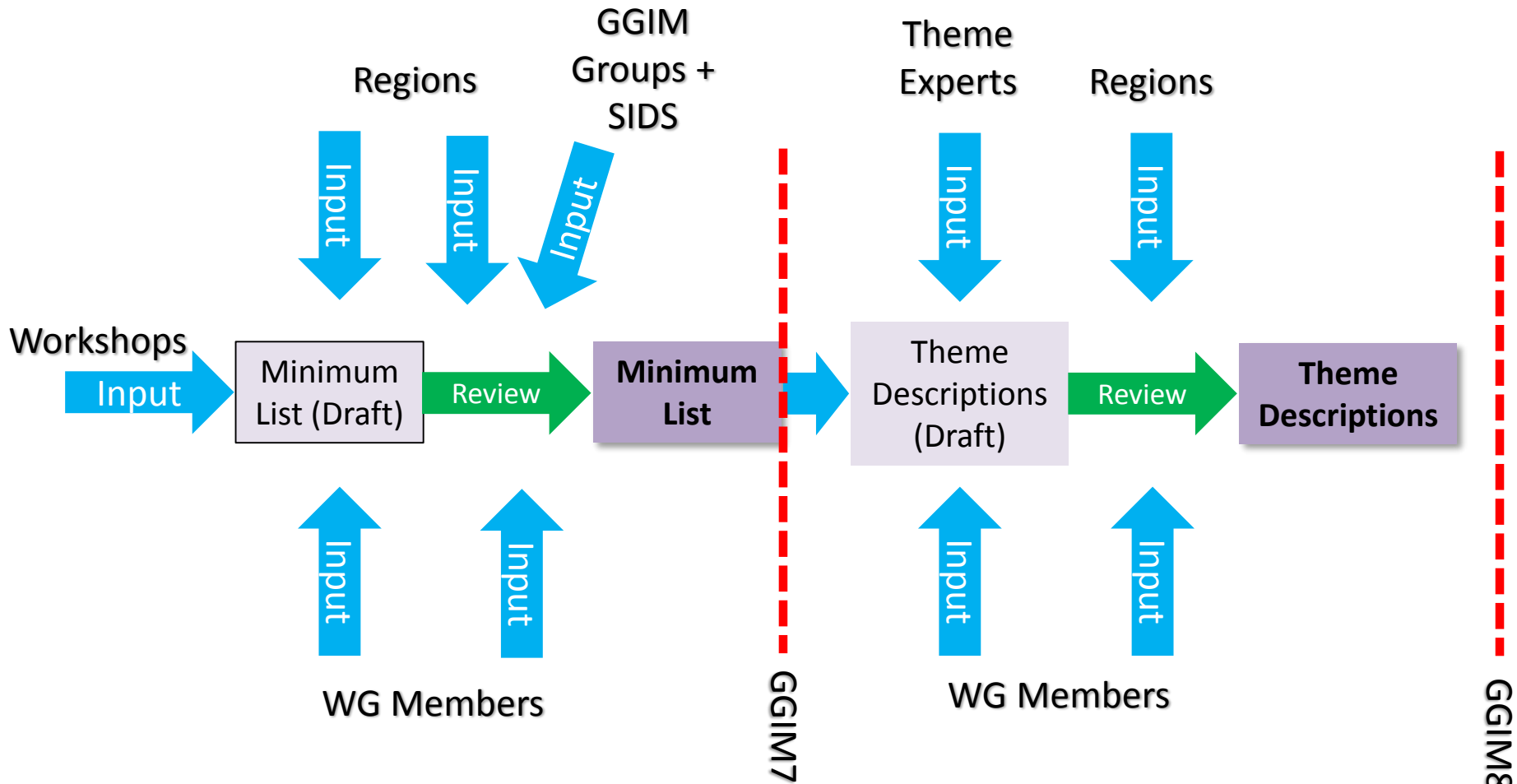
Existing geospatial data standards

Note: This is indicative. Other lists of standards exist and UN-GGIM will seek to work with thematic experts to develop a list of relevant data standards.

- INSPIRE Data Specification on Addresses – Technical Guidelines 3.1
- ISO 19160-1:2015 Addressing -- Part 1: Conceptual model
- ISA Programme Location Core Vocabulary
- ISO 19160-4(UPU, Universal Postal Union) Addressing--Part4: International postal address components and template language



Methodology





Where does the road go now?



Where does the road go now?

- Promotion and awareness raising



Logos



Global Geodetic Reference Frame



Geographical Names



Addresses



Functional Areas



Buildings and Settlements



Land Parcels



Transport Networks



Elevation and Depth



Population Distribution



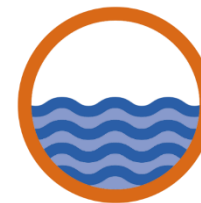
Land Cover and Land Use



Geology and Soils



Physical Infrastructure



Water



Orthoimagery



Where does the road go now?

- Promotion and awareness raising
- Inclusion in the Geospatial Framework



Geospatial Framework



Where does the road go now?

- Promotion and awareness raising
- Inclusion in the Geospatial Framework
- Workshops on implementation ...



Workshop on implementation



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Thank you!



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