Geospatial Information Management: The Integrated Geospatial Information Framework

October 2022

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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

National and Local ….

Digital Transformation/E-Government
Climate change adaptation and mitigation
Smart and Resilient Cities
Preparing for and Responding to crises
Precision Agriculture…

Require accurate and current geospatial data

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STRATEGIC FRAMEWORK NEEDED: WORLD BANK- UNITED NATIONS PARTNERSHIP

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*

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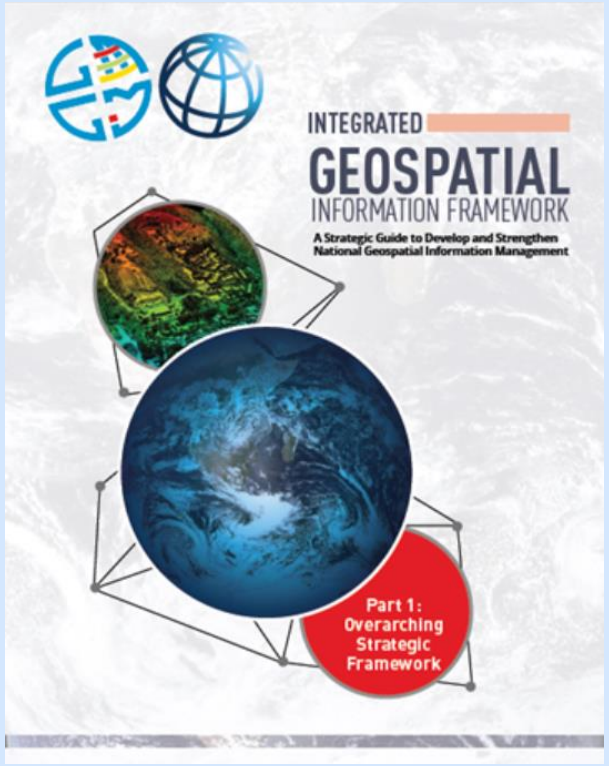
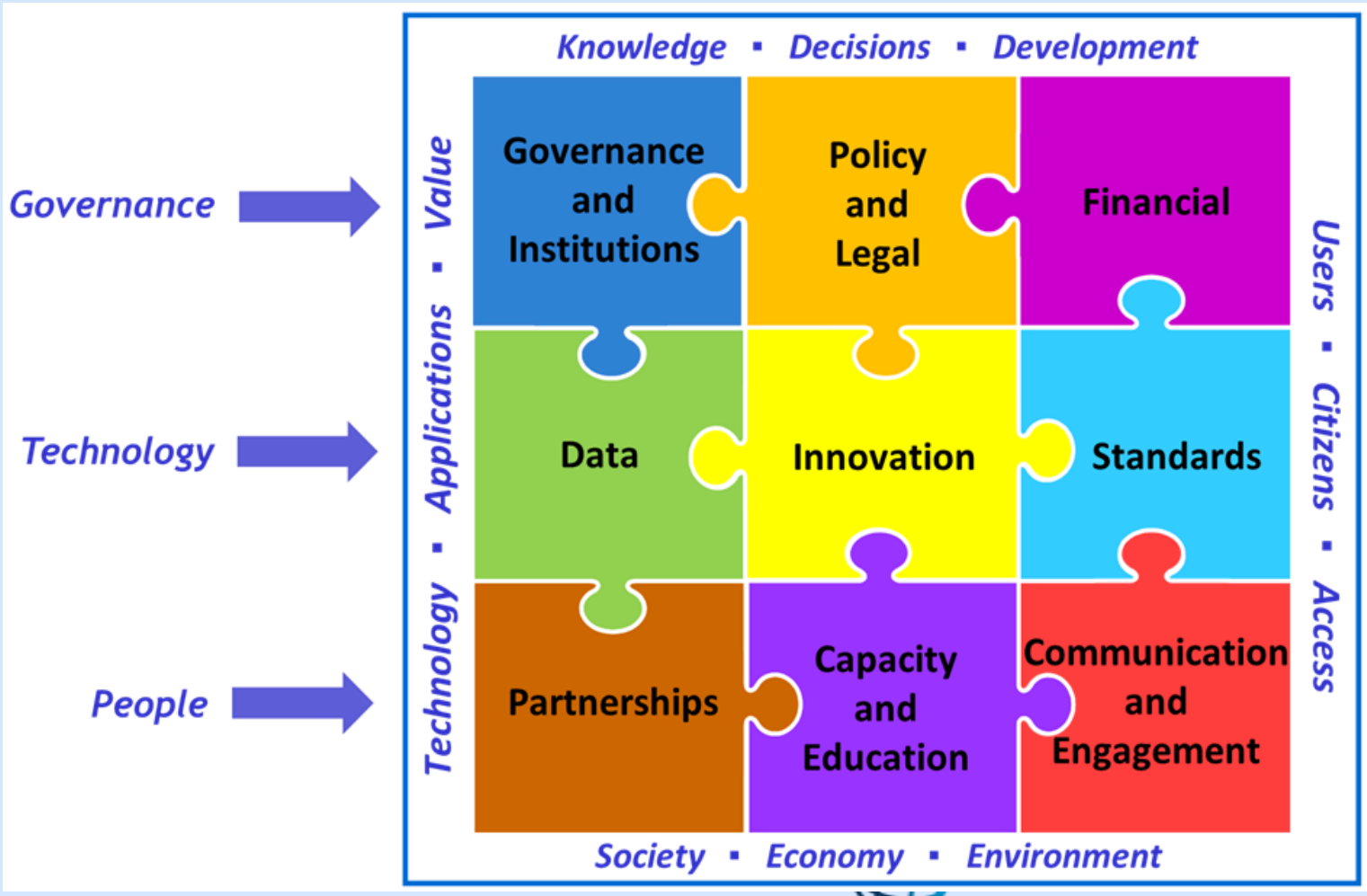
INTEGRATED GEOSPATIAL INFORMATION FRAMEWORK (IGIF)



Adopted by UN Member States in August 2018.

http://ggim.un.org/meetings/GGIM-committee/8th-Session/documents/

IGIF STRATEGIC PATHWAYS



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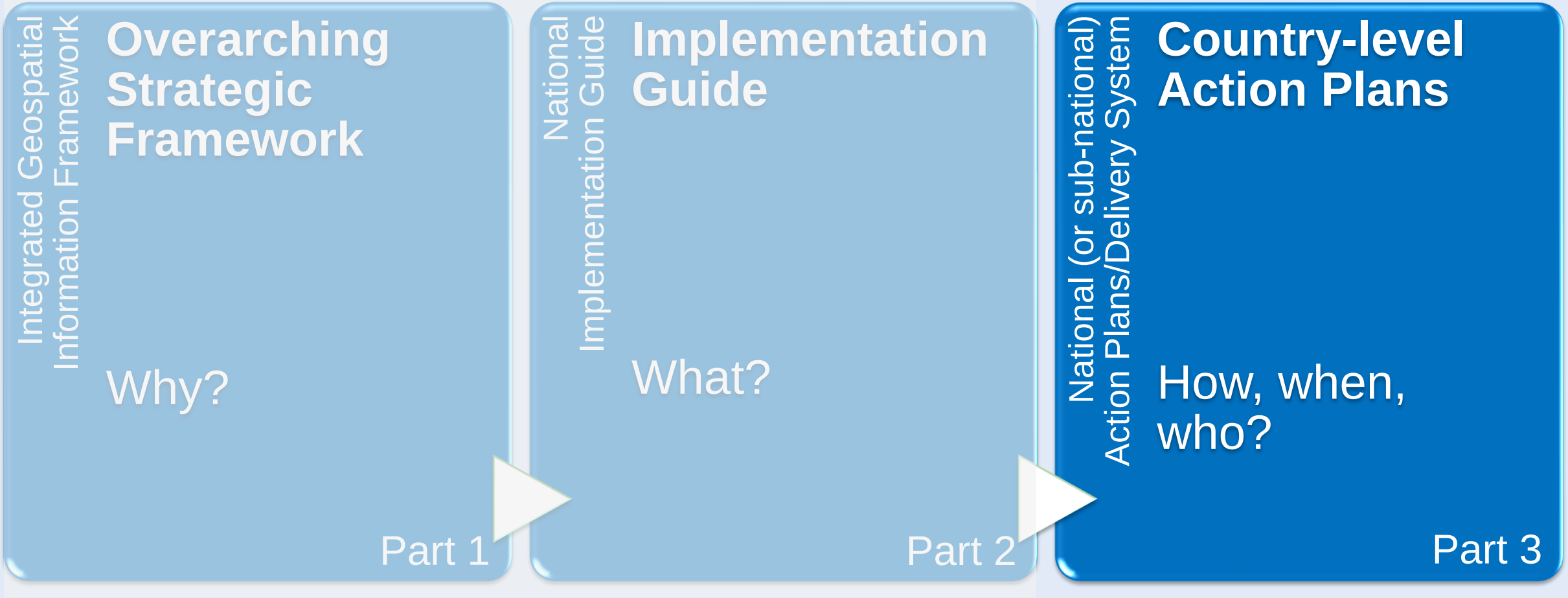
OPERATIONALIZING THE IGIF



Adopted by UNGGIM August 2018

Adopted by UNGGIM August 2020

World Bank - toolkit for task teams and gov. counterparts

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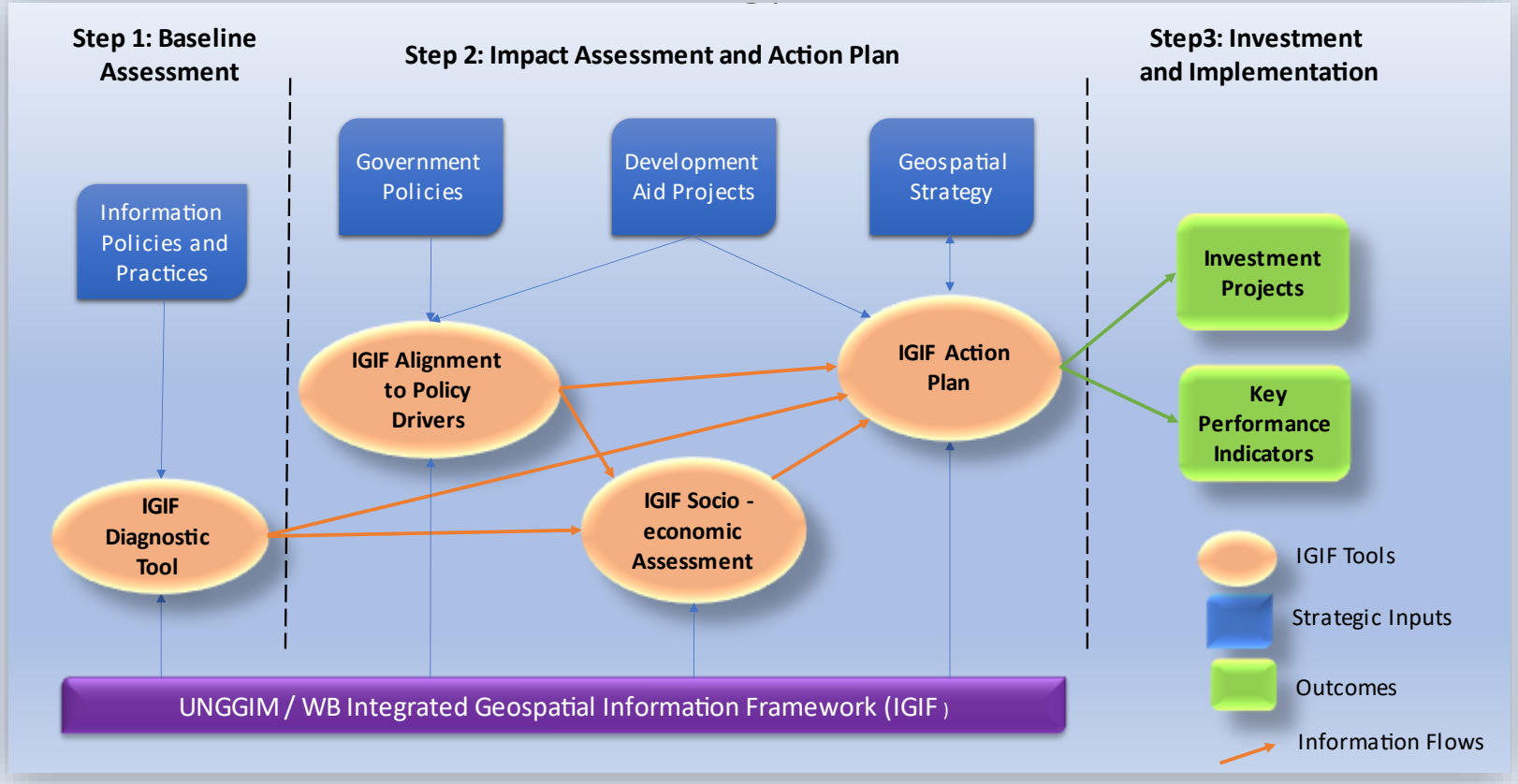
World Bank IGIF Action Plan Implementation Methodology

The World Bank Group has established an IGIF Implementation Methodology and corresponding analytical toolkit to support the use of the IGIF:

- **Incrementally strengthen geospatial information management -** customized to specific countries and priorities
- **Link to financing:** based on analytics, using standard WBG infrastructure model



The diagram shows the analytical tools (in orange), key inputs (in blue), the IGIF in purple, outcomes (in green). Arrows show the different types of information flows.

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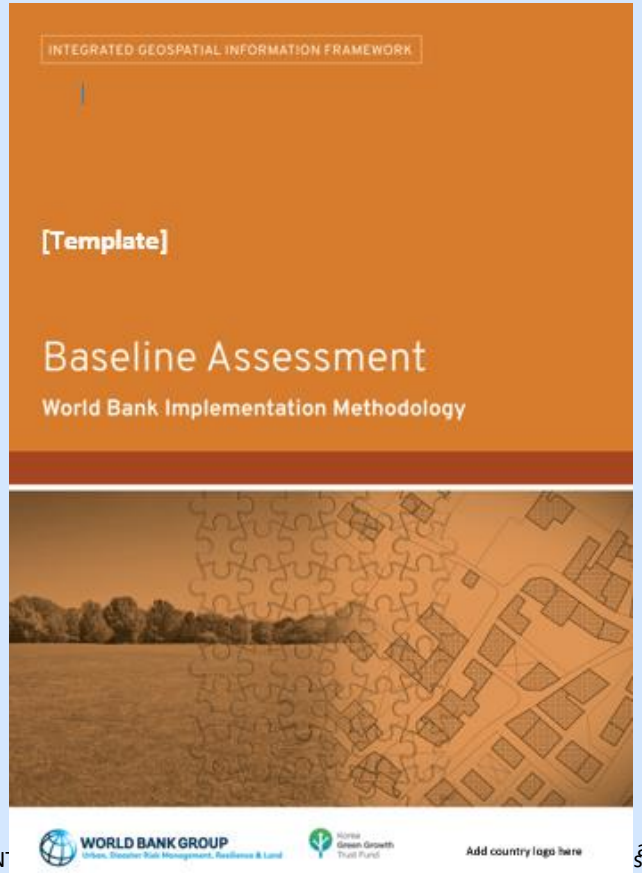
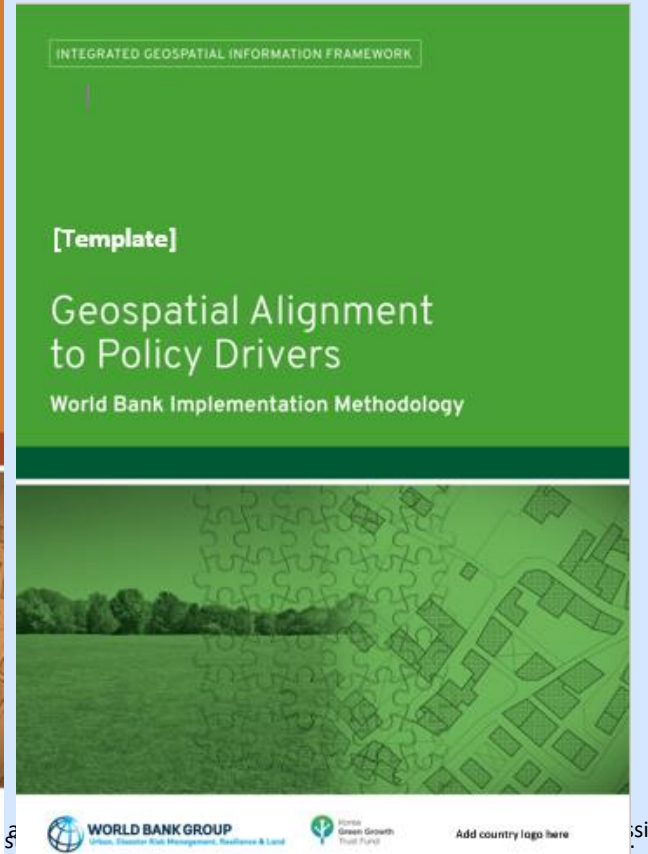
IGIF Country Level Implementation: Templates and Tools

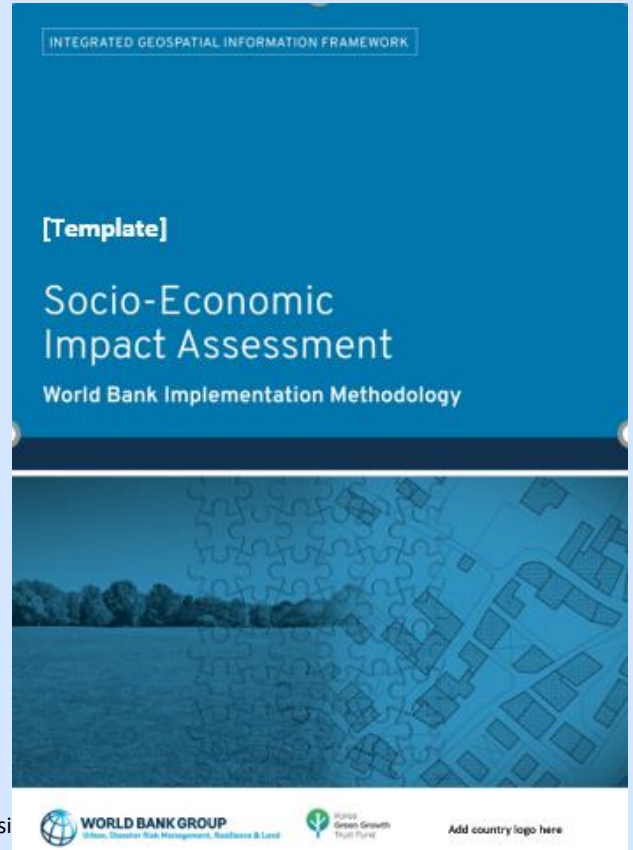
Diagnostic/Baseline Assessment

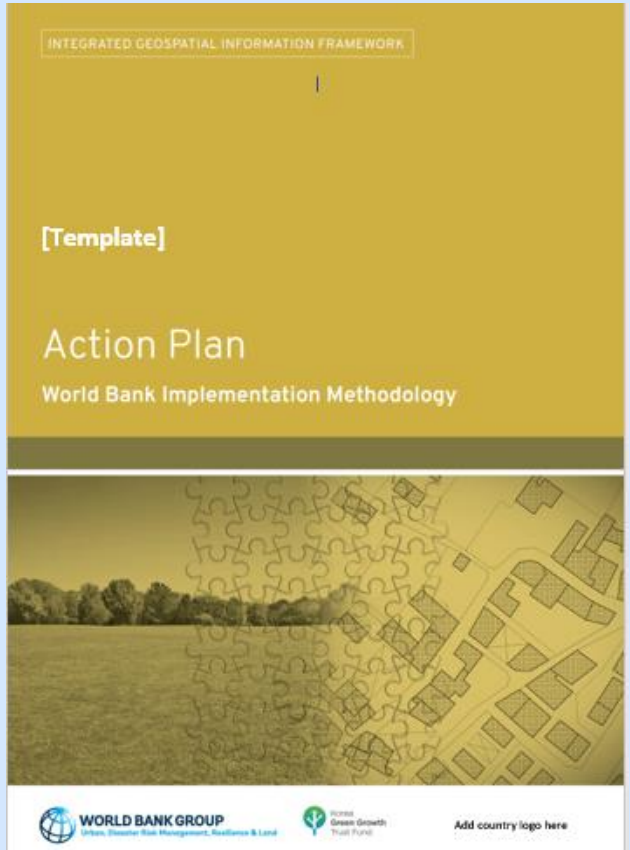
Business case
- Alignment to Policy/ Business Drivers
- Socio-Economic Impact Assessment

Action/Investment Plan









1. Baseline Diagnostic and Baseline Report

IGIF Baseline Diagnostic Tool (DT) is used to collect the necessary information to complete an assessment of the baseline (current state) of geospatial information management.

The DT is designed to be applicable to any geographical entity including city, region and national levels

Used to engage stakeholders through a consultation and verification workshop

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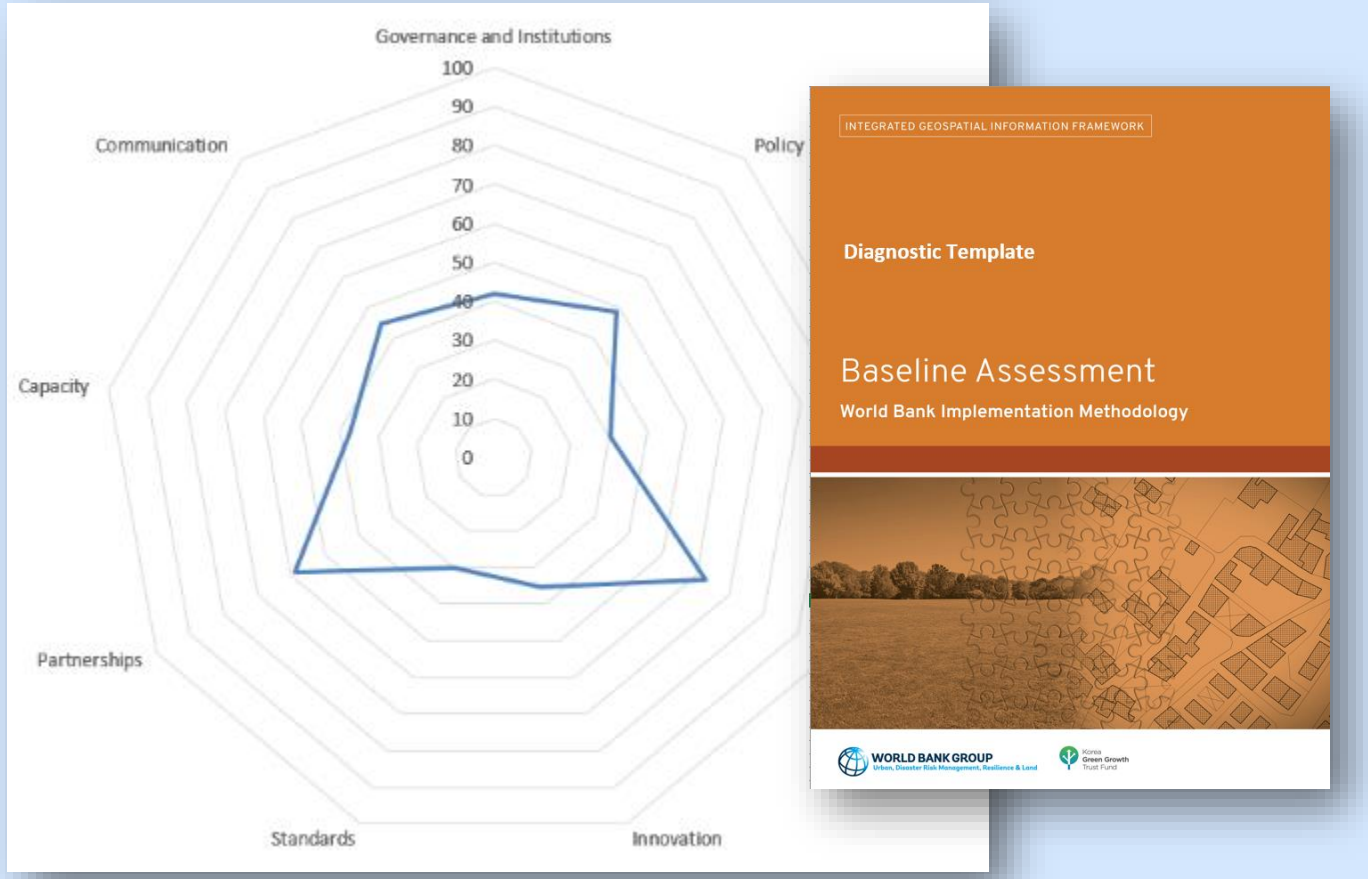

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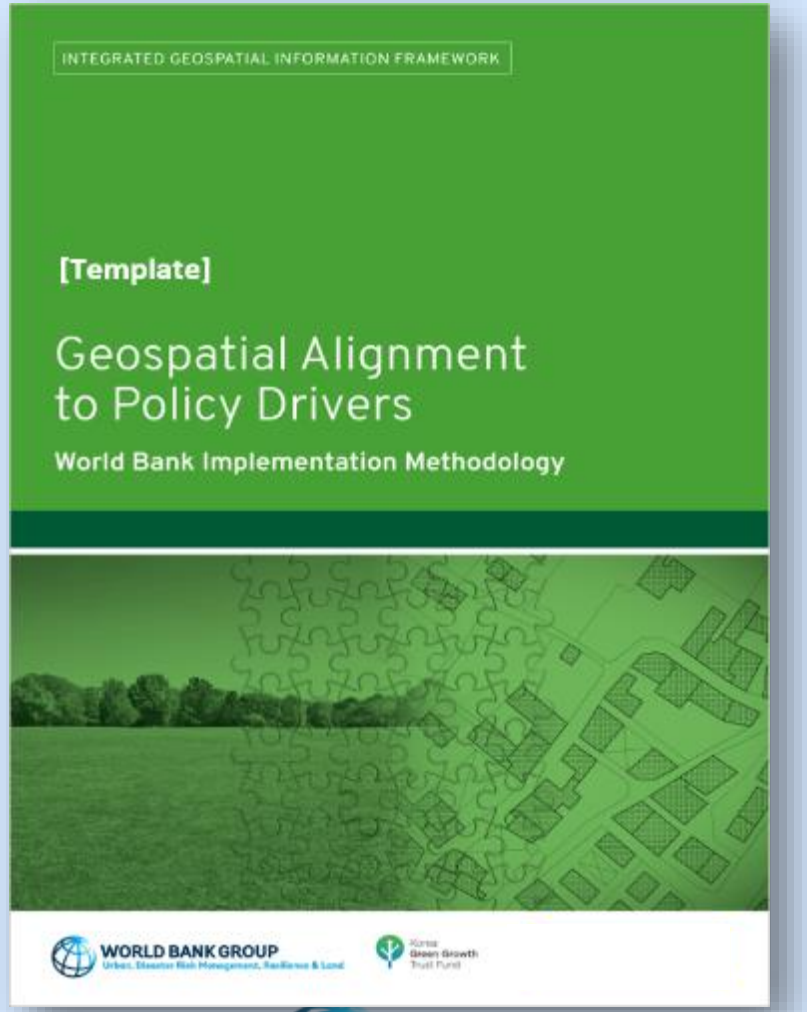
Geospatial Alignment to Policy Drivers

Geospatial Alignment to Policy Drivers Template is used to align the Government's strategic objectives and international commitments to specific spatial use cases (applications) and then prioritizes them based on how well they support and accelerate achieving these strategic objectives.

This work is **key for communications and awareness raising with decision makers.**



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Use Cases - relationship to sectors and investments required

SECTORS

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

USE CASES

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

ACTIONS/INVESTMEMTS

Positioning
e.g. GNSS Network

Imagery Acquisition
e.g. Satellite and Drone Imagery

Data Capture
e.g. Land and Building cadastre

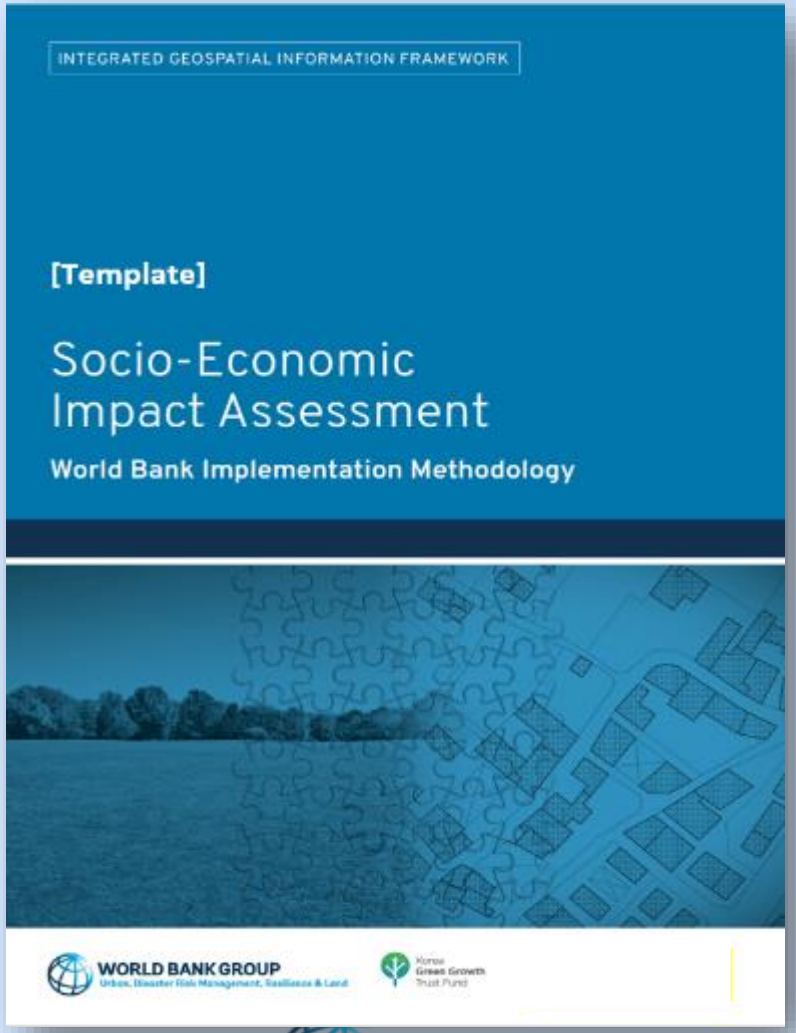
Data Integration
e.g. Street Address

Data Sharing Geoportal/Policy

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

Socio-Economic Impact Assessment

Socio-economic Impact Assessment Template delivers an assessment of the socio-economic business case for investment in geospatial information management from **both a qualitative and quantitative perspective.** It is informed by the outputs from the baseline assessment and geospatial alignment to policy drivers.



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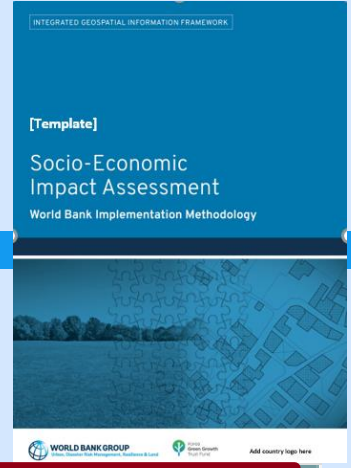
3. Socio-Economic Impact and Benefits: Mongolia example



Across Public and Private Sectors

Ref	Impact	Evidence	Methodology	Benefit Recipients	Net Discounted Value of Benefits	
					Billion MNT	US$ Million
1	National geospatial data sharing (addresses)	ALAMGC cost estimates and current data duplication	Multiplier effect of information sharing	Govt	12.0	4.5
2	Reduced Loss and Damage during Disasters	Substantial Case Study Expert predictions of reduced costs for future Forest Fires, weather and other natural disasters	Reasoned extrapolation from case study, statistics and expert opinion	Indirect	71.5	26.6
3	Faster emergency response in case of building fires, leading to savings in damage	Statistics supplied by NEMA. Global Geospatial Value studies	Reasoned estimation of potential savings, backed by expert opinion.	Indirect	14.5	5.4
4	Increased land use fees and taxes	Current revenues Volumes where premium rates apply	Estimation of proportions of land where premium rates of fees or taxes apply	Revenue	71.5	26.6
5	Increased collection of Property Tax	WB Study in Ulaanbaatar	Predictions of increased revenues for City Council	Revenue	7.1	2.6
6	Land Market Growth	Current real estate market size, Comparable study in Bulgaria	Local market analysis, validated by recent comparative study	Indirect	9.3	3.5
7	Urban Planning efficiencies from 3D City Model	In-depth EuroSDR study for Republic of Ireland	Benefits Transfer, validated by local expert opinion	Govt	6.9	2.6

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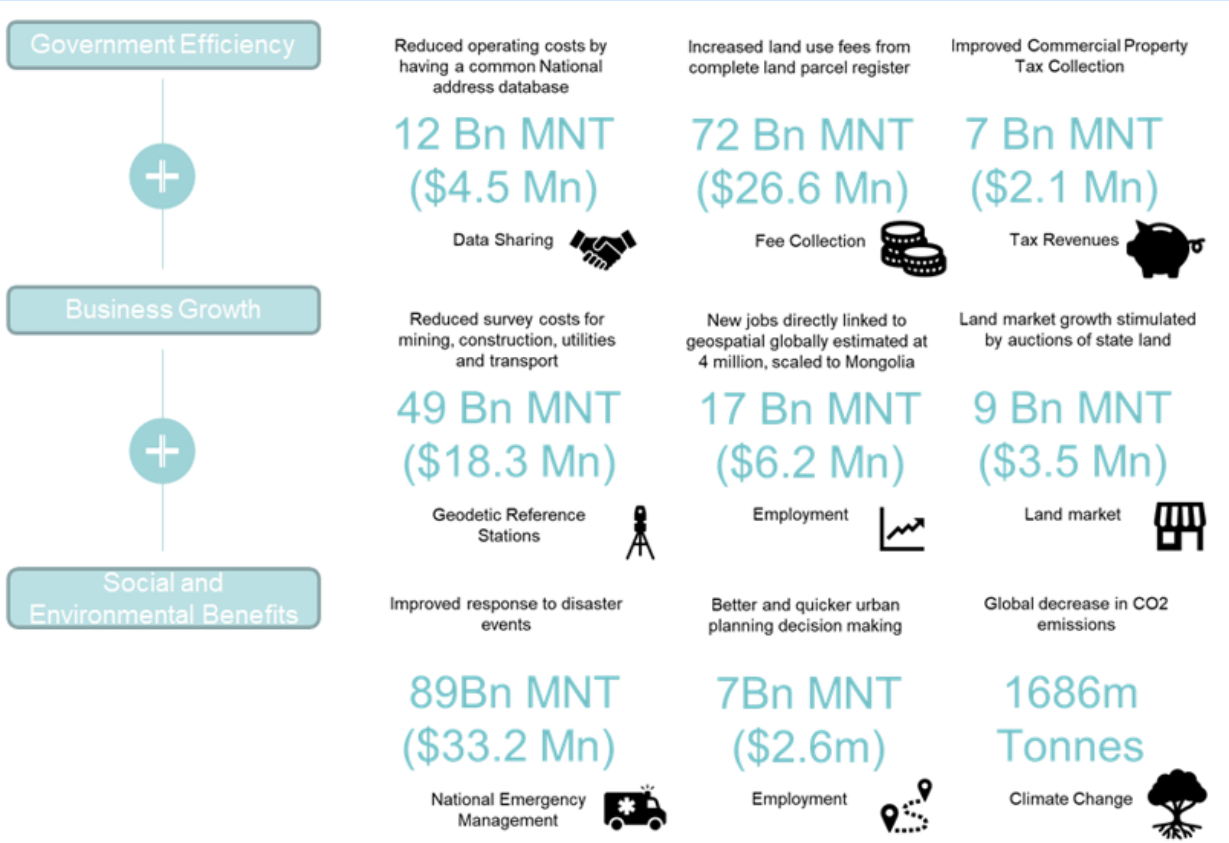
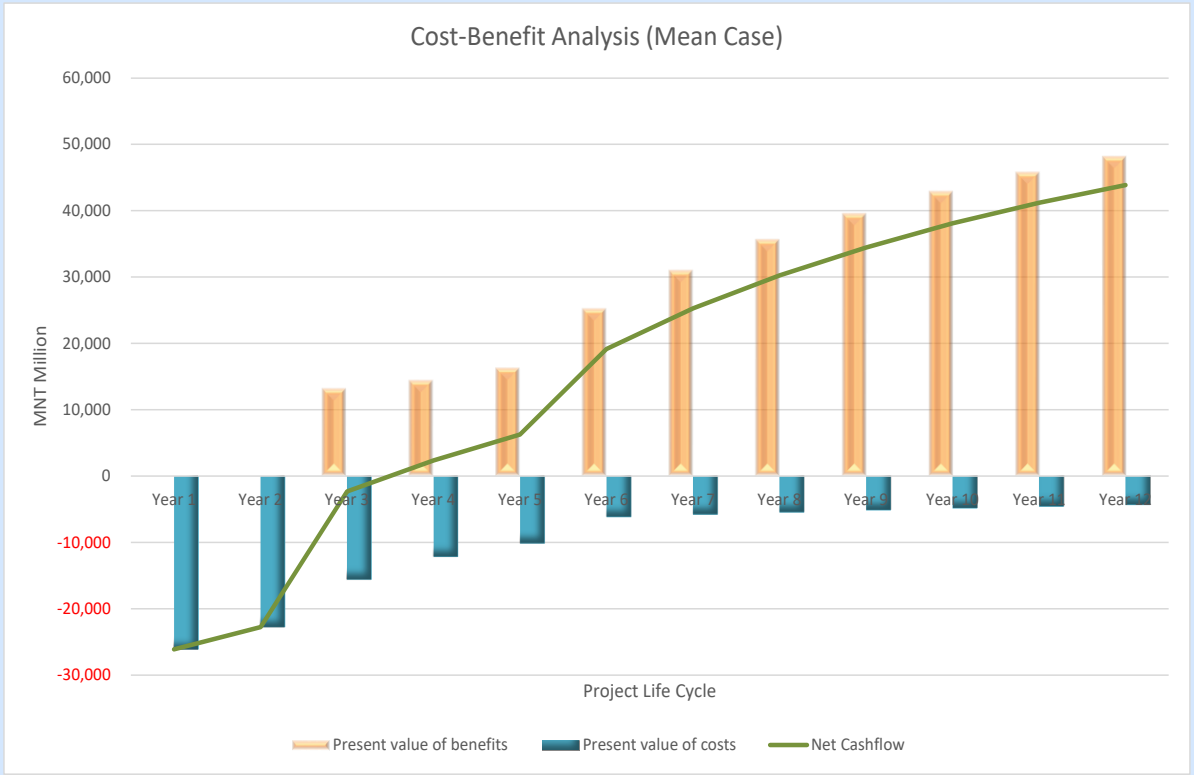
3. Socio-Economic Impact Assessment: Financing Justification

Benefit to Cost Ratio: 2.5: 1
Return on Investment: 250%
Net Present Value: US$ 66,1 million



World Bank Infrastructure Project Model:

- **Project Life Cycle:**
  5 years development
  7 years operation
- **Discount Rate: 6%**



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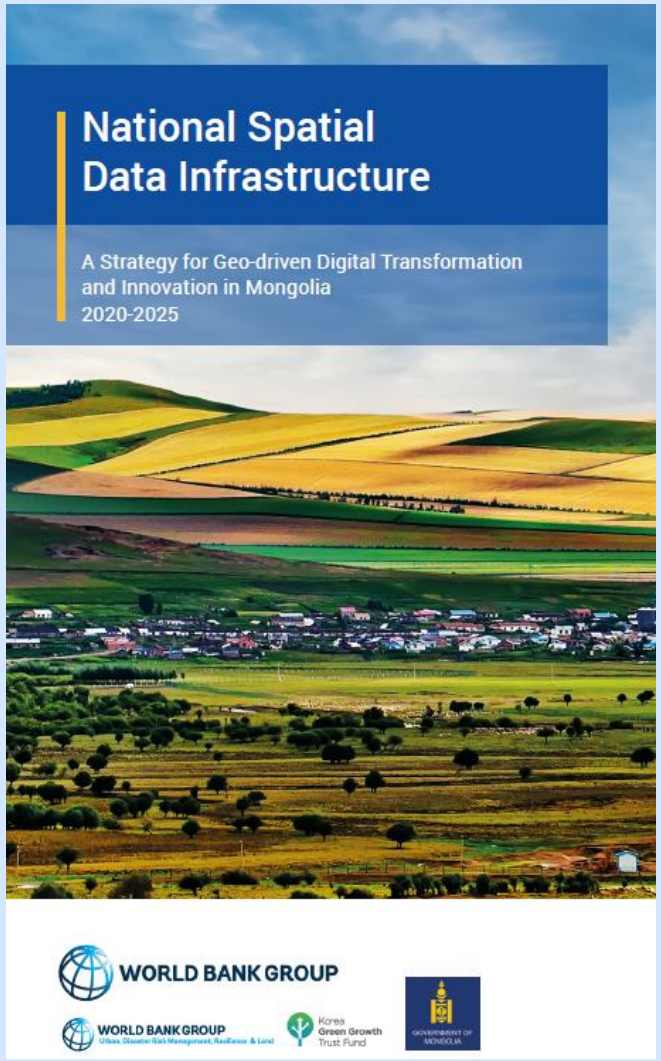
4. IGIF Action/Investment Plan: Mongolia Example



Vision: Geo-driven eGovernment and innovation that empowers efficient and effective use of geospatial information towards national sustainable development and economic growth.

Financing through the WB- financed Digital Development Project: Delivery 2022

IGIF Implementation Guide

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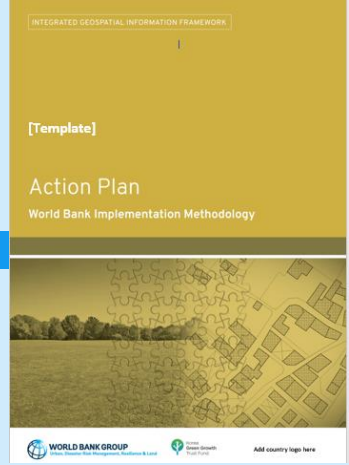
4. Action Plan Priority Investments- "Finance Ready"



Example from Colombia IGIF Action Plan

Task Type					Financial			Time Frame				
Ref		IGIF Pathway	Priority	Description	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						

INT

IGIF IMPLEMENTATION USING WB METHODOLOGY

Source: World Bank

Food and Agriculture Organization of the United Nations

Kartverket

Bundesamt für Kartographie und Geodäsie

NGI Nationaal Geografisch Instituut

IGN Institut Géographique National

States of Jersey

consultingwhere
Maximising the value of location information

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Putting IGIF in Marine Context: Study with IHO, UKHO and OGC

Statistics Division TOPICS

UN-GGIM

Working Group on Marine Geospatial Information

IGIF

(Framework)

for informing

for enhancing

Marine SDI

(Products and Services)

Fundamental Data

Geodetic Reference Frame

Mobile Apps

Digital Twin

Smart Ports

Enterprise GIS

Autonomous Vessels

People, Standards, Technology and Data

Philippines Delegation intervention of support at UNGGIM Plenary in New York, August 2022
Mr. Jose Jacinto P. Morales, attaché, informed the meeting about the proposed pilot work to develop an IGIF Country Action plan for the marine sector

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Marine Use Cases

- Climate Change
- Defence
- Ecosystem Services
- Navigation
- Marine Cadastre (Rights and Boundaries)
- Ports and Piers
- Fisheries and Aquaculture
- Reclamation
- Coastal and Marine Tourism
- Wind and Ocean Energy
- Marine Area Permitting
- Oil and Gas Extraction
- Mining (Deep sea and inshore)
- Disaster Risk Management
- Insurance
- Marine Sciences
- Pollution studies
- Design and Construction
- Maritime transport – shipping
- Inshore and coastal Water Transport
- Industry (Ship Building)
- Biotechnology

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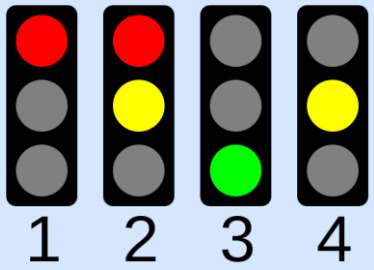
VIETNAM FROM NATIONAL ……..TO SUB-NATIONAL

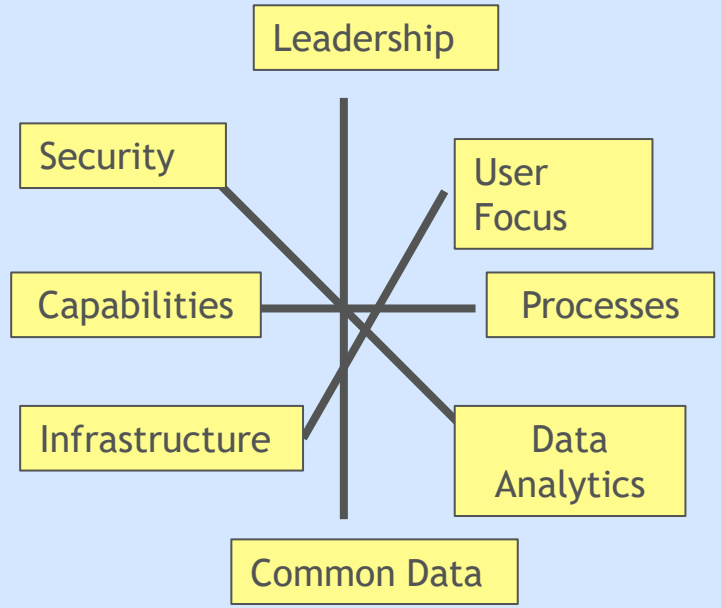
HO CHI MINH CITY - SMART CITY PROGRAM

HO CHI MINH CITY: ASSESSMENT FRAMEWORK

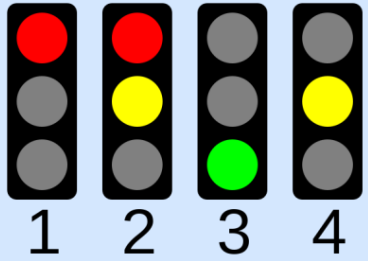
LINKING DIGITAL GOVERNMENT + OPEN DATA + MUNICIPAL SPATIAL DATA INFRASTRUCTURE

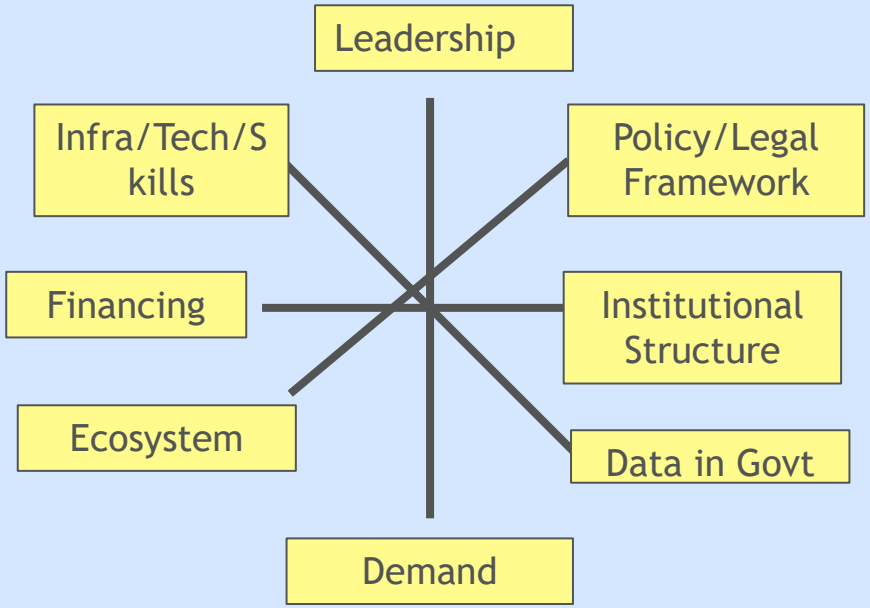
DIGITAL GOVERNMENT





OPEN DATA



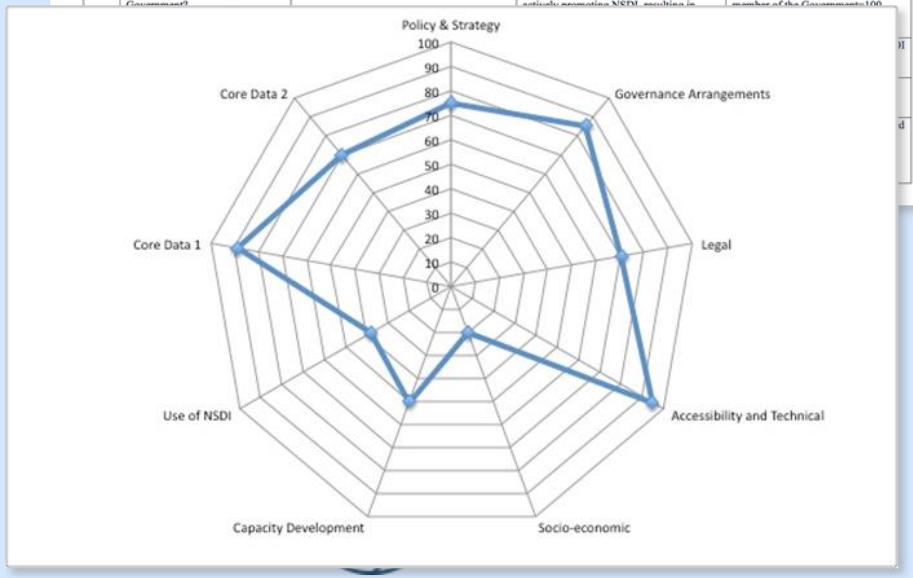


MUNICIPAL SDI

NSDI Diagnostic Tool Template: Guide to Scoring Indicators

1. Policy & Strategy				
No	**Indicator**	**Scoring guide**	**Comments**	**Score and notes**
1.1	Does a NSDI policy and/or strategy exist, and is it "signed off" by government	None / not discussed=0; Planned /being drafted=25; Draft exists=50; Under Review=75; Exists and signed off=100	Policy should include vision / mission statements and road map.	Yes =100
1.2	Is there a NSDI policy and/or strategy Monitoring and Evaluation Framework / Mechanism set up?	None=0; Being drafted=25; Draft exists=50; Under Review=75; Exists and is being implemented=100	Is there a way of checking to see if the policy, if it exists, is achieving its objectives?	Yes=100
1.3	Is the NSDI aligned to high-level Government information policies (e.g. e-Government, Open Data, Statistics)	No=0; Aligned to some=50; Yes, fully integrated/harmonised=100	When the NSDI policy is designed was it done with overall Government policy in mind? – i.e. is it designed to support Gov' policy – in planning, implementation etc	Yes=100
1.4	Is there a NSDI Engagement strategy?	None=0; Being drafted=25; Draft exists=50; Exists and being implemented=100	Or a communication plan? including stakeholder analysis, segmentation and targeted activities	Yes=100
1.5	Is there a policy to make geospatial (and other) data accessible through "Open Data"?	None=0; Being drafted=25; Draft exists=50; Under Review=75; Exists and is being implemented=100	Is there an Open Data policy, and does this recognise and include NSDI?	Yes=100

2. Governance arrangements				
No	**Indicator**	**Scoring guide**	**Comments**	**Score and notes**
2.1	Is there a NSDI "champion" in	None=0; Exists=50; Exists and active=100	Is there a clearly identifiable individual(s)	General Director of ALRC is also a



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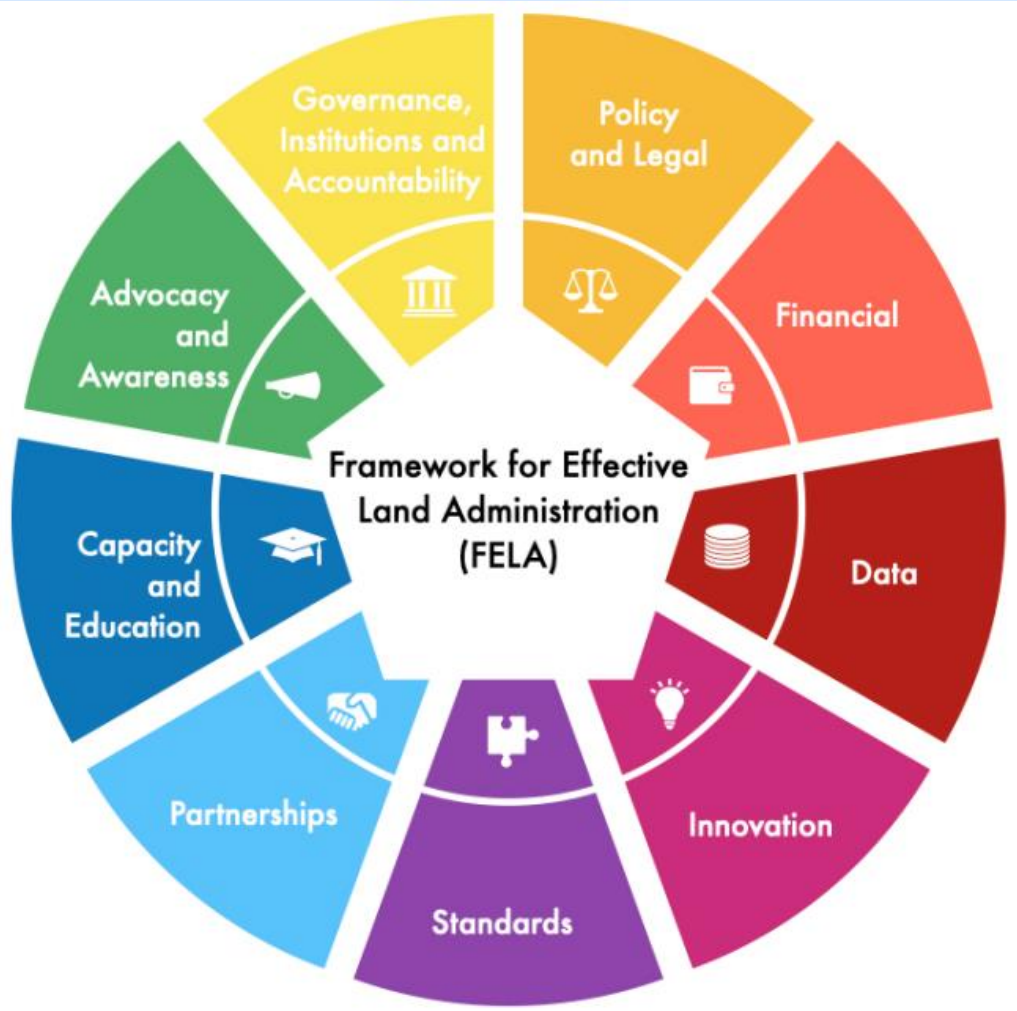
IGIF Sectoral Approach- Framework for Effective Land Administration (FELA)



- New Land Policy Directive requires a fully centralized, digital Land Information System and Database by 2025;
- World Bank is supporting preparation of a National Land Information System Action and Investment plan using the FELA to:
  - Complete the Land Information System
  - Develop a sustainable business model for the future (PPP, self-financing, national investment, cost sharing etc.)

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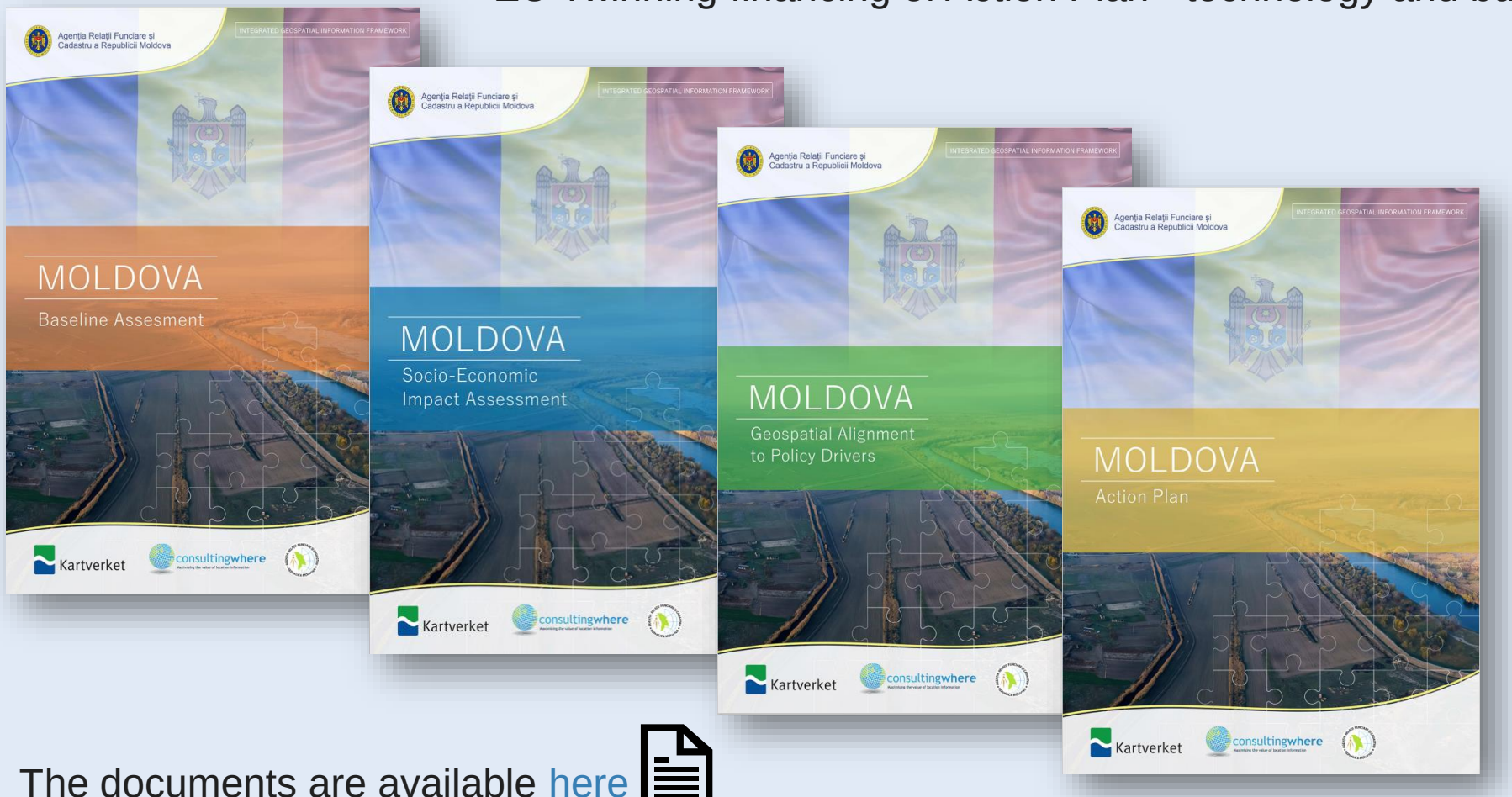
Recent Country IGIF Examples - Moldova

Norwegian Kartverket funded IGIF review using WB methodology
World Bank financing of Action Plan - capacity building
EU Twinning financing of Action Plan - technology and business model



IGIF Action Plan implementation funded by Kartverket for:

Moldova
Georgia
Kyrgyz Republic
Ukraine

The documents are available here

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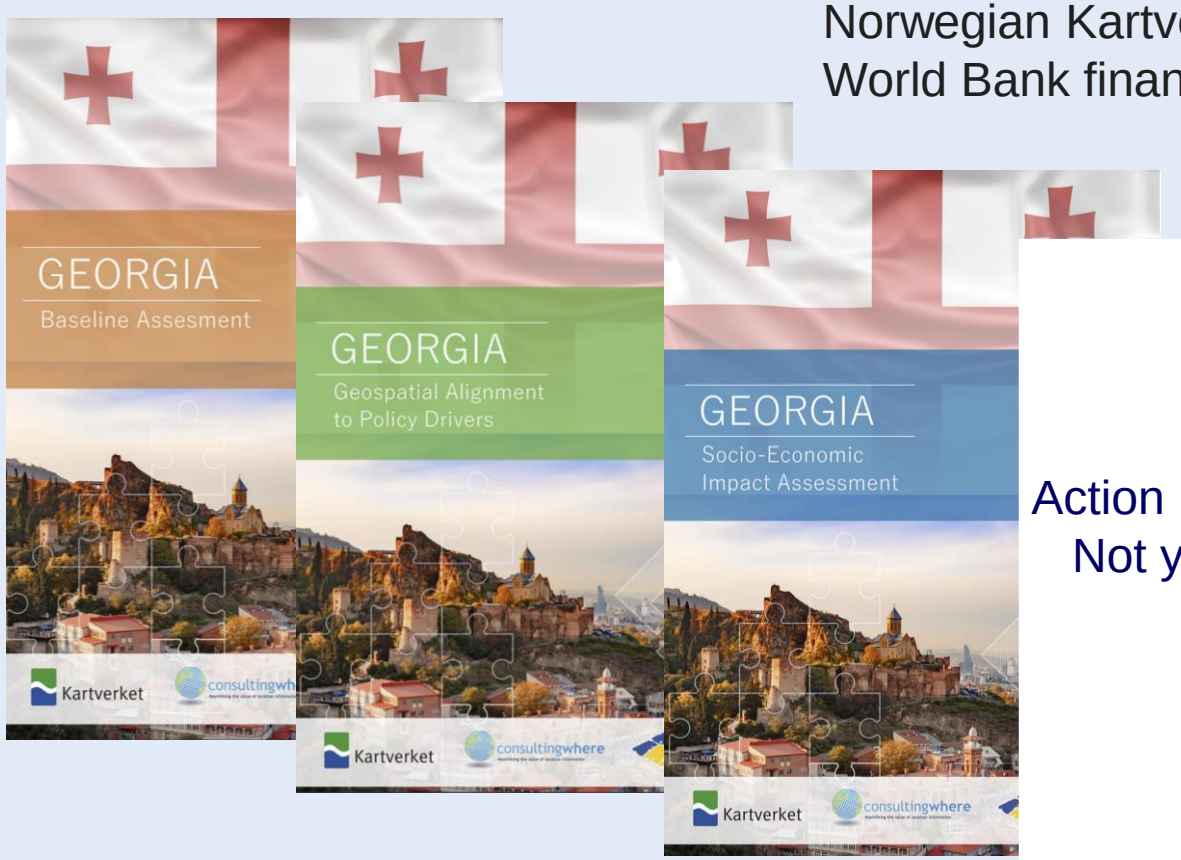
Recent Country IGIF Examples - Georgia



Norwegian Kartverket funded IGIF review using WB methodology
World Bank financing for Action Plan delivery in negotiation

Action Plan complete
Not yet Published

The documents are available on NAPR website under the geoinformation documentation here

Kartverket

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Cambodia

- IGIF Diagnostic and Baseline Assessment completed September 2022
- Findings will be handed over as part of Geospatial Program to be funded by Asian Development Bank

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Thank You!

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