

Geospatial Information Management: Implementing the Integrated Geospatial Information Framework

UN-GGIM ASIA PACIFIC
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WORLD BANK GROUP

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The World Bank: who we are

The World Bank Group Twin Goals adopted in 2013



- 5 institutions
IBRD/IDA: Provide development finance to governments
Sustainable Development cluster
- 6 regions globally
- 100+ country offices

End Extreme Poverty
Reduce the percentage of people living on less than \$1.90 a day to 3% by 2030

Promote Shared Prosperity
Foster income growth of bottom 40% of the population in every country

Achieving the Goals in a Sustainable Manner:

IBRD/IDA Financing Development: Country Engagement

World Bank Financing is initiated through the Ministry of Finance

The WBG focuses its country programs through a selective country engagement model with national priorities, and in coordination with development partners:

- A **Systematic Country Diagnostic** uses **data and analysis** to support country clients and WBG teams in **identifying the most critical constraints** to, and opportunities for, reducing poverty and building shared prosperity sustainably

Analysis Tool for Geospatial/SDI

- A **Country Partnership Framework** describes focus areas for WBG support and finance for a **5-7 year period**, aligned with the country's own development agenda and selected primarily to address the key constraints and opportunities identified in the SCD.

Systematic
Country
Diagnostic (SCD)

Country
Partnership
Framework
(CPF)

World Bank Land and Geospatial Portfolio: Asia Pacific Region

Current Investment: Global US\$ 1,5 billion lending/technical assistance (TA),
Asia-Pacific: ~ US\$ 700 million +50% for ICT systems and data digitization

Investment Projects:

Afghanistan
Indonesia
Laos (under preparation)
Philippines (under preparation)
Vietnam
Uzbekistan

IGIF and Green Growth TA

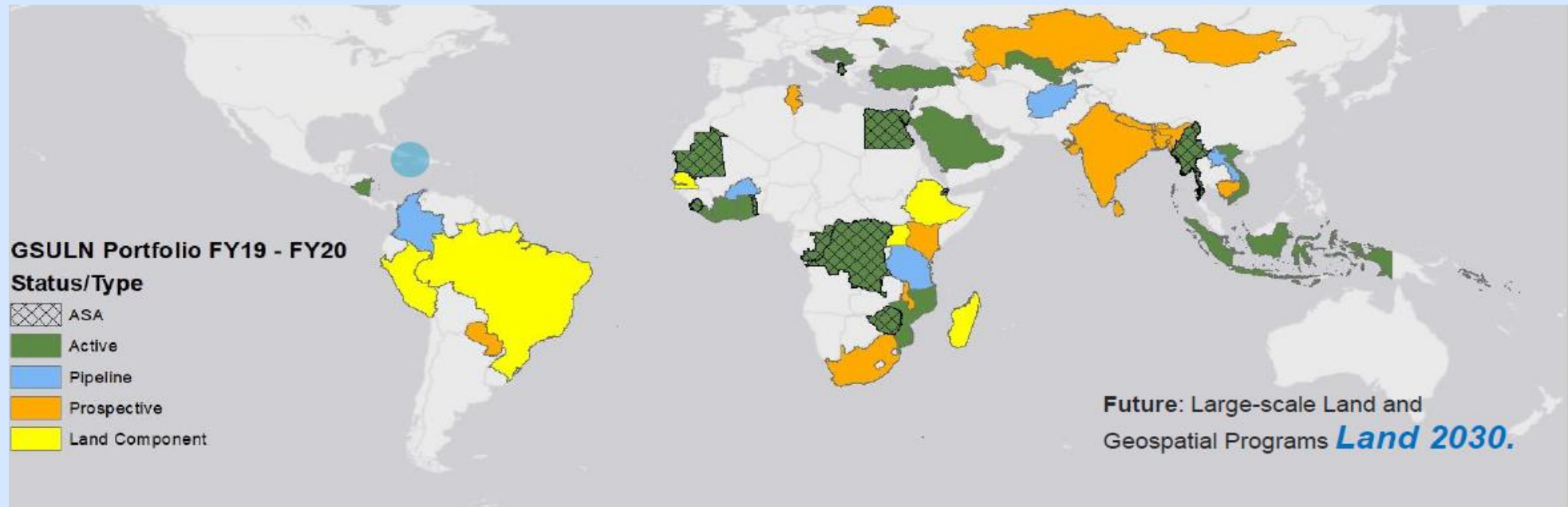
Mongolia
Vietnam
+ 4 countries

Conflict and Fragility TA

Myanmar
Pakistan

Resilience TA:

India/Kerala
Nepal
Solomon Islands



Geospatial Information Management: World Bank Support

Relevance of Geospatial Technology and Information

From Global....
Sustainable Development Goals rely on geospatial technology to achieve the targets and use location as an information integrator

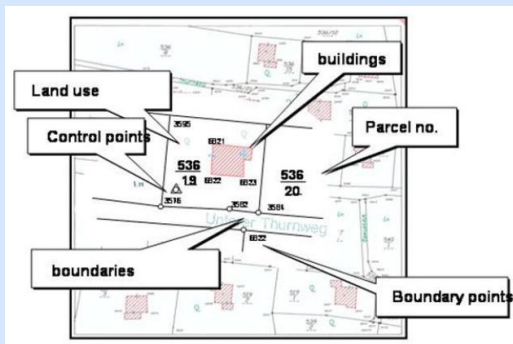


To Local....
*4th Industrial Revolution
Smart and Resilient Cities
E-Government
Precision Agriculture...
Require accurate and current geospatial data*

Paradigm Shift Underway

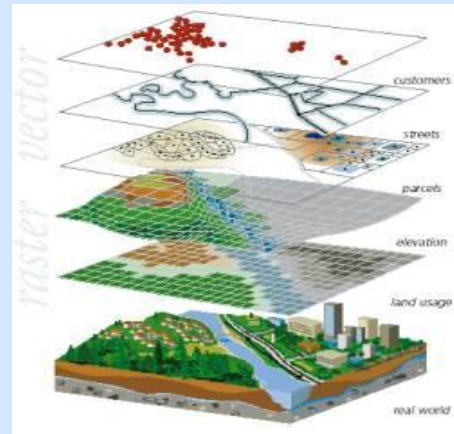
Real Time Integrated 3D/4D Information: Digital Twin

Flat maps



Past

Multi-dimensions



Present



Present to Future

Spatial Data Infrastructure: Importance of Investment

Well established business lines exist for traditional infrastructure



Transport

Energy



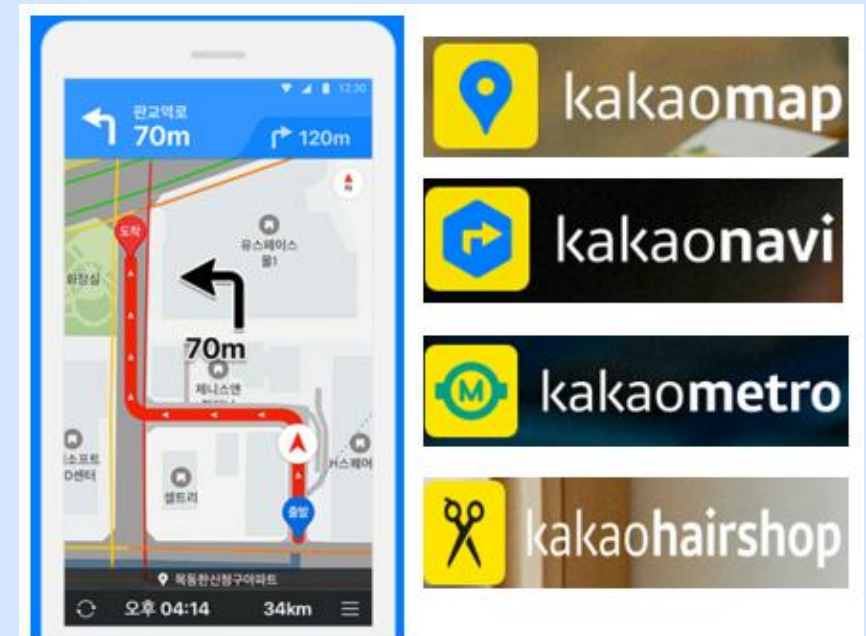
*Data requires a new infrastructure
- A **Spatial Data Infrastructure (SDI)***

Significant financing is needed for SDI

More evidence is needed to justify and target investment

Why is a Global Framework needed?

- Economies are changing....
 - E-government, E-services, E-commerce
 - Smart Cities, autonomous vehicles, Grab
- Most of these functions/applications **require location based information**
- There is a growing **divide between developing and developed countries**
- **Governments have enabling role** for the development of Geospatial Infrastructure at the National and Local levels
- Current investment in geospatial data and systems is often **siload, duplicative and inefficient**



Strategic Partnership: World Bank- United Nations Statistics Department

Committee of Experts on Global Geospatial Information Management (UN-GGIM)

“Bridging the Geospatial Digital Divide”
Signed August 2017

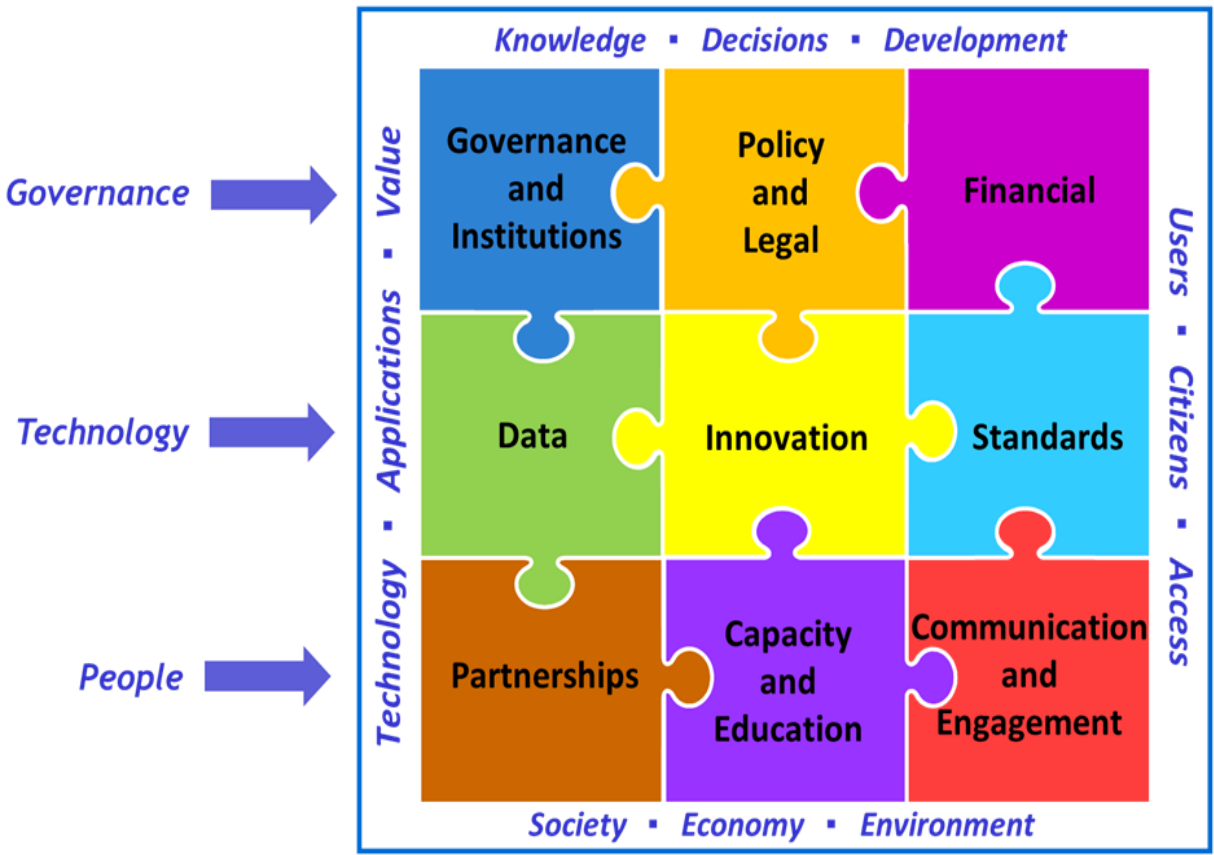
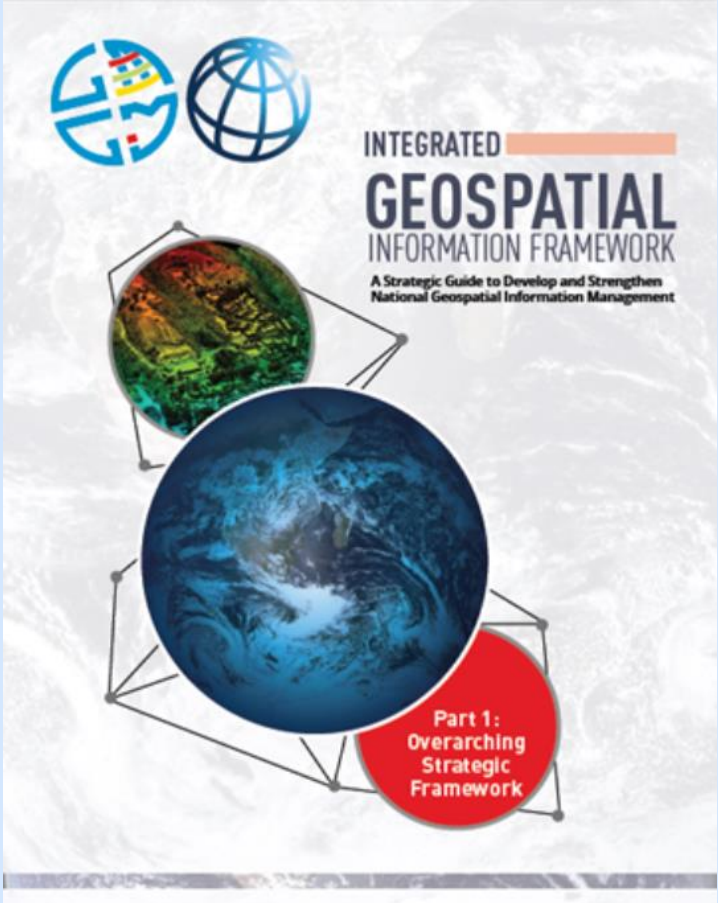
The aim is to:

1. Develop an **overarching Geospatial Framework** for countries to reference when developing their national and sub-national spatial data infrastructures (SDIs).
2. Assist countries to prepare and implement **Country-level Action Plans** to operationalize the Geospatial Framework, **with a particular focus on *low and middle income countries***



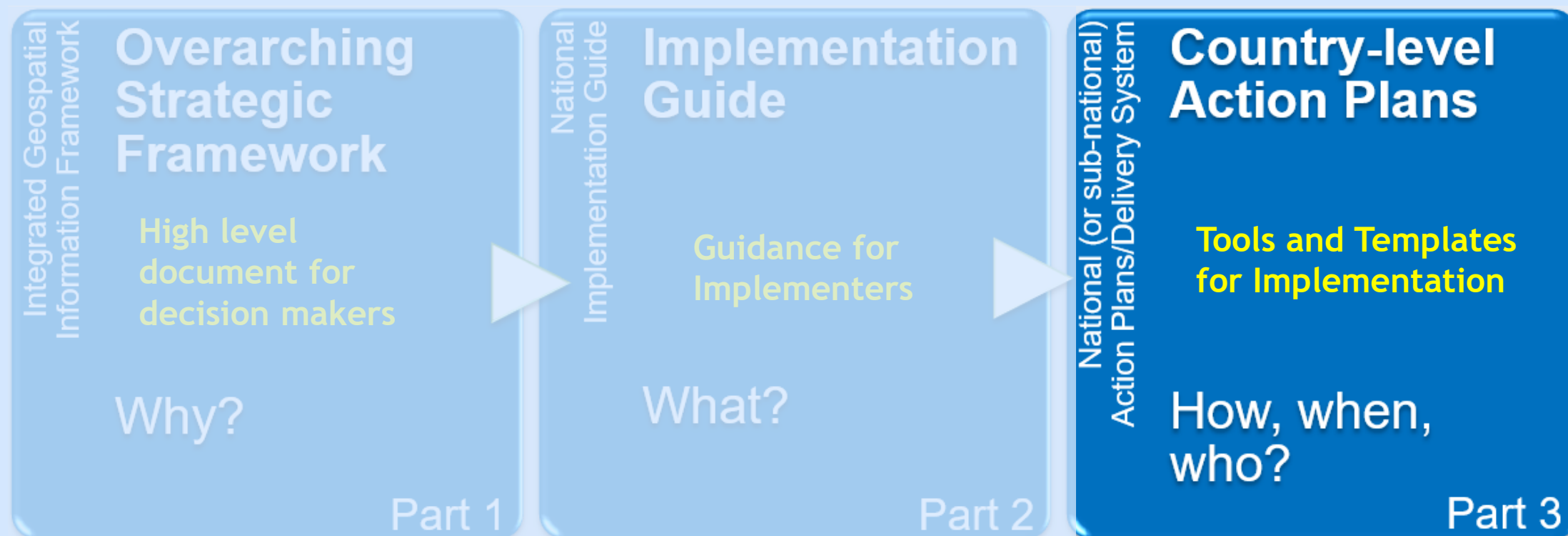
Integrated Geospatial Information Framework (IGIF)

The IGIF was **adopted by member states in August 2018**. It provides a holistic view of geospatial information management through 9 Strategic Pathways.





Structure of the IGIF: 3 interlinked parts



IGIF Country Level Implementation

IGIF Country Level Implementation: A Methodology

Inform Country Partnership Framework and Investment

1. Diagnostic/Baseline

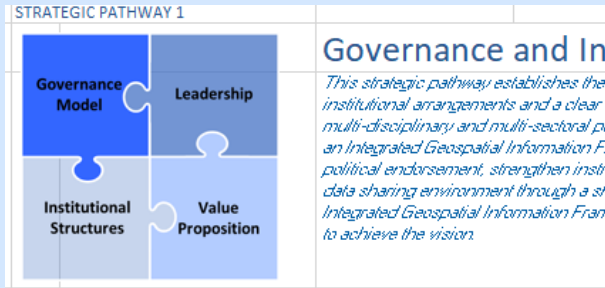
2. Business case

- Alignment to Policy/
Business Drivers
- Socio-Economic analysis

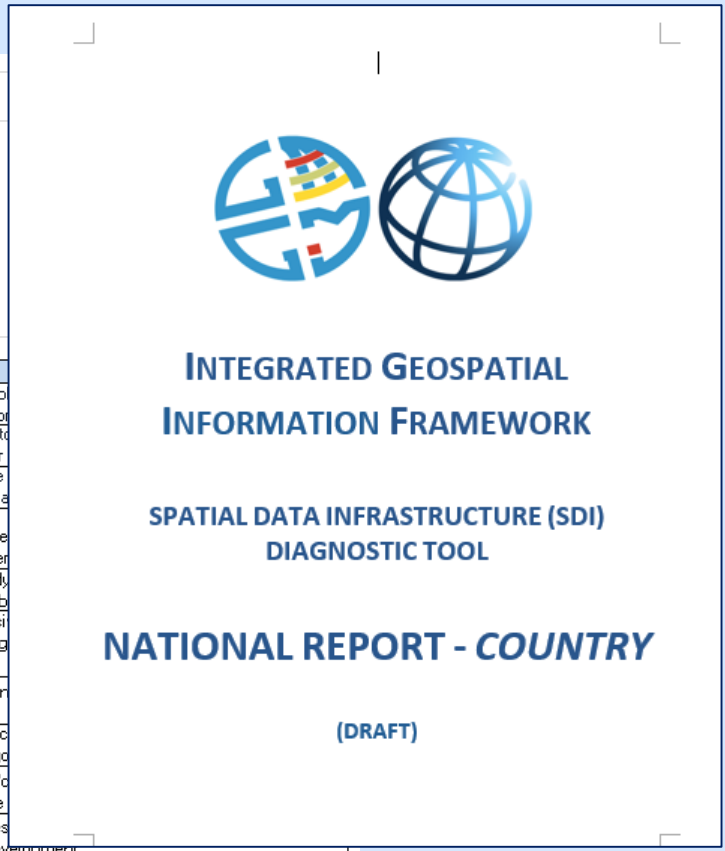
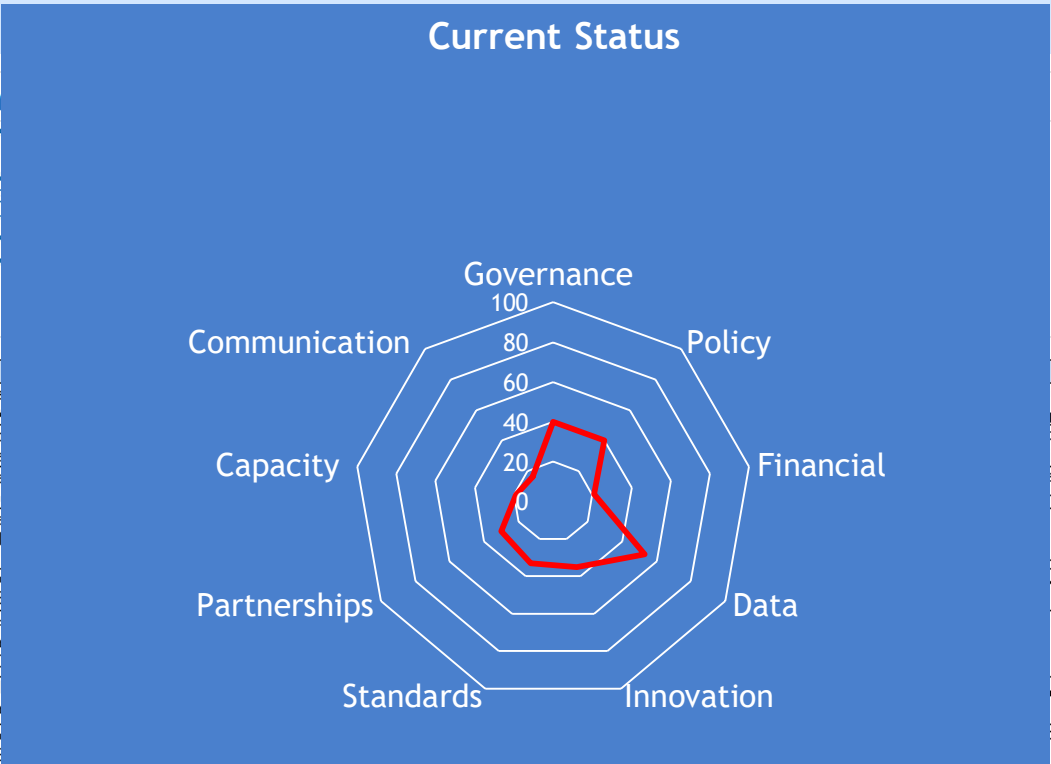
3. Action and Investment Plan



BASELINE: IGIF National Diagnostic Report



Indicator	Scoring Guide	Notes from Interview	Score	Guidance
1.1 Is there a NSDI "champion" in Government?	None=0; role exists=50; Active=100			
1.2 Is there a NSDI Coordinating body?	None=0; body defined=50; Active=100			
1.3 Is the NSDI Coordinating body represented at senior / top level in government?	None=0; role defined, Top level=50; Active=100			
1.4 Is the coordinating body supported by an active secretariat?	None=0; role defined, Top level=50; Active=100			
1.5 Are there clear Terms of Reference (ToR) for the Coordinating Body?	None=0; Not drafted=50; Active=100			
1.6 Does the coordinating body actively reach out to all levels of government (including local government) and other stakeholders (private sector, NGOs, volunteering sector)?	None=0; Reached out=50; Active=100			
1.7 Are there Working Groups supporting SDI development? (e.g. technical, standards, legal, service development)?	None=0; role defined=25; Person in role=50; Active Regionally=75; Active Globally=100			
1.8 Is there a user group / forum available for consultation and providing user feedback / requests?	None=0; Informal=25; Existing=75; Being used=100			
1.9 Does the national "champion" actively interact with the global and regional geospatial community?	None=0; role defined=25; Person in role=50; Active Regionally=75; Active Globally=100		0	The degree to which the "champion" interacts with the geospatial community to exchange information and coordinate efforts.
1.10 Are there linkages between the coordinating body and those developing the e-Government agenda?	None=0; need identified=25; being drafted=50; In place=75; Being used=100		0	This is important for assessing the effectiveness of co-ordinating policy development.



Indicator Scoring Guide Notes from Interview Score Guidance

Basis for Stakeholder Meeting: introduce IGIF, validate baseline results and initiate/enhance coordination efforts

Strategic Alignment to Government Policy: Key for High Level Support



Vietnam eGov Policy

Geospatial (NSDI) is an integrator for the key registers

Cadastre is 1 of 6 key registers

Socio-Economic Benefits: to Support Investment Decisions

Financial

The **four elements** are:

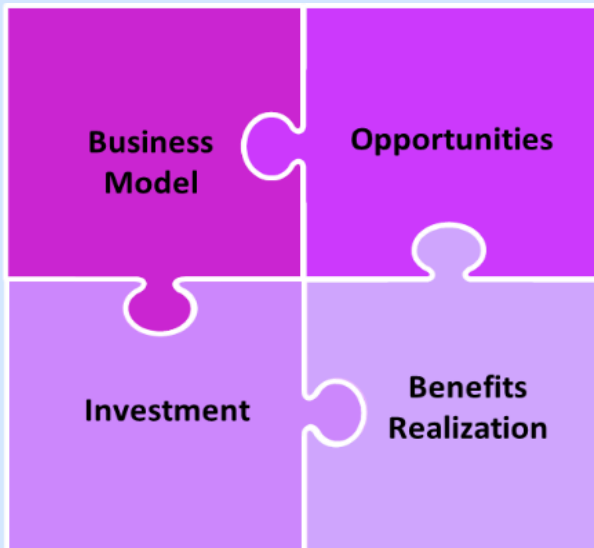
Business Model: that facilitates the wider use of geospatial information, is compatible with the **government's fiscal and funding capabilities**, and is **sustainable**

Opportunities: the techniques to aligning geospatial use cases with **national strategic and policy objectives that identify financing partnerships and opportunities**, and **priorities for investment**.

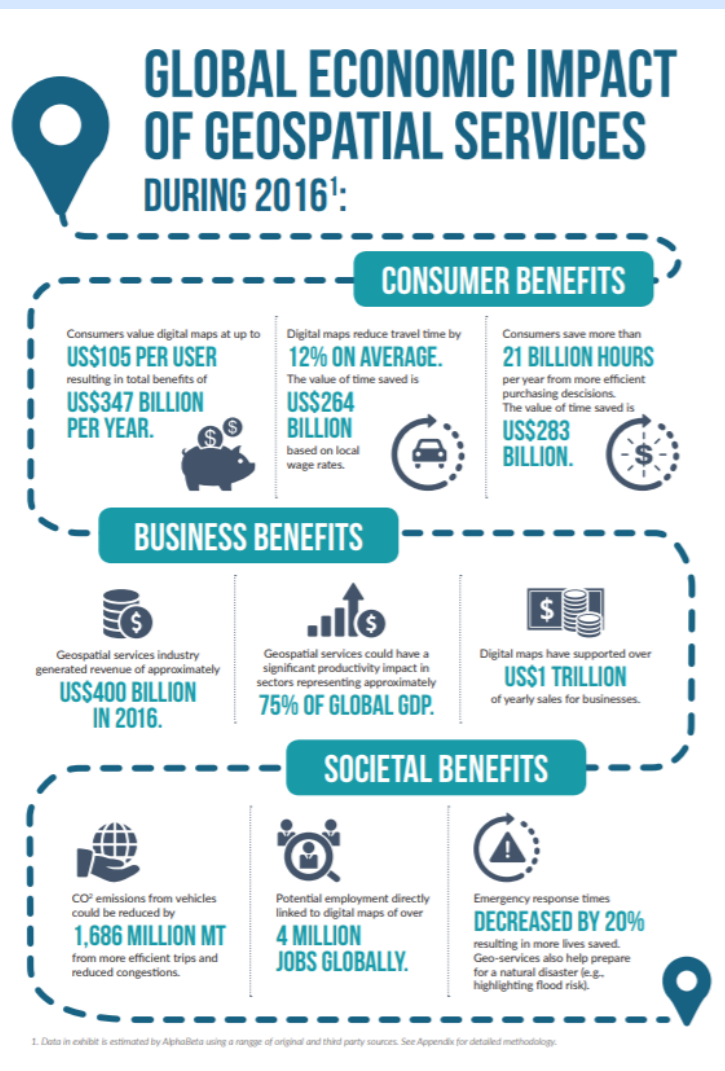
Investment: the business case/s that justify investment:

- Strategic case (why now);
- **Economic case (quantified benefits)**
- 'Commercial' case (customers and partners)
- Financial case (funding sources)
- The management plan (capabilities and resources required).

Benefits Realization – a plan to **reliably measure the complete life cycle of the IGIF program** including the key performance indicators for evaluation and quantification.



The Value of Geospatial Information and Investment



Studies which calculate the value of geospatial information and investment show significant benefits but are **mostly from developed countries**

The World Bank team has focused on the **value of geospatial information management in low/middle income countries:**

- Prepared socio-economic benefits analyses and ROI calculation for Action Plans in **Albania, Guyana, and the Municipality of Tirana, Albania**; analysis is underway in **Mongolia, Vietnam and Saudi Arabia**;

Benefits: Sectors, Use Cases, Actions

SECTORS

Transport Community Services Mining Environment Water Law Tourism Disaster Security Management Government Administration Energy Agriculture Health Urban Planning

USE CASES

Event Management Mining Cadastre Environmental Permitting Emergency Response COP Crop Production Rangeland Monitoring
 Transport Modelling Traffic Operations Intelligent Transport Network Freehold Land Cadastre Eco-tourism Crime Mapping Farm to Table
 Road Safety State Land Cadastre Business Registration Energy Sourcing Location-based Services Agricultural Land Registry
 Street Works Census Valuation SmartCities eGovernment Community Services Livestock Management National Development Plan
 Ride-sharing Apps Parking Earthquake Monitoring Retail Apps Real Estate Apps Disease Monitoring

ACTIONS/INVESTMENTS

Positioning
e.g. GNSS Network

Imagery Acquisition
e.g. Satellite Imagery

Data Capture
e.g. State Land Cadastre

Data Integration
e.g. Street Address

Data Sharing
Geoportal/Policy

Business Intelligence
e.g. AI and Machine-learning Applications

Socio-Economic Benefits and Impact Assessment

Business Benefits

New products and services

Additional Jobs

Growth of the land market

Stimulates Tourism

Agricultural Productivity

Environmental/Social Benefits

Improved Social Cohesion-
Reduced Land-related Court Cases

Consumer Benefits

Fuel efficiency

Travel time savings

Public Sector

- Reduced Geo Data costs
- Enhance National Key Registers
- Increased Income from Taxation
- Additional Land Value Capture
- More Responsive Master Planning
- Faster Emergency Response

Reduction in Land-related Court Cases

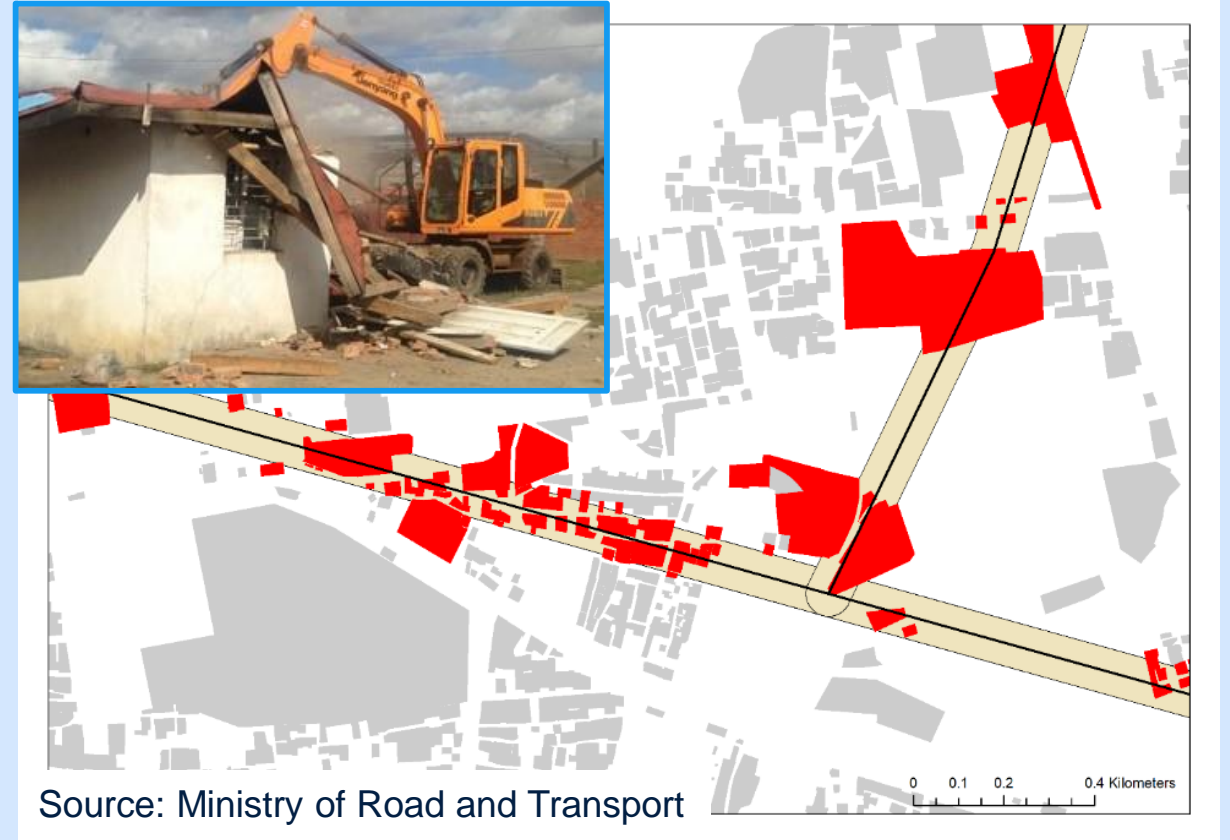
Current State: *Incomplete land cadastre results in overlapping land allocation e.g. encroachment in transport rights of way*

Solution:

- *Register State land/Rights of Way*
- *Stop land allocation in buffer zones*

Benefit:

- *Reduced Land-related court cases linked to cadastral registration: 30% (2016) to 10% (2019)*
- *Reduced land acquisition costs*
- *Improved societal cohesion*



Investment needed for State Land Cadastre: US\$10 mln
Land Acquisition Costs for 3 road segments: US\$ 3 mln

Action Plan: Priority Interventions/Investments linked to existing WB financing

Example from Colombia IGIF Action Plan

Prioritize Activities in Existing Projects

Ref	Task Type			Description	Financial			Time Frame				
	IGIF Pathway	Priority			Total Investment (US\$)	Capital or Recurrent	Funding Source	Year 1	Year 2	Year 3	Year 4	Year 5
		Financial										
3.1	Create an NSDI Business Model		Med		35,000	C	WB	■				
4.1	Create inventory of existing data	Data	High	See also overlap with 6.3	30,000	C	WB	■				
4.2	Train and Guide data owners to complete metadata		High		50,000	C	Gov		■			
4.3	Define fundamental dataset & custodians		High	Consultancy advised	50,000	C	Gov	■				
4.4	Invest in data themes, prioritised to demand		High	Depending on theme and demand								
	Cadastral Parcels - MPC		High	MPC Subcomponent 3.2	19,500,00	C	WB	■	■	■	■	■
	Functional Areas		High	Consultancy advised	500,000	C and R		■	■	■	■	■
	BaseMap		High	Consultancy advised	500,000	C and R		■	■	■	■	■
	Address Database		Med	Consultancy advised	500,000	C and R		■	■	■	■	■
	Security / Safety		High	Consultancy advised	50,000	C and R		■	■	■	■	■
4.5	Create digital archive of historical data and imagery		Low	Could be a PPP	500,000	C and R			■	■	■	■
		Innovation										
5.1	Ensure real time GNSS corrections are available		High	System testing	20,000	C		■				
5.2	Evaluate imagery for updated topographic base maps		High		20,000	C		■				
5.3	Develop a Geospatial Centre of Excellence (CoE)		Med	Assumes Head, 2 x trainers	250,000	C and R		■	■	■	■	■
5.4	Assess Geospatial Innovation start-up scheme		Med		20,000	C		■				
5.5	Improve access to key registers	Demonstrator	Med		50,000	C			■			

Action Plan Facilitates New Co-financing Opportunities

2019 Albania Integrated Land Management Program:

Action Plan adopted by Prime Ministers Office

Socio-economic Impact Assessment

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Business Benefits

New products and services
Additional Jobs
Growth of the land market
Stimulates Tourism
Agricultural Productivity

Consumer Benefits

Fuel efficiency
Travel time savings

Environmental/Social Benefits

Improved Social Cohesion
Reduced Air and Noise Pollution

Public Sector

- Meet European Union Accession req.
- Reduced costs from Geospatial Data Sharing
- Enhance National Key Registers
- Reduced Land-related Court Cases
- Increased Income from Taxation
- Additional Land Value Capture
- More Responsive Master Planning
- Faster Emergency Response

Return on Investment (RoI) 3:1

Financial Model: project life cycle of 12 years

- 5 year implementation + 7 year use
- Based on 12% discount rate

Title	GGIM Strategy Pathway Type	Intervention	Total Investment (€k)	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Section 2: IIMP Related Interventions									
Key Registers									
	Governance and Institutions	Agree business processes with custodians and associated stakeholders, e.g. Municipalities, for maintenance of Key Registers	20						
	Technical	Upgrade ICT solutions custodians and associated stakeholders to support key registers and their interoperability.	1,667						
	Data	Implement data quality assessment and improvement programs for all Key Registers. This will be incrementally implemented by geographical priorities.	538						

	Activity	Costs (€M)
1.	National Land Policy & Property Rights Strategy	0.6
2.	Revise Geospatial Information Strategy & Geodetic Infrastructure	1.1
3.	Land Market	
3.1	Establish National Cadastral Authority	12.0
3.2	National Cadastral Authority ICT Infrastructure	4.4
3.3	National Cadastral Authority First Registration Completion & Data Quality Improvement	47.4
3.4	Establish Key Registers (excluding cadastral parcels)	28.4
3.5	Other Land Market Interventions	16.7
4.	Tourism	2.3
5.	State Land Management	8.3
6.	Agriculture (complete land allocation and registration)	4.4
	TOTAL COSTS	€123.90

Multi-Donor Investment based on Action Plan:

- **Albania Government:** € 6 million agency annual revenue
- **Norwegian Government:** € 3 million for geospatial agency
- **Swedish Government:** € 2 million for land valuation
- **European Union:** € 15 million to upgrade cadastral mapping
- **World Bank:** ? for capital investments (under discussion)

IGIF eLearning Program: end 2019



February 2020 Face to Face Learning

- Support to **6 countries and WB Teams**
- Linked to current WB lending operations for financing and capacity building



IGIF Country Level Action Plans

Completed Pilots	In Progress (with Funding Source)		Planned
<p>Albania (WB/FAO) Palestine (WB) Guyana (FAO)</p> <p><u>Sub-national Level</u> Tirana, Albania (WB)</p>	<p><u>Asia-Pacific Region</u> Fiji (UNSD) Kyrgyzstan (Norway) Mongolia (WB/UNSD) Nepal (UNSD) Tonga (UNSD) Vietnam (WB/FAO)</p>	<p><u>Other Regions:</u> Burkina Faso (UNSD) Colombia (WB) Ethiopia (UNSD) Georgia (Norway) Moldova (Norway) Serbia (WB/FAO) Seychelles (WB) Ukraine (Norway)</p>	<p>Philippines (WB) Cambodia (WB)</p> <p>.....?.....</p>



Thank you!

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December 2013