Working Group on Trends in National Institutional Arrangements in Geospatial Information Management

Sharing Good Practices on Systems for Information Exchange and Sharing

**Seventh Session of the Committee of Experts on
Global Geospatial Information Management**
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Background

13 instruments have been identified as mechanisms of national institutional arrangements

Structural Mechanisms

S1. Establishment of coordinating functions or entities
S2. Reshuffling division of competences
S3. Establishment of a legal framework
S4. Regulated markets
S5. Systems for information exchange and sharing
S6. Entities for collective decision-making
S7. Partnerships

Managerial Mechanisms

M1. Strategic planning
M2. Financial management: input-oriented
M3. Financial management: performance-oriented
M4. Financial management: joined up working and cooperation
M5. Inter-organizational culture and knowledge management
M6. Capacity building
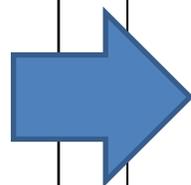
1. **Description of Instrument**

   a) **Technical systems** for geospatial information exchange and flows and the **content of these systems**

   b) Examples include **national geoportals**, and **government-wide information system**

2. **Relevance of Instrument to NIA**

   a) Helps with the **efficient organization** of information flows and systems, which **aligns** the needs and information exchange across stakeholders for **decision-making**

   b) **National, integrated** systems help provide **strategic overview** of government activities

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Background

Good practices from 12 countries identified by the NIA WG and consultant

Good practices from 5 countries will be highlighted

Canada

Mexico

Spain

France

Korea

Morocco

Ecuador

Rwanda

Kenya

Indonesia

Singapore

New Zealand

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Canada's Federal Geospatial Platform Coordinates Data Sharing Across a Vast Range of Stakeholders

1. Learning Points

a) **Collaborative** approach to **coordinating** geospatial asset management across widely-varying administrative departments

b) Supports **Canada's Action Plan on Open Government** through an open data licence framework

2. Background

a) Integrating geospatial data from various federal departments for decision-making required **significant time and effort** due to differing policies and standards, and licensing barriers

b) Canada's Federal Committee on Geomatics and Earth Observations (FCGEO) led the development of a **common web-based environment** for data discovery and access


3. Description

a) One-stop platform for **searching**, **discovering**, **viewing** and **analysing accurate** and **authoritative** federal geospatial data

b) Provides a **common suite of decision-support tools** that are **built once and re-used many times**

c) Operates on **shared infrastructure and governance**

d) Offers the public free data for download and re-use under the **Open Government Licence**, through its open data portal

e) Designed through a **client engagement process** that involves creation of user stories based on clients' needs
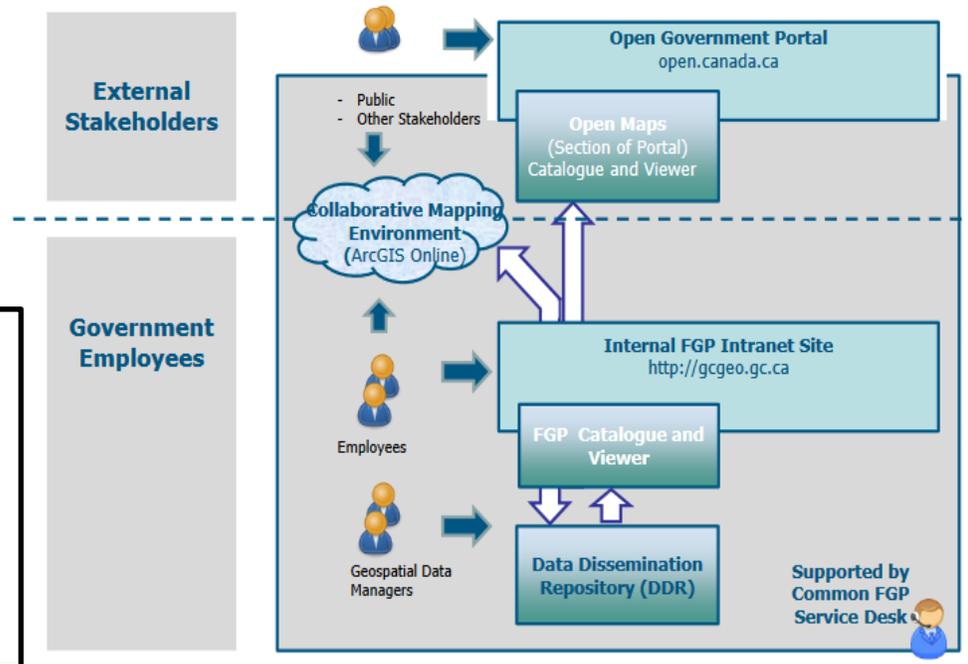
Source: http://www.un-ggim-americas.org/images/reuniones/2016_persepectivas_info_geo_est/reunion2/4.%20canada_loubier_geospatial_platform.pdf

Canada's Federal Geospatial Platform Coordinates Data Sharing Across a Vast Range of Stakeholders

Based on a **set of core data**, the Federal Geospatial Platform **coordinates data sharing** across different domains and federal departments, and encourages **re-use of existing data**

Natural Resource Development and Environmental Protection

Cumulative Effects Assessment

Aboriginal Consultation

Environmental Assessment

Greenhouse gas mitigation

Energy Infrastructure & clean energy

World Class Tanker Safety

Public Safety and Security

Wildfire monitoring & prediction

Floodplain mapping

Climate Change Adaptation

Drought monitoring

Infrastructure integrity

Infrastructure
- Pipelines
- Transmission lines
- Refineries
- Power plants
- Airports
- Ports and marine network system
- Navigable waterways
- Winter roads ...

Natural resources
- Bedrock/surficial geology
- Top 100 exploration projects
- Land capability
- Soil landscape
- Principal mineral areas
- Major Project Inventory ...

Environment
- Water quality, quantity
- Pollutants release
- GHG emissions and projections
- Climate, air quality
- Climate change/water scenarios
- Wetland inventory
- Critical habitat designations
- Species at risk range maps
- National Parks
- Protected/Conservation Areas
- Natural disturbances
- Permafrost/snow/ice, trends

Aboriginal
- Community locations
- Tribal councils
- Treaties/specific claims
- Community wellbeing...

Frameworks
- Roads / Railways
- Hydrographic network
- Land cover
- Watersheds
- Ecozones / ecoregions
- Elevation / Bathymetry
- Administrative boundaries
- Census boundaries
- Geographic names ...
- High-resolution imagery

FGP CORE DATA

Source: http://www.un-ggim-americas.org/images/reuniones/2016_persepectivas_info_geo_est/reunion2/4.%20canada_loubier_geospatial_platform.pdf

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Indonesia Coordinates Data Sharing Through National Geospatial Information Networks

1. Learning Points
a) **Strong political commitment** to overcoming national challenges in geospatial data sharing and coordination

2. Background
a) Indonesia **needed quality integrated geospatial data** for nationwide development and decision-making
b) **Complex geography** made access to such data even more critical.

3. Description
a) The National Geospatial Information Networks was created by **Presidential regulation** to facilitate sharing of uniform geospatial information across **various levels of government**
b) Supports geospatial data development and sharing through **policy**, **technology** and **capacity building** initiatives
c) Involves OneMap policy for achieving a single geo-reference, geo-database, geo-standard, data custodian, and data version; as well as the National Competency Standard Performance (SKKNI) for providing certification guidelines

Presidential Regulation Nr.27 / 2014 : National Geospatial Information Networks (JIGN)

GeoSpatial Data Sharing

Indonesian GeoSpatial Information Network

5. Science & Technology

4. Human Resources

1. Policy & Regulation

3. Data & Standard

2. Institutional Arrangement
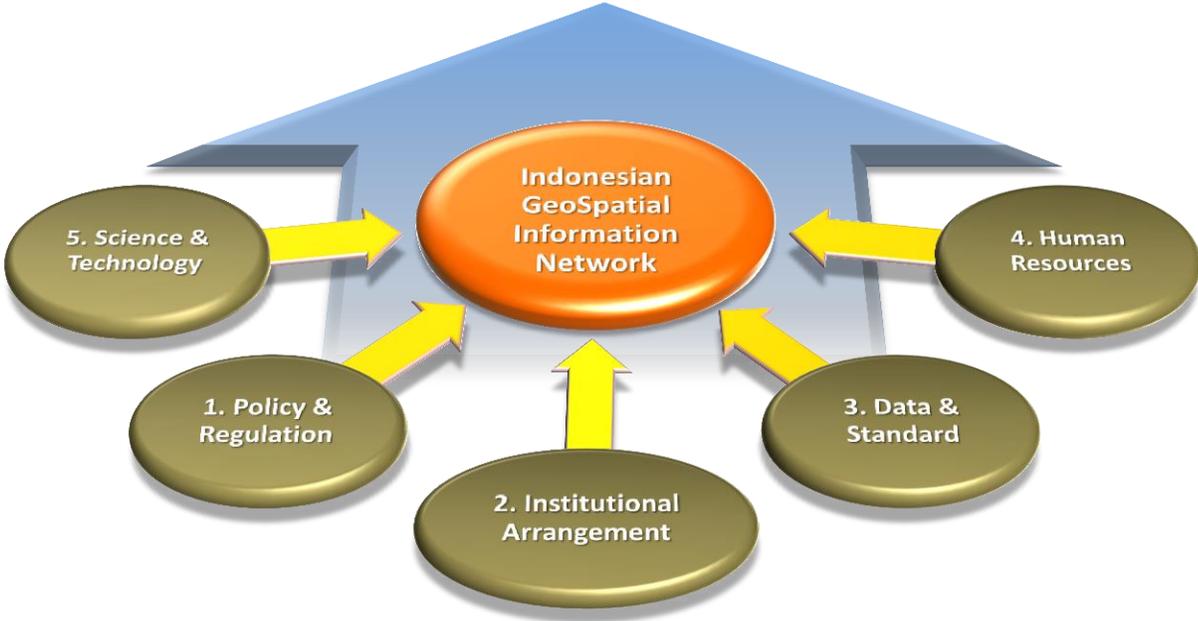
Source: Adi Rusmanto, Dodi Sukmayadi, Nurwadjedi. 10 May 2016. The Role and Function of Geospatial Information Authority (Big) on the National Planning And Development

Indonesia Coordinates Data Sharing Through National Geospatial Information Networks

57 Ministries, 34 Provinces, And 508 Regencies/Cities

a) A network of nodes coordinates geospatial data sharing across different levels of government

b) The national geoportal and Badan Informasi Geospasial (BIG)'s geospatial data centre coordinated data sharing and processing across production units

c) Supports the production of national base and thematic maps for various applications

Source: http://ggim.un.org/docs/meetings/2ndHighLevelForum/Session%204/4-UNGGIM-DOHA_BIG_INDONESIA.pdf

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France's National Geoportal Acts as a Building Block for other NSDI Initiatives

1. Learning Points

a) Geoportal is a **key building block** for other regional and thematic platforms of the NSDI
b) Geospatial data can be an **important component** of the **digitalization** of government services

2. Background

a) The geoportal was co-implemented by the **IGN** (National Mapping and Cartographic Agency) and the **BRGM** (National Geological Survey), as part of a broader effort to **digitalise** the French national administration through a geospatial component

Source: https://www.geoportail.gouv.fr/

3. Description

a) **Integrates** and provides access to different **2D and 3D thematic geospatial information** across national administrative organizations
b) Forms the basis for other **regional** and **local geoportals** to be developed, as well as other **thematic geoportals**, such those for land planning and the environment
c) Offers **viewing**, **download** and **geo-processing services, as well as a** 'Geo-catalogue' service that provides a **key national access point** for **metadata** published by different authorities
d) APIs allow government agencies to integrate geospatial data available in other administrations into their e-services, facilitating **re-use** and **efficiency**

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France's National Geoportal Acts as a Building Block for other NSDI Initiatives

Taps upon the IGN's **"Carto API"** as a building block for integrating geospatial data and **web services** into agencies' **e-services interfaces**, such as application forms

This allows data to be **retrieved** from the geoportal and **cross-checked** for filling application forms (e.g. cadastral plot identifier can be obtained from addresses for building permit applications)
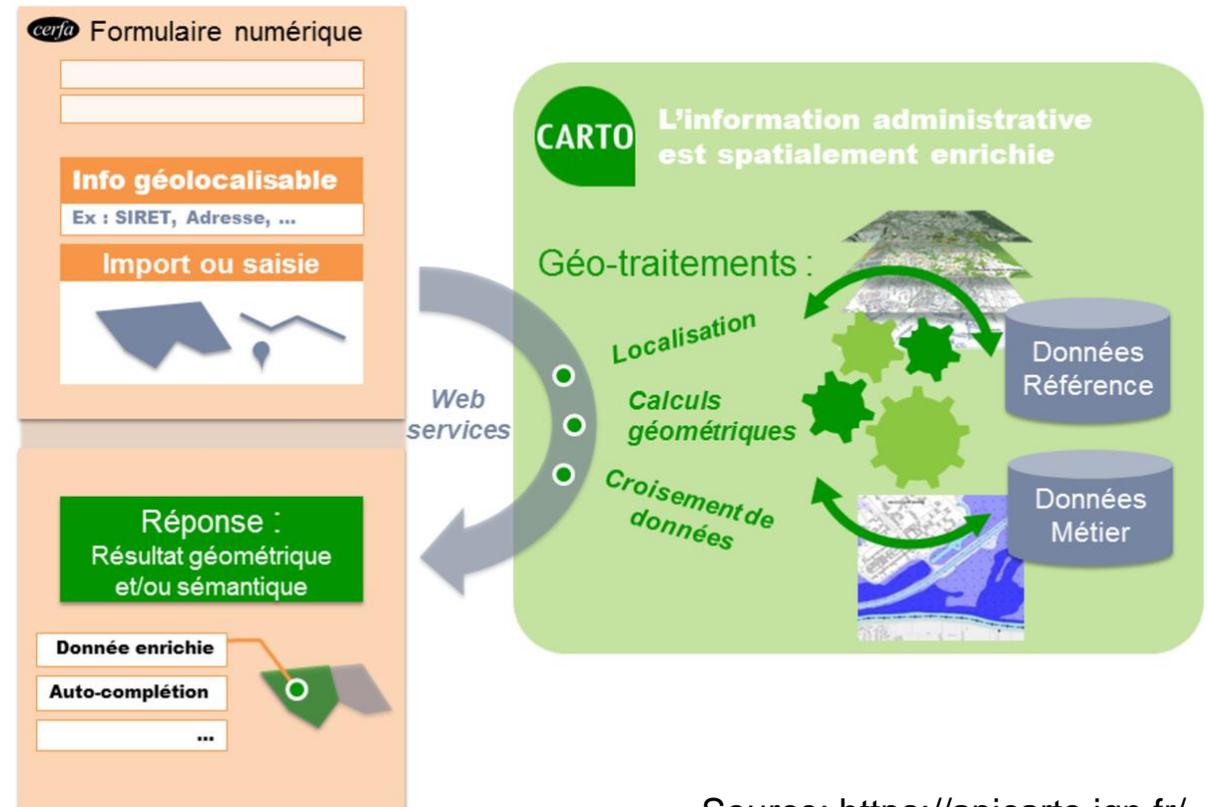

Source: https://apicarto.ign.fr/

New Zealand's LINZ Data Service (LDS) Provides Free Geospatial Data for Creating Products and Services

1. Learning Points

a) Facilitate open, quick access to government geospatial data through use of the **Creative Commons licensing framework**

b) Supports **efficient, innovative** creation of other **information infrastructures, products and services** across sectors

2. Background

a) Users needed **direct access** to Land Information New Zealand (LINZ)'s datasets instead of third-party sources, in order to plug into them **cost-effectively**

Source: https://data.linz.govt.nz/
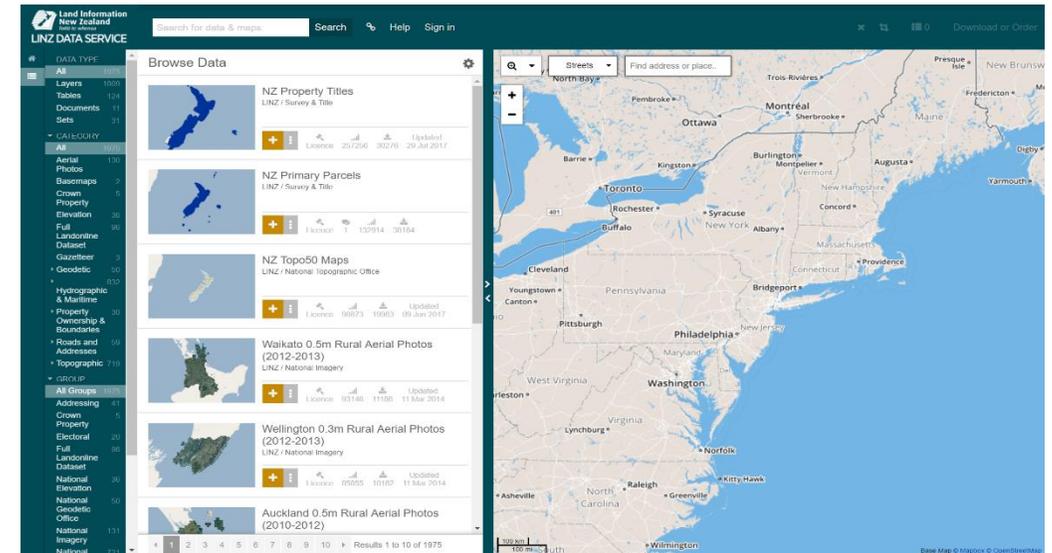
3. Description

a) Offers the public **free, updated land and seabed data** in a range of formats, as well as **web services** to support customization and visualization of LINZ data

b) Provides web services to **automate the integration** of LDS data with users' web, mobile and GIS applications

c) Uses **self-help reference material** and **online discussion forum** to support data access

New Zealand's LINZ Data Service (LDS) Provides Free Geospatial Data for Creating Products and Services

LINZ Data Services's web services enable **machine-to-machine** sharing of data and **real-time access** for on-demand visualization and consumption, thus **saving time and cost in data management**

LDS web services on offer

LDS web service	Supported data types	LDS examples
WMTS	Raster data	• Aerial photos • Topographic maps • Hydrographic chart images
WFS	Vector (point, line, polygon) and tabular data	• NZ Street Address (Electoral) • NZ Contours • NZ Primary Parcels • NZ Property Titles List
WMS	Raster data	• Topographic maps • Hydrographic chart images
CS-W	Metadata	Allows the harvesting of LDS layers and tables for incorporation into a local or international catalogue.

Source: http://www.linz.govt.nz/data/linz-data-service/guides-and-documentation/which-web-service-should-i-use

Rwanda's SpIDeRR System Enhances Capacity for Disaster Management

1. Learning Points

a) **Thematically-focused geoportals** facilitate the creation of specific information products

b) Training workshops and user guides promote **usability** of geoportals and **build capacity**

2. Background

a) Rwanda experiences **high vulnerability to natural disasters** due to topographic and socio-economic factors

b) **Rwanda Ministry of Disaster Management and Refugee Affairs (MIDIMAR)** partnered with inter-governmental organisations to create the **Spatial Information and Data Portal for Disaster Risk Reduction** to offer agencies and the public **disaster-related maps and climate information**

Source: http://41.74.166.109/layers/?limit=100&offset=0

3. Description

a) Provides a platform for agencies to share data **relevant to each phase of disaster risk reduction** (preparedness, response, mitigation and recovery)

b) Involves **training workshops** that train officers to use the portal, and **user guides** with step-by-step instructions

c) Offers access to **free and open source tools** for **data analysis** and **mapping**

d) Supports the development of the **Rwanda National Risk Atlas**, a comprehensive disaster risk profile for the nation

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Rwanda's SpIDeRR System Enhances Capacity for Disaster Management

User-friendly tours and tutorials provide detailed steps from registering an account to processing spatial data

Source: http://41.74.166.109/earlywarning/
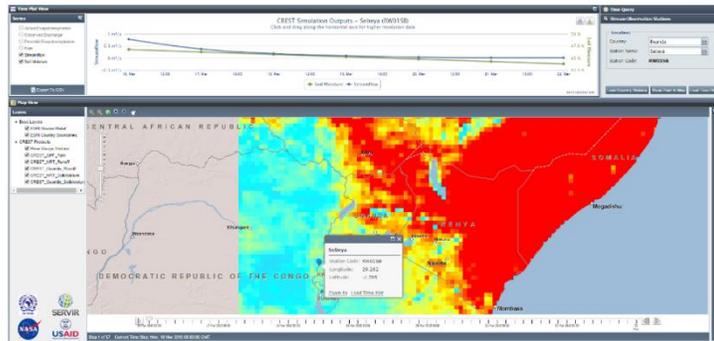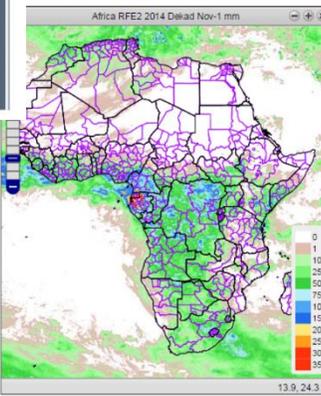
Maps of hydrologic models and rainfall time series in SpIDeRR helps with flood prediction and seasonal drought monitoring. This supports agencies' roles in the **national early warning system**, by providing them with spatial data that **targets the preparedness phase** in disaster risk reduction

Source: http://41.74.166.109/user_guide/tutorials/users/index.html

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Key Lessons and Guidelines

1. Systems for information exchange and sharing are not just data infrastructures, but also **communication channels** between data suppliers and users across sectors

2. **Strengthen collaborations** among key geospatial information organizations in order to supply data, products and services meeting user needs

3. Easing systems **usability** should be prioritized e.g. provision of a range of query/analysis tools, provision of guides and a user forum, etc.

4. Any information sharing system should be spearheaded by **national commitment**

5. Adopt and implement an **open data license framework** (e.g. Creative Commons) as this will massively stimulate re-use and value-add of the data.

6. Adopt **internationally-recognized geospatial standards** as the utilization of these standards will facilitate the effective and efficient exchange, sharing and use of geospatial information.

7. **Transparent and updated assessment** of the usage of the systems e.g. provision of usage statistics in a meaningful way, system 'openness', etc.

Thank you for your attention

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Annex A: Other Good Practices

Ecuador's National Spatial Data Infrastructure Facilitates Emergency Response to Earthquakes

Source: IGM-Ecuador Geoportal

1. Learning Points

a) Strong national commitment facilitates pro-active policies towards data timeliness, and transparency of data sharing

2. Background

a) Due to demand, the **Military Geographic Institute (IGM) of Ecuador** initiated the production and sharing of **timely geographic**

b) **information** for mitigation and response to earthquakes such as the large one on April 16, 2016

c) The MGI developed solutions to facilitate access, use, download and analysis of information, based on its NSDI

3. Description

a) Offers tools such as Geographic Viewer Earthquake, Web map services (WMS), and a virtual 'space' (platform) for downloading geographic information relevant to response (including base mapping

b) develops, ortho-photographs, digital terrain models) and geospatial studies (e.g. destroyed

c) buildings and proposed temporary shelters, etc.).

d) The "Open Data in Ecuador" policy facilitated timeliness of uploaded data, including the constant updating of maps in the most affected placed by OpenStreetMap

Kenya's National Land Information Management System Promotes Efficient Service Delivery

1. Learning Points

a) Geospatial systems and technology can be an important component of digitalization of services

2. Background

a) Land administration relied on **paper-based manual systems** that are **inefficient and costly**

b) The National Land information system (NLIMS) was developed to computerize land administrative functions

3. Description

a) Land Registration maps and Land Ownership Data are in a **single integrated GIS based Land Database** to provide clients and customers **with timely, high quality land information products and services.**

b) Land data are now **easily made available** by highlighting a feature to display all information stored about it. The amount of information (spatial and related non-spatial) that can be stored in a Geographical Information System(GIS)/ Land Information Management System (LIMS) Database is almost limitless.

Source: Creation of the National Land Information Management System (Murage Mundia, 2013)
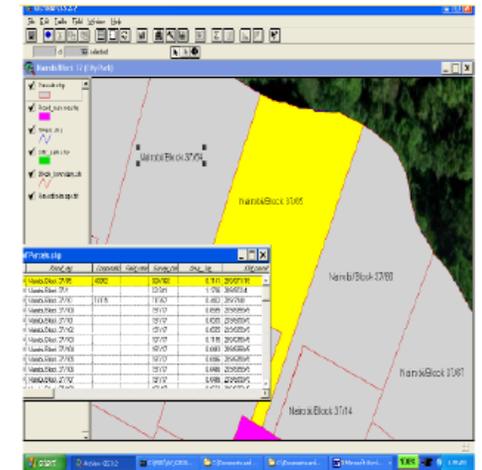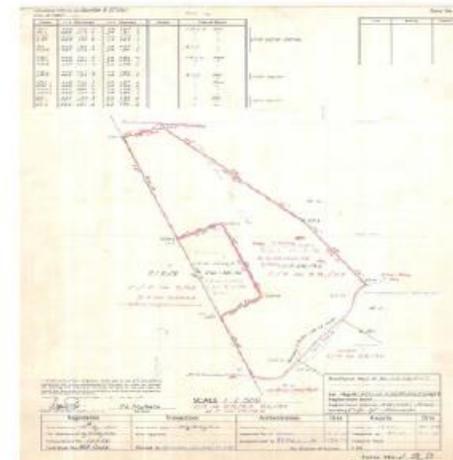
Analogue, static land records that might get lost or damaged

Dynamic, interactive geospatial information that is easily-retrievable and promotes prompt service delivery

Korea Integrates Geospatial and Administrative Data Through the National Integrated Information System (NIIS)

1. Learning Points

a) Combines **e-government** with **NSDI**

b) **Efficient organization** and **integration** of information flows nationwide, which facilitates **seamless data sharing** and reuse of geospatial resources

2. Background

a) Need for a **process-based approach**, in which the management of geospatial assets are focused on **delivery of services and solutions** for the sharing and reuse of resources

3. Description

a) Achieves seamless connection **among geospatial** and **textual fundamental databases** nationwide

b) Supports **various thematic applications**, such as National Land Information, Coastal Management Information, Korean Tidal Flat Information, National Environmental and Ecological Information, Agricultural Information, Forestry, and Cultural Heritage

c) Offers **open API** and **geoweb platform technologies** (WMS, WFS, etc.) for users to mash-up and **create services and applications**.
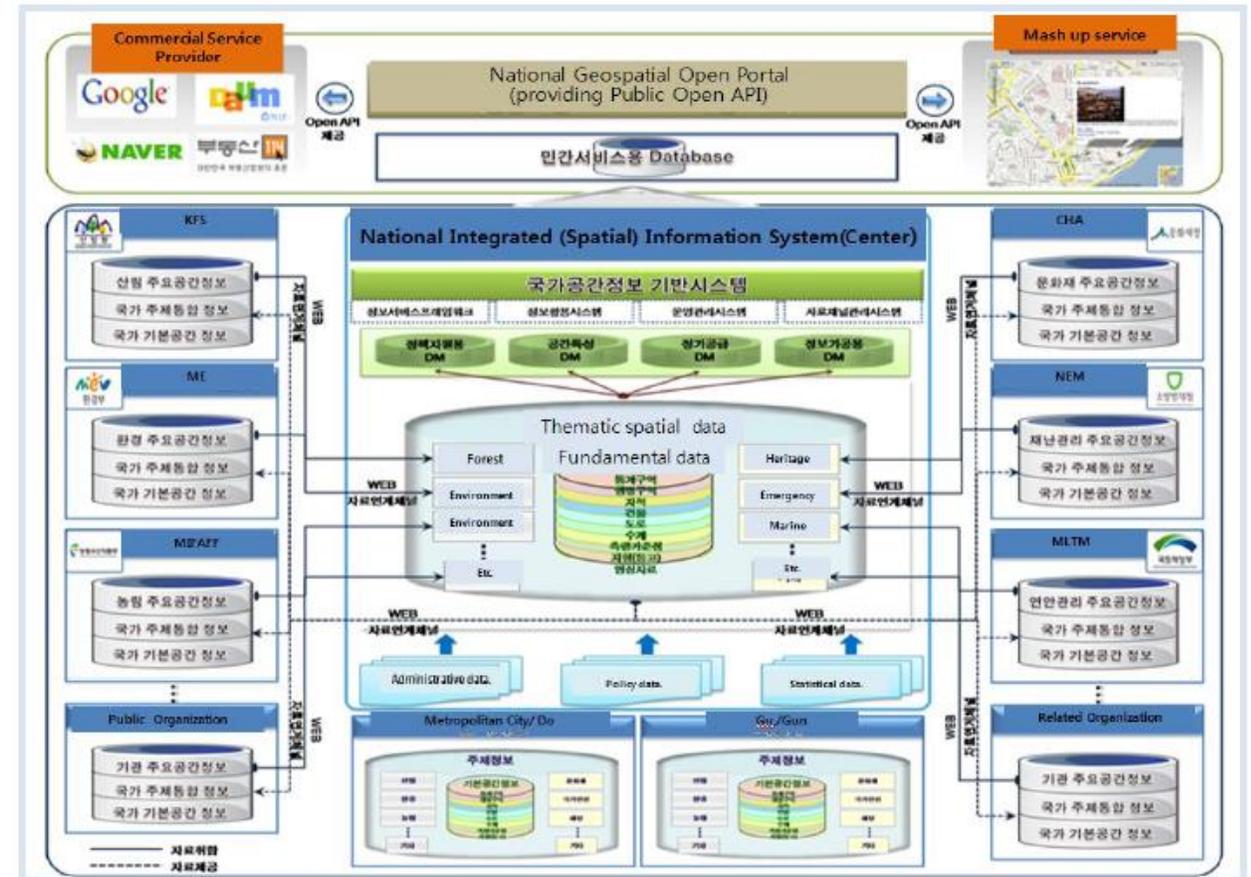
Source: Eun Hyung Kim. (2010). National Spatial Data Infrastructure: The Case of the Republic of Korea. https://www.infodev.org/infodev-files/resource/InfodevDocuments_1110.pdf

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The Digital Map of Mexico Facilitates Access to Geographical and Statistical Data Across Sectors

1. Learning Points

a) The **integration of statistical and geographic information** could promote widespread data sharing and access

2. Background

a) The Digital Map of Mexico is a Geographic Information System developed by INEGI (national geographic and statistical agency) in the early 2000s to provide citizens and government a tool that allows **easy query of official geographic information**

3. Description

a) Offers both **geographical information** and **georeferenced statistical information**

b) Based on an architecture supported on services with international specifications for the interoperability of geospatial data (Open Geospatial Consortium standards), allowing it to interact with other software and services that apply those standards

Source: gaia.inegi.org.mx

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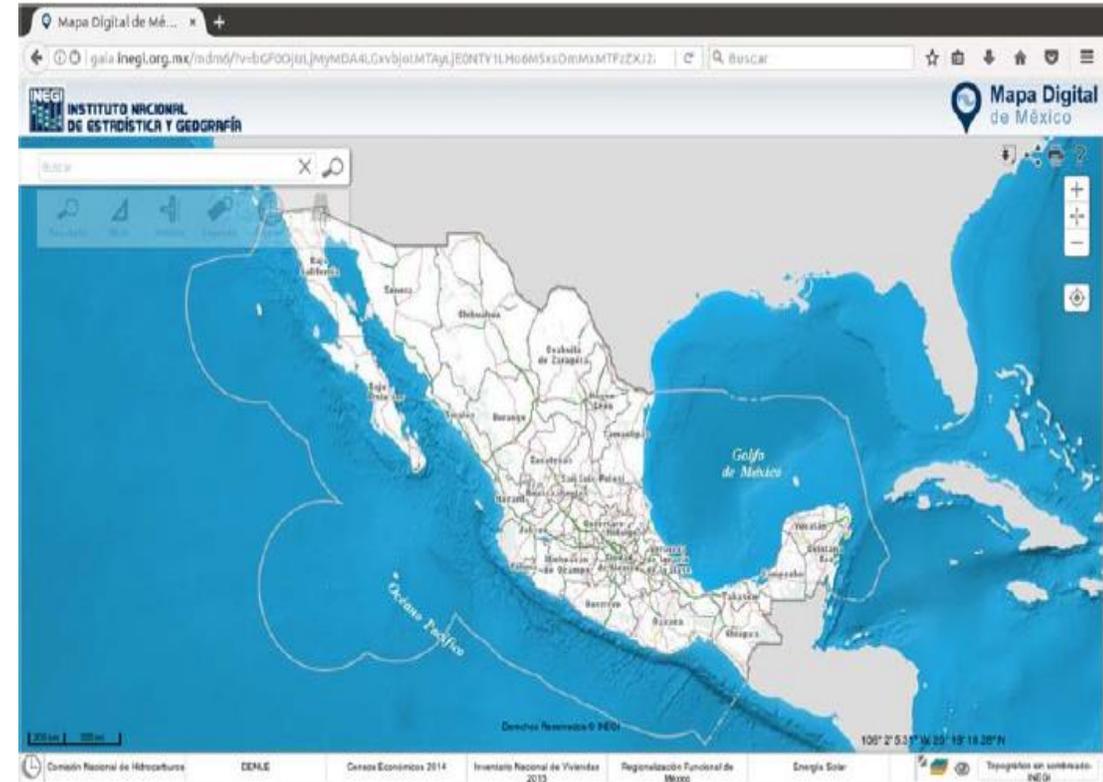
Morocco's Government-Wide Geoportal Brings Data Closer to the Citizens

1. Learning Points
a) **Strong national commitment** and **collaboration** are key to sharing data effectively

2. Background
a) The Moroccan Government developed a government-wide geoportal as part of its intent to digitalize the administration as it allows for a **higher accessibility and flexibility of the administration**

3. Description
a) Single-stop platform that **brings together geospatial data from throughout the government** on the location of 14,000 governmental services that might have relevance for businesses or citizens
b) Besides this general geoportal, there are also other **geoportals with more specific information** on various topics. The geoportal of the Ministry of Agriculture and Maritime Fisheries is an example of this.
c) Both an intranet and extranet application have been developed for users

Source: http://map.service-public.ma/mfpma/geo/front/
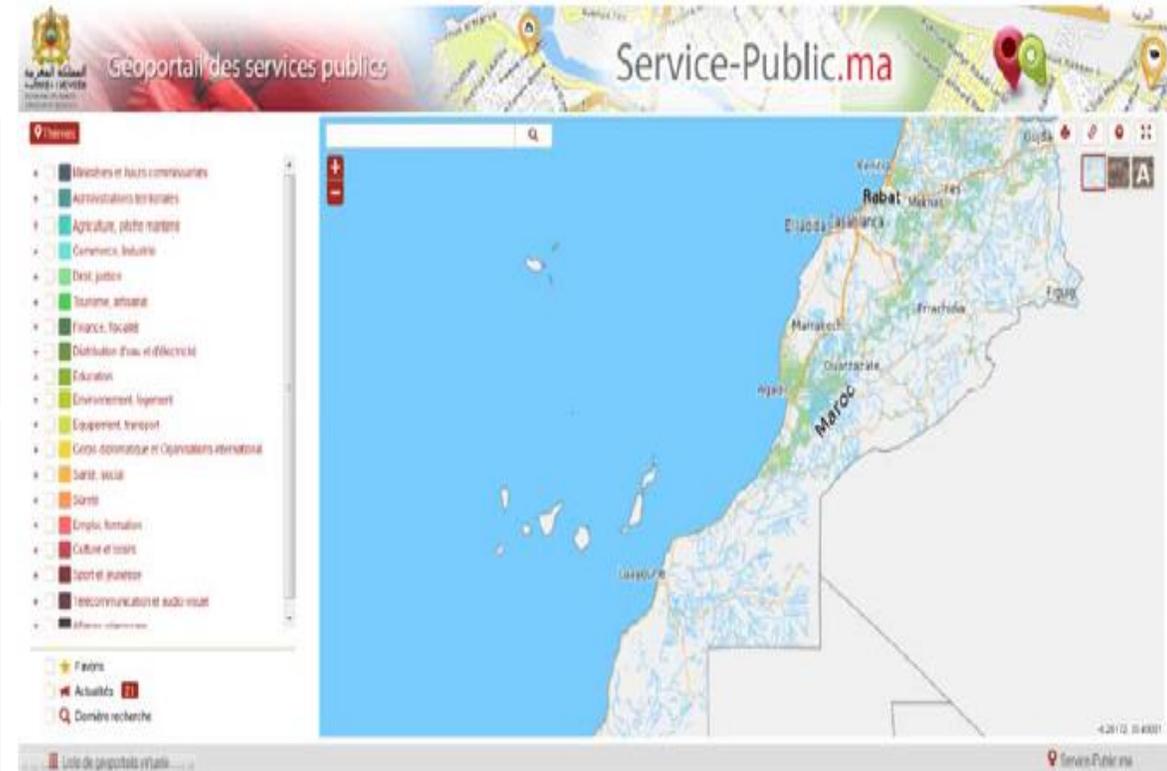
Singapore Delivers Services and Builds Communities Through GeoSpace and OneMap

1. Learning Points

a) Goes beyond data sharing to target users' needs through **customized services** and **geo-communities**

b) **Aligns information needs** of stakeholders strategically and efficiently

2. Background

a) **User-friendly** platforms are needed to cater to **specific information needs** and **applications** of users across sectors

GeoSpace

Launched in 2011

Geo-Data   Geo-Analytics   Geo-Communitie   Geo-Requests

OneMap

Launched in 2010

Citizens   Business   Academia   NGO

Agencies' Systems

Agencies' Apps

Public Apps
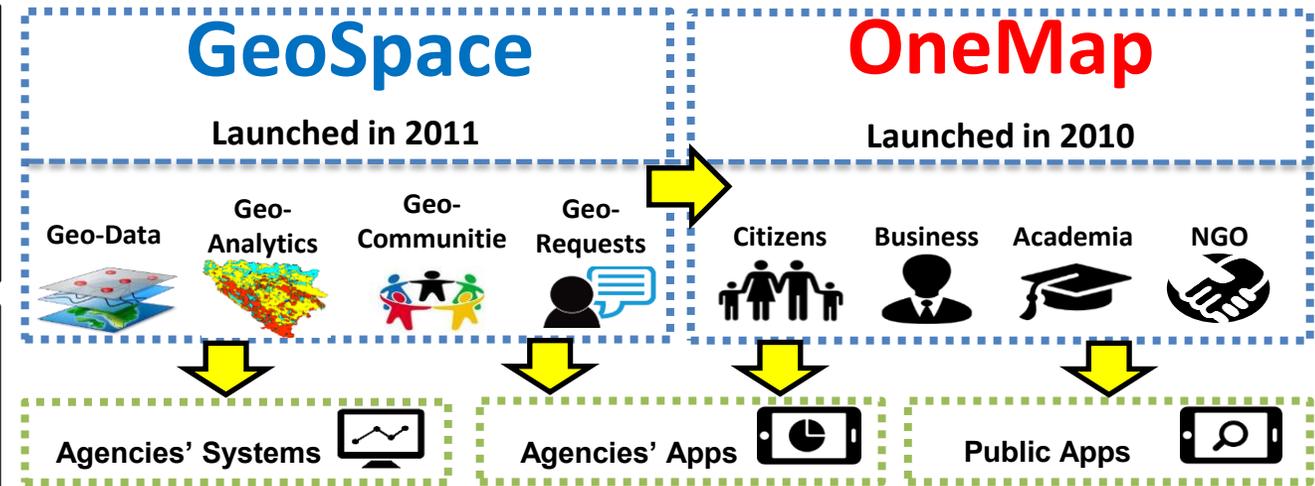
Source: www.ggim.un.org/2nd%20session/country%20reportss/Country_Report_Singapore.pdf

3. Description

a) **GeoSpace** and **OneMap** are **one-stop geospatial data portals** for the government and public respectively

b) GeoSpace offers a **central platform** for agencies to **share data,** and use **in-built tools and applications** for **analysis and modelling**

c) GeoSpace hosts **engagement channels** for stakeholders to align needs; such as **GeoCommunities**, which allow public agencies in similar domains to solve problems together, and the **Data Request Mechanism**, which brokers data sharing between supplier and requestor agencies. Examples of Geocommunities include those on **climate change, management of slope failure, and UAV flight paths and imagery**

d) OneMap offers the public **authoritative, updated** data for **co-creating solutions,** as well as **services** that are **cutomised to local needs.** New features will facilitate **citizen-to-citizen sharing** through **crowdsourcing of maps**

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Spain's Cadastral Electronic Site (SEC)

1. Learning Points

a) Systems for information exchange can act as **data banks** that brokers needs between government bodies and the public for planning

2. Background

a) The Cadastral Electronic Site (SEC) started up in May 2003 with the main goal of providing other Administrations with information which, up to that moment, citizens were requested to present in the suitable office after collecting it themselves from the cadastral office

3. Description

a) Provides a series of **web services** that enables **querying cadastral information** (both protected and unprotected data) and its updating

b) Provides three services: **Request and certification of cadastral data, including geospatial information;Massive exchange of information; and INSPIRE services dealing with cadastral cartography**

Source: http://www.catastro.meh.es/