



Implementation of the United Nations Integrated Geospatial Information Framework – Country Experience

INDIA

Presented by

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UN - GGIM

United Nations Committee of Experts on Global
Geospatial Information Management

2.2.13. National Digital Twin of major cities and towns.

3. Strategy and Approach

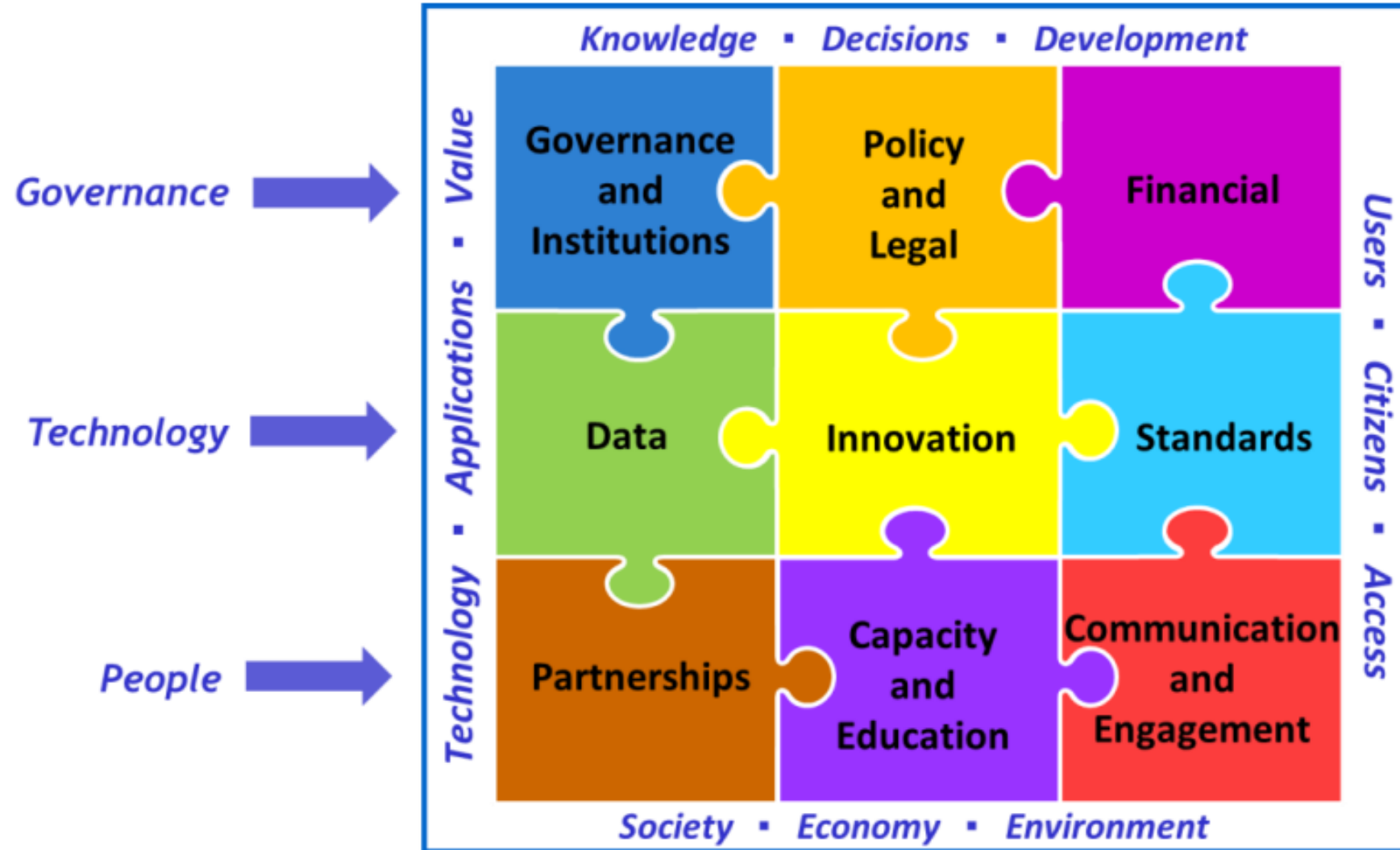
3.1. The focus of the Policy is to make Geospatial technology and data as agents of transformation for achieving the Sustainable Development Goals (SDGs), bringing efficiency in all sectors of economy and instilling accountability and transparency at all levels of governance.

3.2. **Atmanirbhar Bharat:** The Policy recognizes the importance of locally available and locally relevant Maps and Geospatial Data in improved planning and management of resources and better serving the specific needs of the Indian population. The Policy aims to create an enabling ecosystem thereby providing a conducive environment to Indian Companies that will enable them to make India self-reliant in producing and using their own Geospatial data /information as also compete with foreign companies in the global space.

3.3. **Integrated Geospatial Information Framework (IGIF):** The Policy seeks to draw on international best practices, such those of United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) including the IGIF, to strengthen national-level spatial information management arrangements across our country.



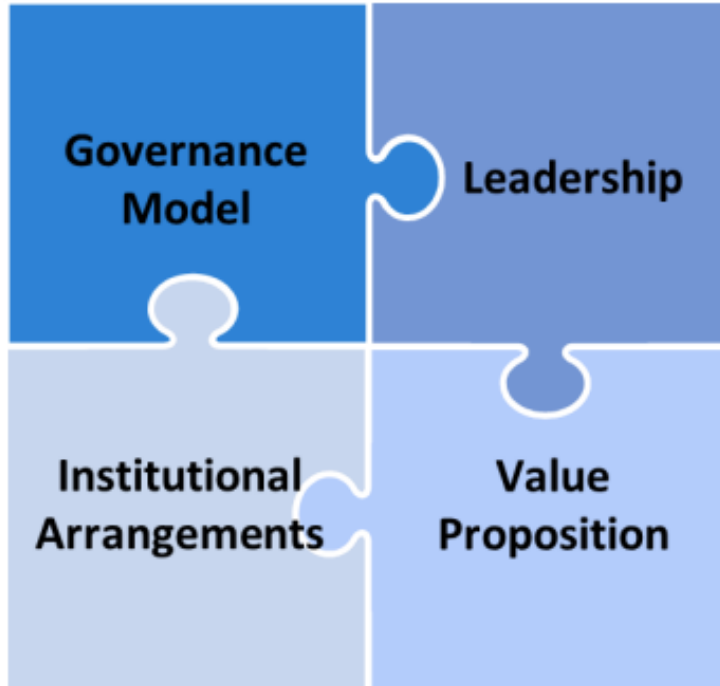
Strategic Pathways of UN-IGIF



1. Governance

a. Governance & Institution

Four Elements



* Geospatial Data Promotion and Development Committee

Key Actions for Strengthening Geospatial Information Management

Forming the Leadership

- Nodal Department & Overarching Agency are defined.
- At apex level, *GDPDC has been constituted to oversee the implementation of Policy
- Nodal Ministries for the UN-GGIM's 14 Fundamental Data Themes are defined.
- Steering Committees constituted for all the themes with the Nodal Agency in the lead and other stakeholder agencies as Partnering
- National And State SDIs are in place.

Creating a Plan of Action

- A National Geospatial Mission has been proposed to create the foundational geospatial data and infrastructure.



1. Governance

b. Policy and Legal

Four Elements



Key Actions for Strengthening Geospatial Information Management

Policy & Legal Review

- “Guidelines for acquiring and producing Geospatial Data and Geospatial Data Services including Maps” was notified in 2021.
- Sub-committees on Technical and Legal aspects were created.
- Any violation of these guidelines will be dealt with under the applicable laws. (▶18)

Data Protection and Data Sharing

- A Negative Attribute List has been published.
- System of prior approval/clearances for Geospatial data is completely abolished
- All Geospatial data created from public funds is disseminated free of cost for G2G and at nominal cost to all users.

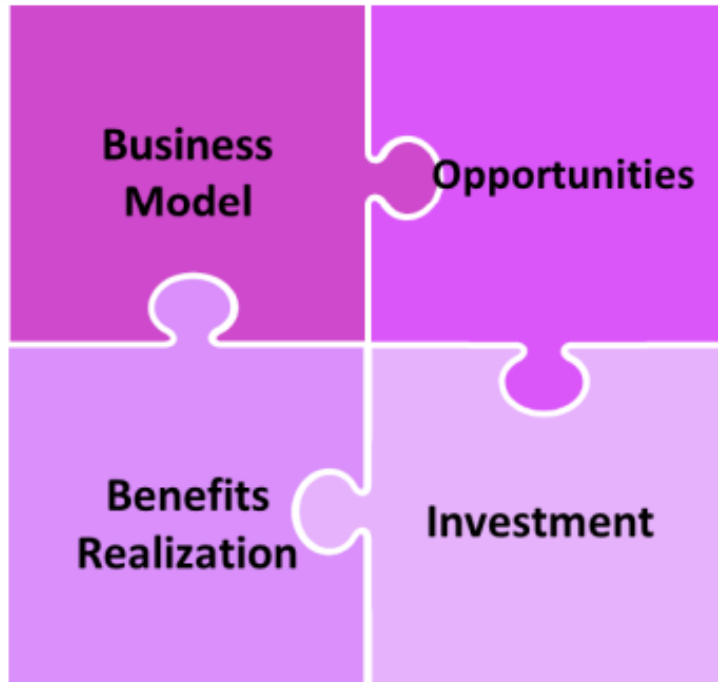


1. Governance

c. Financial



Four Elements



Key Actions for Strengthening Geospatial Information Management

Sources of Funding

- For the development and management of the fundamental geospatial data theme, each of the respective nodal agency is responsible to cater the funds.
- For the development of the foundational geospatial data and infrastructure, a National Geospatial Mission has been proposed by Survey of India.

Socio – Economic Impact Assessment

- Periodic third-party impact assessments by reputed consultancy firms are undertaken to evaluate the effectiveness of policies and guidelines, and the resulting analysis and recommendations are incorporated into funding proposals and future schemes.



2. Technology

a. Data (1/2)

Four Elements



Key Actions for Strengthening Geospatial Information Management

Data Themes and Custodianship

- The National Geospatial Policy has incorporated the 14 fundamental data themes recommended by UN-GGIM.
- It has designated nodal agencies for the development, updation, management and dissemination of all data pertaining to each respective theme.

Maintaining Accurate Positioning

- National Geodetic Reference Framework: Through 1145 CORS stations; high accuracy Geoid Model, 36 Tidal Stations, Dence High Precision Levelling line Network, etc.
- Through Indian Regional Navigation Satellite System (IRNSS) - NavIC (Navigation with Indian Constellation)

Integrating Data

- By providing authoritative foundational geospatial data and infrastructure – over which the data pertaining to other fundamental and sectoral themes could be developed/ integrated.



2. Technology

a. Data (2/2)


Four Elements



* National Geospatial Data Registry and Unified Geospatial Interface

^ PM Gati Shakti - National Master Plan



Key Actions for Strengthening Geospatial Information Management	Capturing and Acquiring Data
	<ul style="list-style-type: none"> ▪ Through Aerial/ UAV based Photogrammetry – equipped with Image sensors (Nadir or Oblique) and LiDAR sensors. ▪ Undertaken various projects of National Importance for creation of High-Resolution Geospatial Data. ( 19)
	Data Delivery
	<ul style="list-style-type: none"> ▪ Each nodal agency could create a robust Geo-Platform for effective data management, and dissemination of its respective data themes. ▪ These Geoportals and the data therein would further be accessed through *NGDR & UGI. ▪ Through ^PMGS-NMP, infrastructure development through, holistic, and integrated planning has been revolutionized.

2. Technology

b. Innovation

Four Elements



Key Actions for Strengthening Geospatial Information Management	Operationalizing Innovation <ul style="list-style-type: none"> Establishment of Geospatial Innovation Accelerators (GIA) in premier education institutes of the country.
	Identifying Innovation Needs and Developing Solutions <ul style="list-style-type: none"> Operation Dronagiri (Phase-1): An initiative to leverage geospatial technology to address real-world challenges across agriculture, livelihoods, and logistics sectors.
	Developing Innovation Culture <ul style="list-style-type: none"> Through government-sponsored initiatives, including competitive calls for proposals and organization of hackathons to address identified challenges through innovative solutions.



2. Technology

c. Standards

Four Elements



Key Actions for Strengthening Geospatial Information Management	Standards Governance
	<ul style="list-style-type: none"> ▪ Each Nodal Ministry has created/ is creating a dedicated Thematic Working Group on Standards comprising of experts in the domain from various stakeholders.
	Standards Development
	<ul style="list-style-type: none"> ▪ Currently ten Standards are under development in collaboration with the Bureau of Indian Standards – through its Geospatial Information Sectional Committee (LITD 22) (▶ 20)
	Participation in International Standards Development Organization (SDO)
	<ul style="list-style-type: none"> ▪ Active participation in all three geospatial SDOs – ISO, OGC and IHO.



3. People

a. Partnerships (1/2)

Four Elements



* Office of the Registrar General of India and Census Commissioner

^ Ministry of Electronics & Information Technology



Key Actions for Strengthening Geospatial Information Management	Collaboration with other Ministries/ Departments/ State Governments
	<ul style="list-style-type: none"> ▪ Collaboration of Survey of India (SoI) with other departments for the integration of CORS stations into a single National Network. ▪ Collaboration between SoI, as technical partner with other Central Ministries/ Departments and State Governments for the generation of high – resolution ORI and DEM – as part of various projects of National importance. (▶19) ▪ Collaboration between SoI and *ORGI for harmonizing authoritative Administrative Boundary Database (ABDB). ▪ Collaboration between SoI and the Common Service Centres (CSC), ^ MeiTY for facilitating participative audio-byte for the development of Geographical Names Database (GNDB)

3. People

a. Partnerships (2/2)

Four Elements



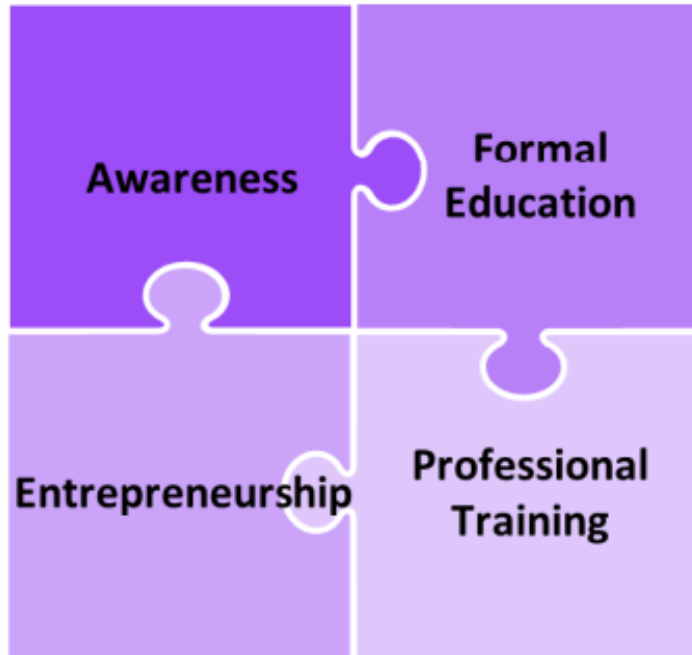
Key Actions for Strengthening Geospatial Information Management	<p align="center">Private Sector and Academia Collaboration</p> <ul style="list-style-type: none"> SoI, partnered with the private sector/ industry for – development of state-of-the-art Geoportal; executing various projects for the creation of 3D data, Digital Twin etc. SoI, collaborated with the premier academic institutions of the country for Training and Capacity Building.
	<p align="center">International Collaboration</p> <ul style="list-style-type: none"> Bilateral: Signed MoUs with the Russian Federation, Federation of Nigeria and republic of Slovenia. SoI, on behalf of the Government of India, participated in the Multilateral MoU of the UN-GGCE. Active participation in UN-GGIM, UN-GEGN, ISO, FIG, OGC, ICA etc.



3. People

b. Capacity and Education

Four Elements



* National Institute of Geo-informatics Science and Technology (NIGST)



Key Actions for Strengthening Geospatial Information Management	Professional Training
	<ul style="list-style-type: none"> ▪ Upgradation and Standardization of Geospatial Curriculum for Professional Training Courses at *NIGST, SoI. ▪ Surveyor Certification & Registration: NIGST has been awarded as the Assessing & Awarding Body for Geospatial Surveying Supervisor Course. ▪ Creation of Geospatial Skill Council is under process with the Ministry of Skill Development (MSDE).
	Formal Education
	<ul style="list-style-type: none"> ▪ SoI collaborated with various academic institutions in the country for the inclusion of suitable courses/ papers on Geospatial Technology in their curricula.

3. People

c. Communication and Engagement

Four Elements



Key Actions for Strengthening Geospatial Information Management	Stakeholder and User Engagement
	<ul style="list-style-type: none"> ▪ Organization of annual National Workshop on Strengthening of Geospatial Ecosystem – with participation from Central Ministries, State Governments, Industry and Academia ▪ Zonal/ Regional Workshops - for creating awareness about the various CORS services available and to increase its user base.
	Outreach Activities
	<ul style="list-style-type: none"> ▪ Through various social media platforms, regular posts are being shared on important developments in the geospatial sector—both national and international—along with articles on diverse aspects of surveying and geospatial technology, and engagement activities such as quizzes.



Strengthening UN-IGIF Pathways in India

Challenges Identified

1. Limited Awareness and Outreach:

Inadequate awareness about the value and impact of geospatial information management among State/Provincial Governments, stakeholders, academia, and common users restricts its wider adoption and effective utilization.

2. Development of Skilled Workforce:

Given India's vast geographical expanse and diversity in terrain and land-use patterns, building a large, ground-level cadre of skilled geospatial professionals is essential for the sustainable growth of geospatial information management.

3. Standards Adoptability:

Inconsistent adoption of geospatial standards continues to hamper data interoperability, integration, and seamless sharing across organizations and platforms.



Strengthening UN-IGIF Pathways in India

Way Ahead

- 1. Strengthen Awareness & Outreach:** Expand structured outreach programmes with States, academia, and user departments to demonstrate the value of geospatial information for governance, planning, and citizen services.
- 2. Build Skilled Geospatial Workforce:** Develop national and State-level capacity building frameworks, including certified training, curriculum integration, and partnerships with universities and technical institutes.
- 3. Promote Standards & Interoperability:** Ensure nationwide adoption of common geospatial standards, metadata frameworks, and interoperable platforms for seamless data sharing.
- 4. Enhance Institutional Coordination:** Enhance collaboration among nodal ministries and States for collaborative implementation of fundamental data themes.
- 5. Leverage Innovation Ecosystem:** Encourage innovation through hackathons, research grants, and start-up engagement to address domain challenges with emerging technologies.
- 6. Periodic Impact Assessment:** Institutionalize third-party evaluations to assess policy outcomes and incorporate recommendations into future schemes and funding models.



Thank you!



List of existing relevant laws to address potential Geo-spatial violations



- Criminal trespass (Section 329 of Bharatiya Nyaya Sanhita, 2023);
- Penalties of spying/Communication with foreign agencies /Wrongful communication, etc of info (Sec. 3-5-Official Secret Act, 1923);
- Failure to protect data (Sec. 43A-Information Technology Act, 2000);
- Power to make orders detaining certain persons (Sec.2-5-National Security Act, 1980);
- Punishment of false evidence (Section 229 The Bharatiya Nyaya Sanhita, 2023);
- Issuing or signing false certificate (Section 234 of Bhartiya Nyaya Sanhita, 2023);
- Punishment of forgery/ false document(Section 336 of Bhartiya Nyaya Sanhita, 2023)



1. National Urban Information System (NUIS) – Ministry of Urban Development (now MoHUA)
2. Central Mine Planning & Design Institute (CMPDI) project, a subsidiary of Coal India Limited (CIL)
3. Integrated Coastal Zone Management (ICZM) for Ministry of Environment, Forest and Climate Change (MoEFCC)
4. National Hydrology Project (NHP) for Department of Water Resources, River Development and Ganga Rejuvenation (DoWR, RD&GR)
5. National Mission for Clean Ganga (NMCG) for DoWR, RD&GR
6. Survey of Villages and Mapping with Improvised Technology in Village Areas (SVAMITVA) for Ministry of Panchayati Raj (MoPR)
7. Large Scale Mapping for the States of Haryana, Karnataka, Andhra Pradesh, Andaman & Nicobar Islands, Puducherry & New Delhi
8. Atal Mission for Rejuvenation and Urban Transformation (AMRUT) for MoHUA
9. National Geospatial Knowledge-based Land Survey of Urban Habitations (NAKSHA) for Department of Land Resources (DoLR)
10. Digital Twin for MoHUA



Standards under development by TWG 10



Sl. No.	Thematic Working Groups (TWGs)	Nodal Ministry/Dept	Draft Standard (UC)
1.	Geodetic Reference Frame	SOI	Code of Practice for establishing Geodetic Reference Frame ((WC Draft)
2.	Orthoimagery	SOI	Orthoimagery- Data Acquisition and Accuracy Assessment (WC Draft)
3.	Functional Areas (Administrative Boundaries)	SOI	Administrative Boundaries (Final Draft)
4.	Geographical Names (Toponymy)	SOI	Toponymy : Collection, Processing and Use of Geographical Names, Part I -Code of Practice
5.	Elevation and Depth	SOI	Elevation - Specifications
6.	Topographic Database harmonization and maintenance	SOI	Code of Practice for Topographic Data Harmonization
7.	Physical Infrastructure	MoHUA and MoPR	NaviC Receiver
8.	Land Parcels	DOLR	LADM (IS 18594)
9.	Addresses	Dept of Posts	DIGIPIN
10.	Geology and Soils	GSI and NBSSLUP	DCS – Soils, Geology and Forestry

