Global Geospatial Information Management

Geospatial Information and the SEEA

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Positioning geospatial information to address global challenges
UN-GGIM: A global initiative

Formal inter-governmental Committee of Experts to:

• Discuss, enhance and coordinate Global Geospatial Information Management activities by involving Member States at the highest level. Reports to ECOSOC

• Make joint decisions and set directions on the use of geospatial information within national and global policy frameworks

• Work with Governments to improve policy, institutional arrangements, and legal frameworks

• Address global issues and contribute collective knowledge as a community with shared interests and concerns

• Develop effective strategies to build geospatial capacity in developing countries
UN-GGIM: Program of activities

- Future Trends and Inventory of Issues
- Develop baselines - policy and legal, institutional arrangements, governance, methodologies
- Sustaining the global geodetic reference frame
- Implement and adopt international standards and interoperability
- Establishing a global geospatial information platform for sustainable development: Post-2015 agenda
- Information integration - land, marine, environment, urban hazards, statistics
- Implement a global-regional architecture for UN-GGIM
UN-GGIM

Linking geospatial information to statistics
A growing continuum of user needs
Positioning geospatial information to address global challenges

**Statistical Community**

**Geospatial Community**

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**Geospatial Data Frameworks**

- **Themes:**
  - Admin. & statistical boundaries
  - Addressing, Place Names
  - Transport, Water
  - Land and Property
  - Elevation and Depth
  - Imagery
  - Positioning

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**Socio-economic datasets**

- **Core NSO datasets**
  - Census, Demographics, Agriculture, Building, Labour Force, etc.

- **Tax**
  - Income and business tax

- **Electoral Role**

- **Health Services**
  - Medicare, Pharmaceuticals, Medical workforce

- **Land Valuation and Land Use**

- **Social Welfare Services**
  - Unemployment, Disability, Family Support

- **Others ...**

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**Creating the bridge**
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Location information at address level

Geocoded unit level data
25 Smith St = x, y: 35.5676, 135.6587

Aggregated to suburb or postcode

Aggregated to Local Government area or higher

Analysis and aggregation across geographies
Statistical geospatial framework

**Australian application of SSF**

- Policies, standards and guidelines, covering: confidentiality and privacy, data quality, analysis, dissemination and visualisation.

**Metadata interoperability**

- Developing the interoperability of statistical and spatial metadata.

**Common geographic boundaries**

- ASGS – Australian Statistical Geography Standard

**Data management: geocoded unit record data**

- Geocode is a NAMF compliant point coordinate and ASGS Mesh Block.

**Agreed and authoritative geocoding**

- NAMF – National Address Management Framework
First meeting of United Nations Expert Group on the Integration of Statistical and Geospatial Information
30 October - 1 November 2013, UNHQ, New York

Decisions/conclusions:

“Agreed on the importance of influencing the 2020 Round of Population Censuses, but noted the importance of the integration of statistical and geospatial information to a broader agenda including agriculture and economic censuses, environmental-economic accounting, and the Post-2015 Development Agenda”
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Country user case studies

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**Greece**: Spatial data infrastructure for depicting habitats of “NATURA 2000” network

**Background**: Delimitation of terrestrial-type sites of “NATURA 2000” network

**User’s problem**: Development of large scale spatial data infrastructure for terrestrial areas protected under “NATURA 2000” network, at national scale

**Contribution** of large scale color orthophotomaps for:
- precise determination of the boundaries of terrestrial sites of “NATURA 200” network
- updating, description and delimitation of terrestrial type- habitats at 241 sites of “NATURA 2000”

**Benefits**: Protection of the high environmental importance sites of avifauna and other animal and floral species of the European Network of “NATURA 2000”
Spain: National Mapping Agency (IGN)

Spanish Land Cover & Land Use Information System

• Users:
  General public (using National Reference Map & databases at different scales)

• Key use:
  Identify biophysical cover of the land (vegetation, bare soil, etc.) and its socio-economic purpose

• How?:
  National Topographic Map shows LC & LU data, using synthetic symbology for cartographic purposes

• Benefits:
  Increased coherence between specialized Land Cover database and topographic data sets and maps.
  Production cost reduced by 20%.
TUNISIA: North African early warning system of drought (SMAS)

Drought Early warning is based on indicators of vulnerability to climatic and human pressure, as well as environmental monitoring instruments. Information generated by these tools has to be integrated into national development programmes. It should also serve as a basis for a collective strategy for the sub-region.

• There is a wide range of vulnerability indicators: some are derived from satellite data such as vegetation and biomass indexes and surface temperature, while others are based on agro-hydro-meteorological information including moisture deficit/excess, and attacks by harmful insects.

• The various vulnerability indicators allow experts to observe trends—in climatic changes for instance—and predict their impacts on natural resources and populations.
Management of water resources in the national interest

Groundwater and surface water modelling and reporting

Geospatial information and relationships

- Administrative boundaries
  - Water planning areas, councils, supply schemes, g/w areas
- National hydrofeatures
  - Rivers, lakes, wetlands, reservoirs, aquifers
- Catchment reporting units
  - Basins, catchments, sub-catchments
- Place and feature names
- Land cover, soils, hydrogeology
- Monitoring points
  - Flow and rain gauges, water meters, climate stations, bores
- Water infrastructure
  - Supply and drainage channels, pipes, plants, storages
- Satellite and Airborne Orthoimagery
- National Digital Elevation Data

Policy development

Evidence based decision making

Service delivery

Engaging the community
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Geospatial information and the SEEA
SEEA Experimental Ecosystem Accounting

Relies on a spatial units approach for Ecosystem Accounting

- Delineation of spatial units undertaken with the development of spatial and non-spatial databases (in a GIS)
- Databases could contain information such as soil type and status, water tables, rainfall amount and pattern, temperatures, vegetation, biodiversity, slopes, altitude, land management and use, population, and social and economic variables
- Information may be used to assess flows of ecosystem services from given spatial areas to relevant beneficiaries
- Proposes a units model based on spatial areas for measurement and compilation
- Relies on availability of persistent and appropriate spatial data. At what scales?
- Requires the spatial data to be analysed and/or input into specific models and tools to derive ecosystem baselines. What ecosystem assets? What units? What data? What conditioning of the data?
Need: Dynamic environmental information over space and time

... how much of it is readily able to be consumed by ecosystem models?

Source: European Environment Agency
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Figure 1: Arizona Ecological Systems. The systems were defined by NatureServe and mapped by the SiRe3AP project.
Land cover of Australia 2000-2008
250m resolution - enables reliable monitoring of changes in land cover at a national scale

Elevation of Australia 2011
30m resolution National DEM - enables modeling the stocks and flows of water at a national scale
China Global Land Cover Mapping

- Time: 2009~2013
- Financed by: Ministry of Science and Technology
- Led by: National Geomatics Center of China (NGCC)
- Overall Goals: Mapping land cover of the whole globe at 30 m for two baseline years (2000 and 2010)
- The first time in the world at 30m resolution
China Global Land Cover Mapping
Water change analysis

Landsat images integrated with China’s HJ-1 and Beijing-1 satellites
China Global Land Cover Mapping
Urban expansion

2000  New Dehli  2010
Local to global framework geospatial datasets exist, but are they suitable for Ecosystem Accounting?
All of these variables can be integrated into consolidated indicators... if the data is consistently available over space and time.
SEEA Experimental Ecosystem Accounting

Some considerations regarding the geospatial aspects

- A new area and many data gaps, but requires a data-driven approach for the analysis
- What are countries and agencies doing? What are reliable sources of information/knowledge?
- Scale - local to national, micro to macro?
- Within a geospatial-statistical paradigm, consider:
  - Tools and applications that may be needed and/or available
  - The data (and units of measure) needed to drive the analysis must be sustainable and persistent - will be variable at first
  - The temporality of the data - real-time, sensors, monitoring, etc.
  - Modelling and analysis - to what level of detail, aggregation, disaggregation
  - Take a standards-based approach, be interoperable across systems
  - Being able to communicate outputs - visualise and disseminate - will be vital
Thank you

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