

# THE INTEGRATED GEOSPATIAL INFORMATION FRAMEWORK : IMPLEMENTATION IN GUYANA

INTERNATIONAL WORKSHOP ON OPERATIONALISING THE IGIF  
9-11 SEPTEMBER 2019  
SANTIAGO, CHILE





# OUTLINE – IMPLEMENTATION OF THE IGIF IN GUYANA

## 1. CONTEXT

1. Political Commitment to Sustainable Development
2. Mandate of Guyana Lands and Surveys Commission
3. Sustainable Land Development and Management (SLDM) Project

## 2. TOWARDS IMPLEMENTATION OF IGIF IN GUYANA

1. National Geospatial Policy
2. NSDI Action Plan – Methodology and Content

## 3. IMPLEMENTATION STATUS OF THE IGIF

1. Overview
2. Strategic Pathways 1-9

## 4. REFLECTIONS ON IGIF EXPERIENCE TO-DATE



# THE INTEGRATED GEOSPATIAL INFORMATION FRAMEWORK : **IMPLEMENTATION IN GUYANA**

SOME CONTEXT





## CONTEXT: 2. MANDATED LEAD GEOSPATIAL AGENCY - GUYANA LANDS & SURVEYS COMMISSION (GLSC)

- Under the Guyana Lands and Surveys Commission Act of 1999, GLSC is legally mandated:
  - To have charge of and act as guardian over all public lands, rivers and creeks of Guyana;
  - To function as Guyana's -
    - National Mapping and Geospatial Agency
    - National Surveying and Cadaster Authority
    - National Public Land Administration Agency (Land Tenure administration, Land Use Planning, Land Development, Land Valuation)
    - Lead Agency Liaison among land agencies
    - Advisor to Government on geospatial related Policy
  - “To formulate policy on geographic and land information and set standards in relation to digital data, establish the framework for a national network of geographic information systems and develop and maintain a parcel-based land information system;” – Function (n)  
Section 4 (1) of the GLSC Act 15 of 1999 / Cap. 59:05



# CONTEXT: GLSC'S NATIONAL GEOSPATIAL INFORMATION SYSTEM CONCEPT MODEL

Spatial data

**Model (first developed in 2016) adapted for GLSC's context from the following sources:**

1. Enemark, S. (2007, April). Integrated Land-Use Management for Sustainable Development. *International Federation of Surveyors, Article of the Month*.
2. Enemark, S., Williamson, I., & Wallace, J. (2005, December). Building Modern Land Administration Systems in Modern Economies. *Spatial Science, 50(2), 51-68*.
3. Henzel, J. P. (2016). *Improving Ease of Doing Business in Guyana. World Bank Mission to Guyana to Assess ICT Readiness, Trade & Competitiveness*. World Bank.
4. International Federation of Surveyors. (2014). *Cadastre 2014 and Beyond*. (D. Steudler, Ed.) Copenhagen, Denmark: International Federation of Surveyors.
5. Williamson, I. (2008, April). Using Cadastres to Support Sustainable Development. *International Federation of Surveyors, Article of the Month*.

Cadastral Plans

GIS enabled Link

Land Title Register (LMS + rights, responsibilities, restrictions)

Digital Cadastre Database (DCDB)

SDG's 6-9, 11, 13-15

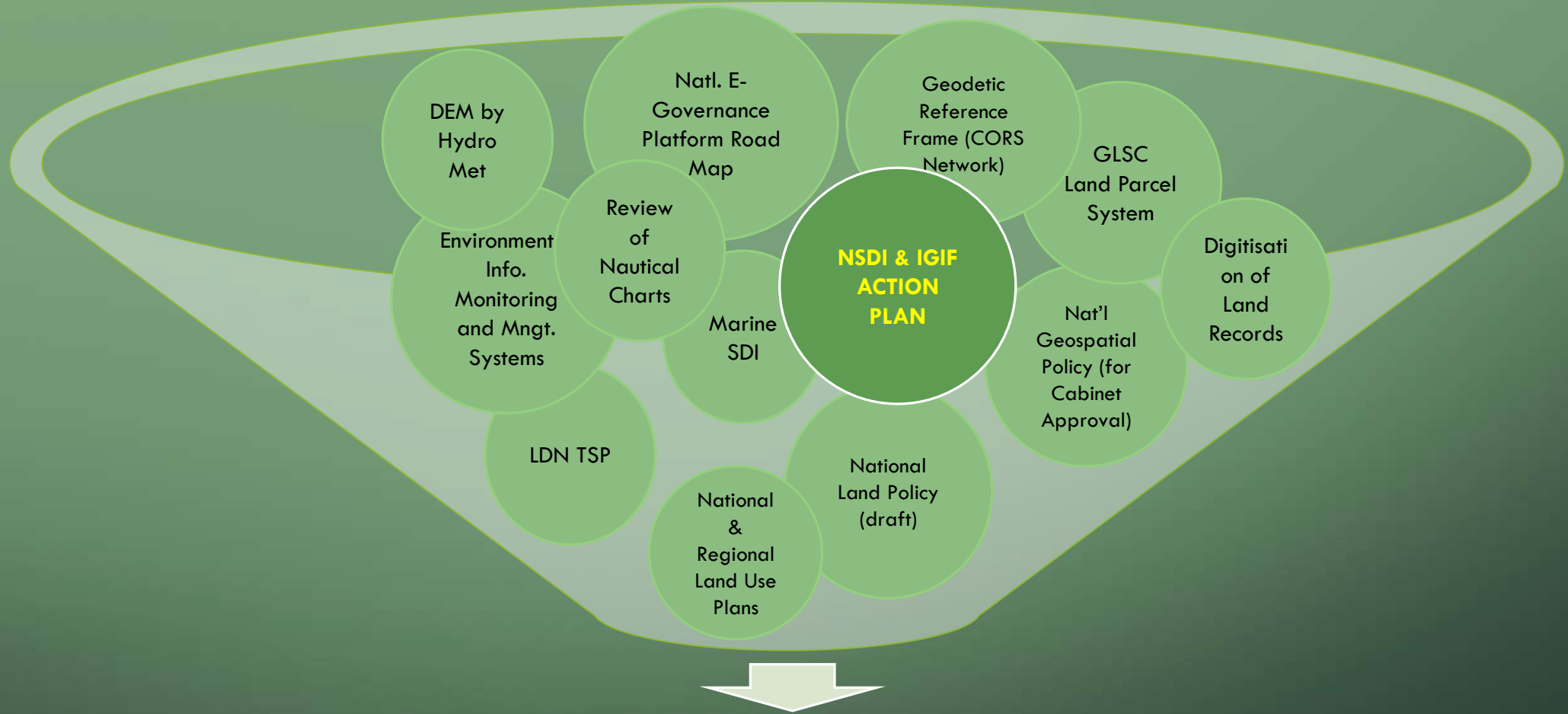
SLM

Social Cohesion

Leverage Market opportunities

me em

# CONTEXT: Geospatial Information Development in Guyana



# CONTEXT: 3. SLDM PROJECT - MAINSTREAMING SUSTAINABLE LAND DEVELOPMENT AND MANAGEMENT IN THE CO-OPERATIVE REPUBLIC OF GUYANA



Executing Agency:

**Guyana Lands & Surveys Commission** on behalf of the Government of Guyana



Implementing Partner:

**United Nations Food and Agriculture Office (UNFAO)**

Source of Financing:

**Performance-based payments for avoided deforestation** received from **Kingdom of Norway** under the **Guyana REDD+ Investment Fund (GRIF)**



Project Period:

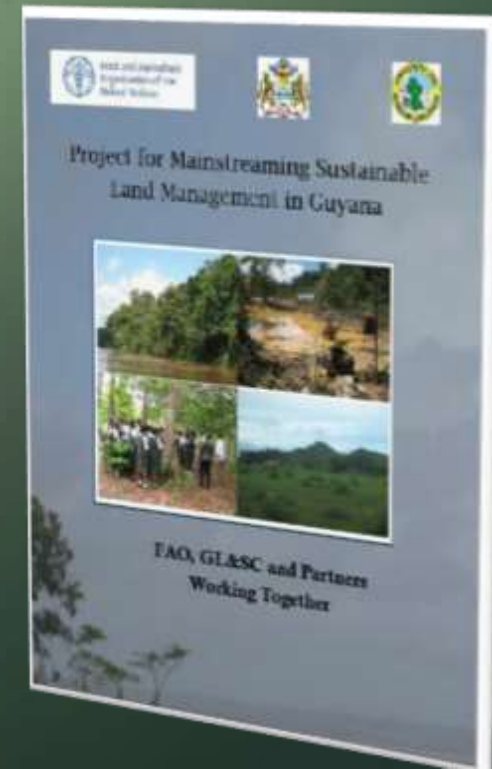
**Mid 2017- Mid 2021 (4 years)**

## Indicative Outcomes

**Outcome 1:** Sustainable Land Development and Management (SLDM) Mainstreamed In Policy, Institutional and Governance Mechanisms to Prevent Degradation and Restore Degraded Lands

**Outcome 2:** Strengthened Institutional and Human Capacity for Participatory and Integrated SLDM

**Outcome 3:** Local Governance Strengthened in 3 Regions for Implementing SLDM







# THE INTEGRATED GEOSPATIAL INFORMATION FRAMEWORK : **IMPLEMENTATION IN GUYANA**

TOWARDS IMPLEMENTATION OF THE IGIF IN GUYANA



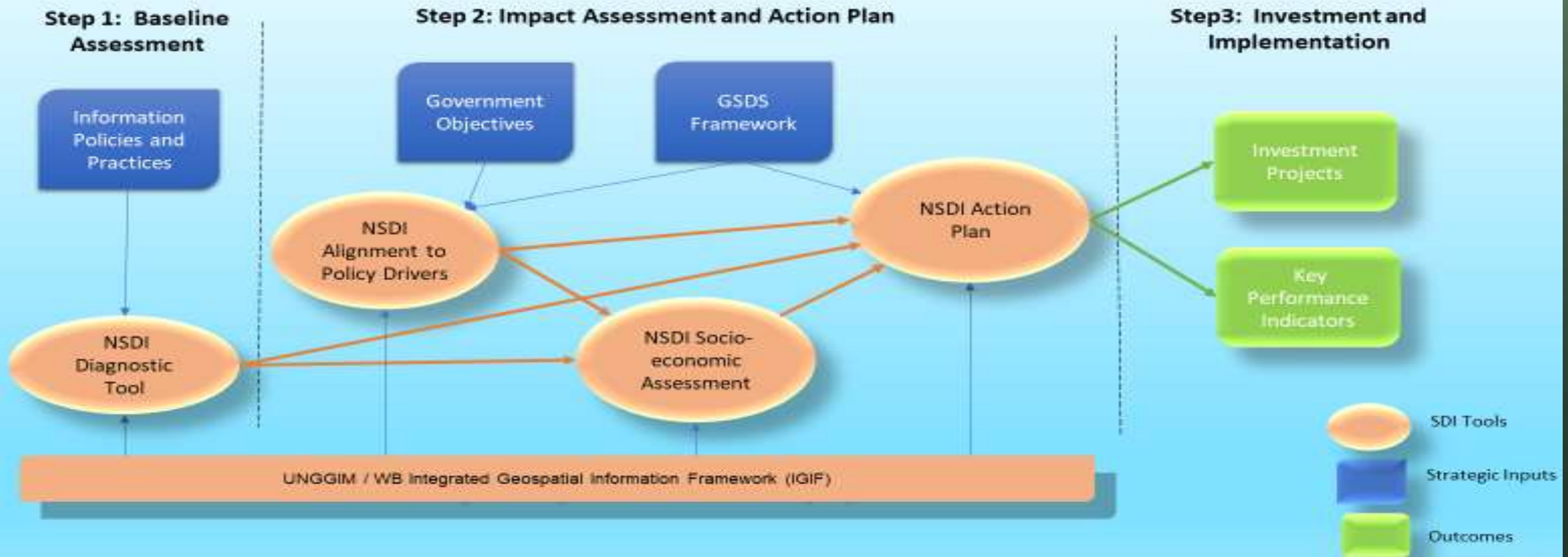
# TOWARDS IGIF IMPLEMENTATION: NATIONAL GEOSPATIAL POLICY

- July 3-5, 2018 ECLAC Workshop in Georgetown - **Towards a National Geospatial Framework and Policy in Guyana**
- 5<sup>th</sup> iteration of National GIS Policy was reviewed using the IGIF Strategic Pathways
- Policy was revised and sent to GoG Cabinet, where it is awaits approval.

# TOWARDS IGIF IMPLEMENTATION: NSDI ASSESSMENT METHODOLOGY WITH ACCOMPANYING ANALYTICAL TOOLS

(UNGGIM, WB, UNFAO)

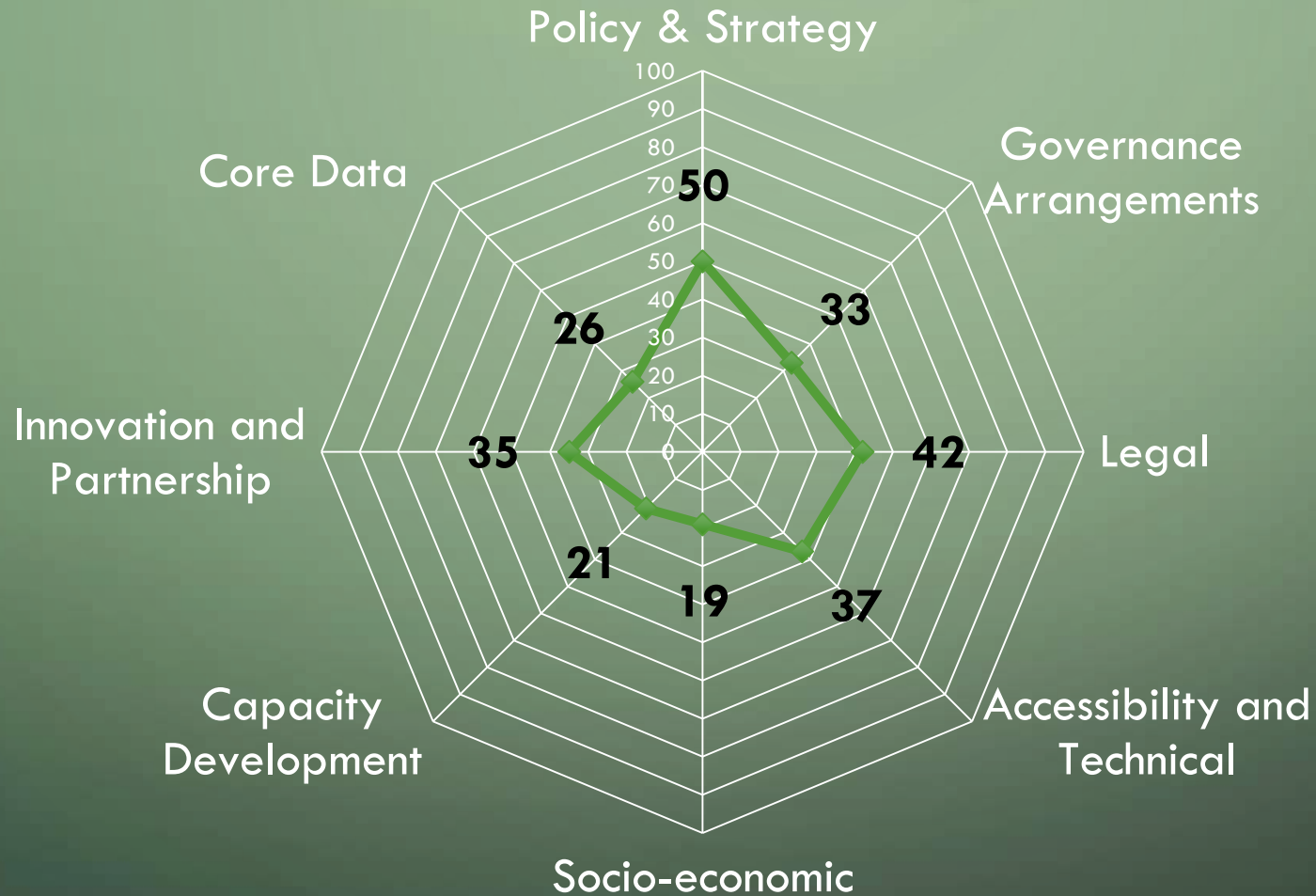
## Methodology



# DELIVERABLES FROM ASSESSMENT METHODOLOGY AND TOOLS



# NSDI DIAGNOSTIC SUMMARY, JANUARY 2019



# NSDI ALIGNMENT TO POLICY DRIVERS

## Key Policy and Reference Documents

- Framework for the Green State Development Strategy (GSDS)
- Digital Governance Roadmap
- Guyana Energy Strategy
- SLDM Project Document
- National Action Plan (NAP) to combat Land Degradation
- National Land Use Plan
- SDGs
- Integrated Geospatial Information Framework (IGIF) Part 1
- ECLAC Geospatial Policy Consultation
- World Bank ICT Assessment Report 2016
- And others...

## Thematic Drivers for Investment

- 1. Green State and Low Carbon Development**
- 2. Sustainable Land Management**
- 3. E-Government**
- 4. Support for monitoring and reporting on Sustainable Development Goals**
- 5. Climate change and disaster risk management**
- 6. Environmental Management**
- 7. Improve Capacity and skills of Human Resources**
- 8. Managing Economic Growth**

## Geospatial Use Cases

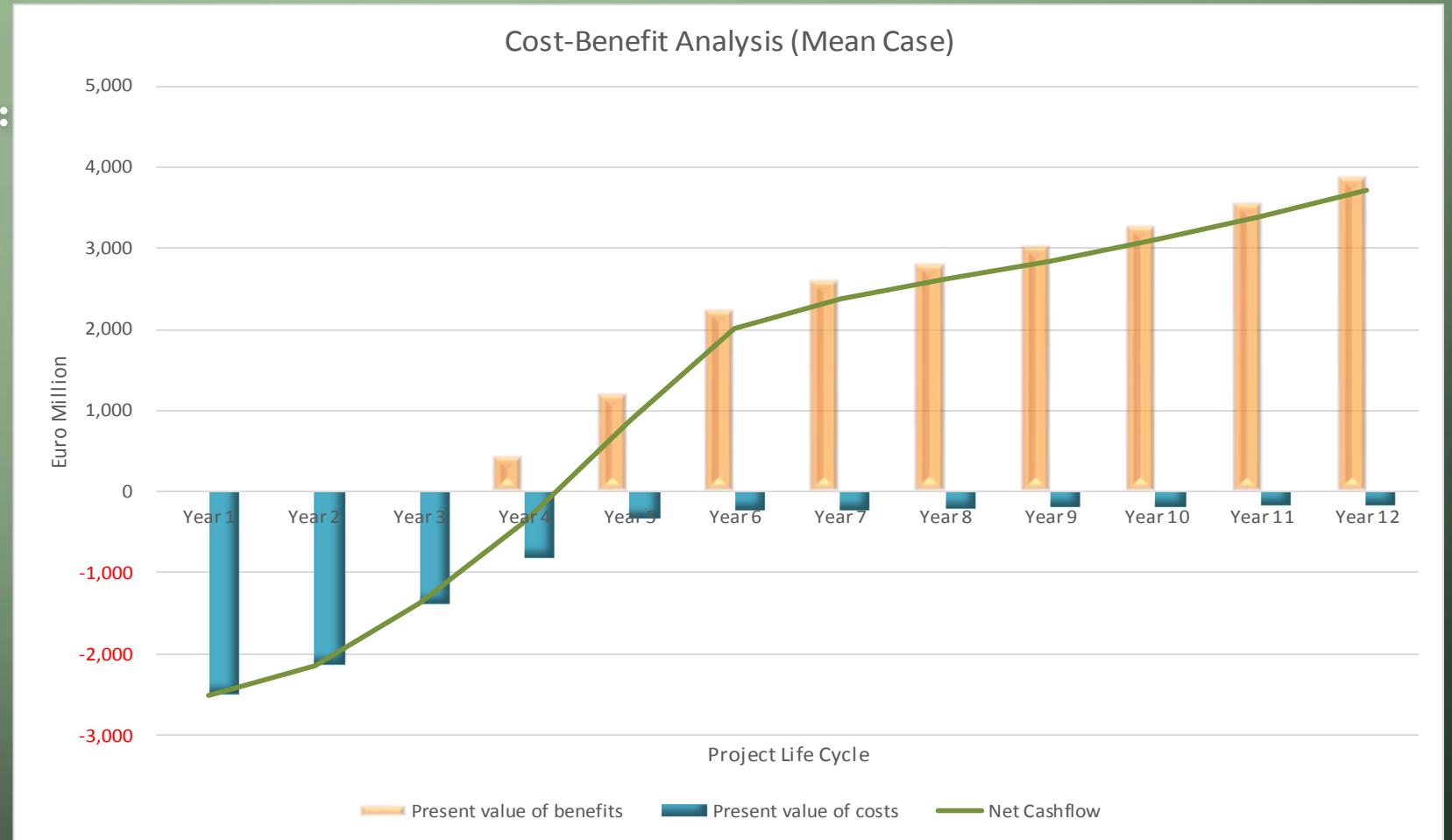
Theme	No. of Use Cases (Investment Priority)
1	3 (M x2, L x1)
2	5 (H x5)
3	4 (H x3, M x1)
4	2 (H x2)
5	3 (H x2, M x1)
6	2 (M x2)
7	4 (H x2, M x2)
8	5 (H x5)

# NSDI SOCIO-ECONOMIC ASSESSMENT: QUANTIFIED MARKET IMPACTS

Ref	Impact	Evidence	Methodology	Net Undiscounted Value of Impacts (US\$)
1	Improved National Geospatial Data Sharing	Usage assessment	Multiplier effect of information sharing	5.2 million
2	Land Market Growth	Comparable studies	Benefits transfer from Bulgarian Study	5.7 million
3	Increasing Revenue from Leasing of State Land	Current revenues plus expert opinion	Business process modelling	3.3 million
4	New Geospatial Products and Services	Global Study	Scaling based on size and maturity of Guyanese economy	15.9 million
5	Improved Forestry Revenues	National Statistics and expert opinion	Estimated uplift to current levels of income	2.1 million
6	Reduced Loss and Damage from Better Flood Prediction	Internationally reported economic costs of floods	Expert judgement (4% improvement) from improved Digital Elevation Models	2.2 million
7	Integration of Marine and Terrestrial NSDI	Expert opinion and International studies	Reduced shipping insurance costs and extra cruise ship visits	2.5 million

# PROVISIONAL RETURN ON INVESTMENT ANALYSIS

- **Benefit to Cost Ratio:**  
2.7:1 (RoI of 270%)
- **Net Present Value:**  
US\$ 13m
- **Project Life Cycle:**  
5 years development  
7 years operation
- **Discount Rate:** 6%







# NSDI SOCIO-ECONOMIC ASSESSMENT: UN-QUANTIFIED BENEFITS

- 1) Reduced Number of Land and Property-related Court Cases**
- 2) Cost Savings in Infrastructure Design and Construction**
- 3) Improved Water Services**
- 4) Smarter Development Planning**
- 5) More accurate Land Valuation**
- 6) Higher accuracy Land Surveys from Re-established CORS Network**
- 7) Improved SDG Reporting and Population Census**
- 8) Support for Climate Change Adaptation**
- 9) Optimized Site Selection**
- 10) Reduced Data Procurement Costs**
- 11) Enhanced support for Aviation Industry**

# IGIF - NSDI ACTION PLAN

- Developed under the SLDM Project, Approved by UNFAO & GLSC in January 2019 following highly consultative and review period (5 months).
- This document presents an Action Plan, based on the IGIF, for development of a National Spatial Data Infrastructure (NSDI) for Guyana over a 5-year period and outlines its socio-economic benefits.
- The implementation of the action plan will require an indicative level of investment of US\$7.8m for the 5-year period.
- It is a living document!
- 80 pages
- Guyana is one of the first countries globally to start implementing the UNGGIM IGIF

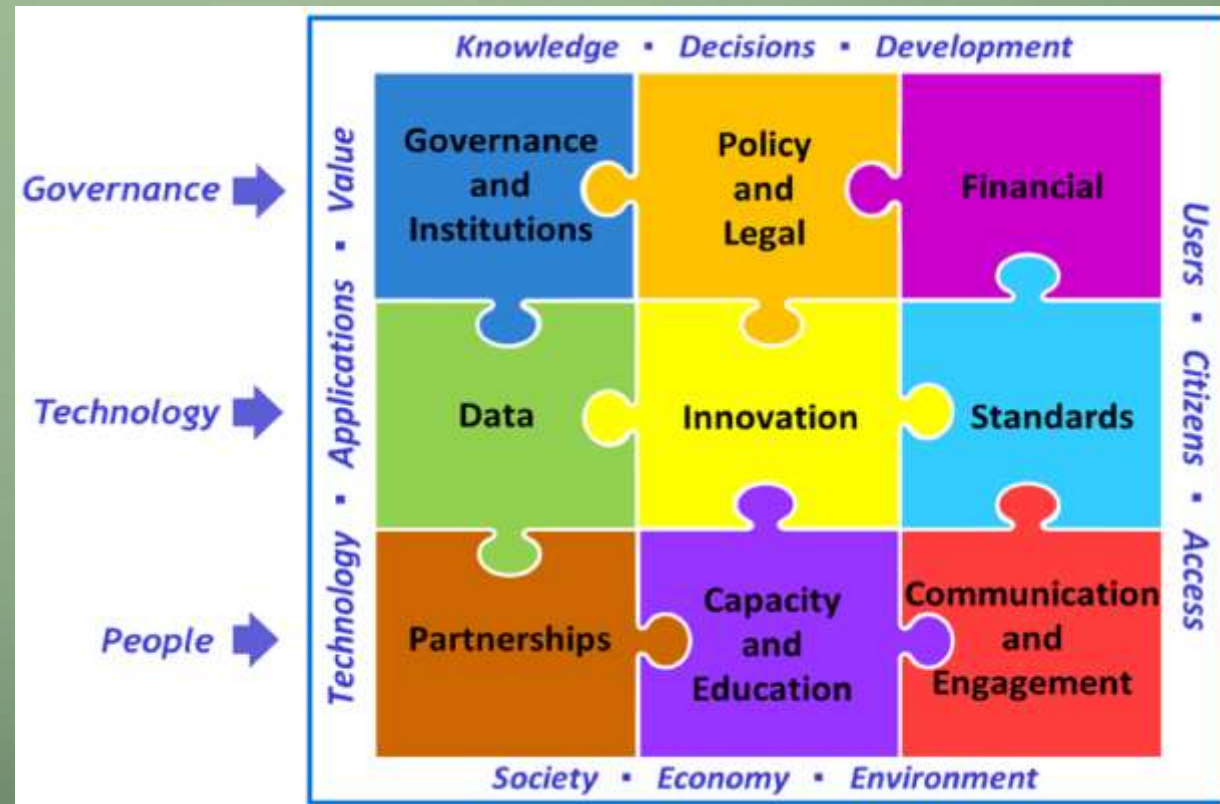
## Cooperative Republic of GUYANA Integrated Geospatial Information Framework

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# ACTION PLAN'S ALIGNMENT TO THE UNGGIM IGIF

- The Action plan sets out 24 key Actions grouped according to the 9 IGIF strategic pathways and addresses the 14 UNGGIM fundamental geospatial data themes
- Prioritizes the Actions and identifies KPIs for each Pathway.



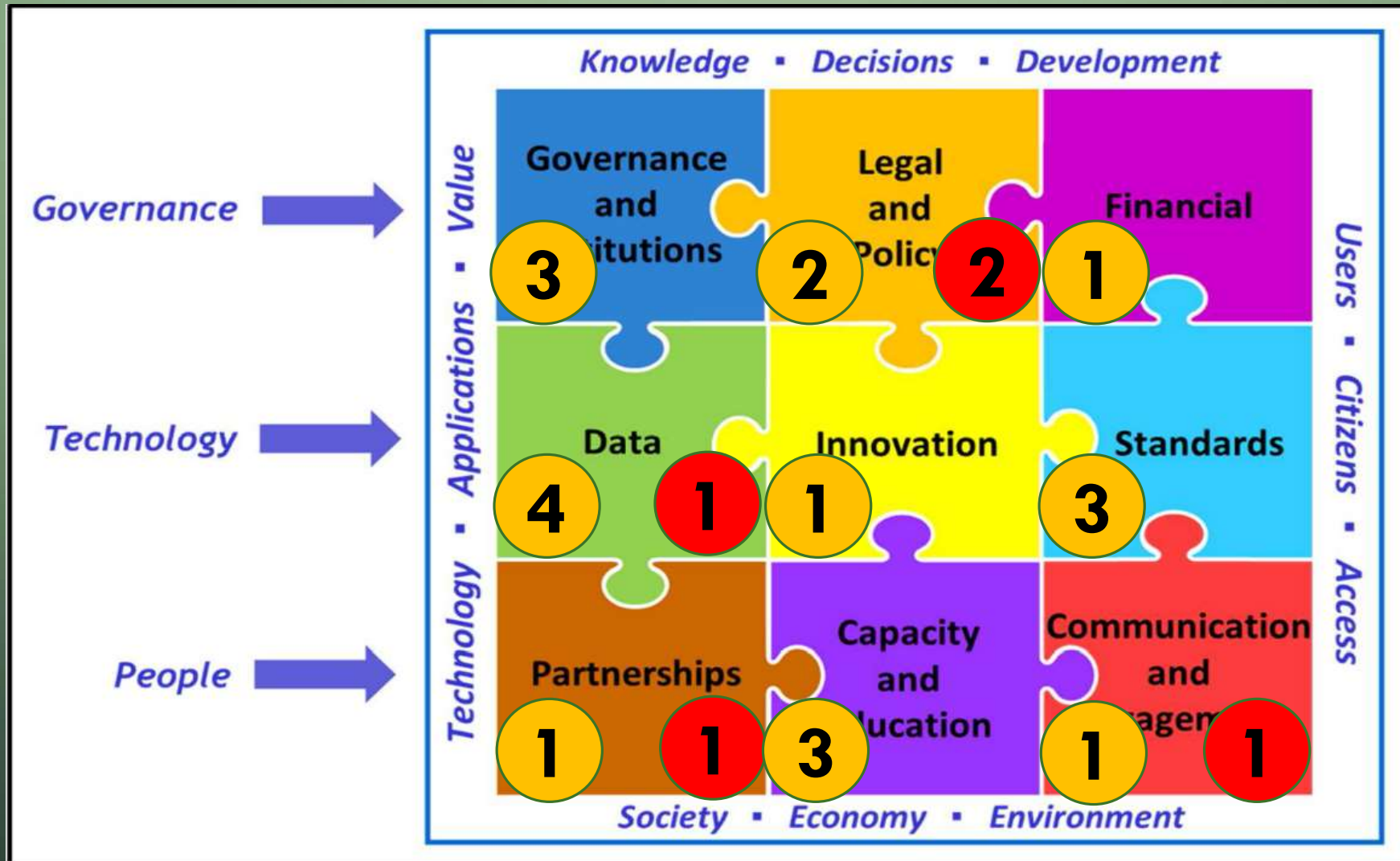


# THE INTEGRATED GEOSPATIAL INFORMATION FRAMEWORK : **IMPLEMENTATION IN GUYANA**

CURRENT STATUS ON IMPLEMENTING IGIF IN GUYANA

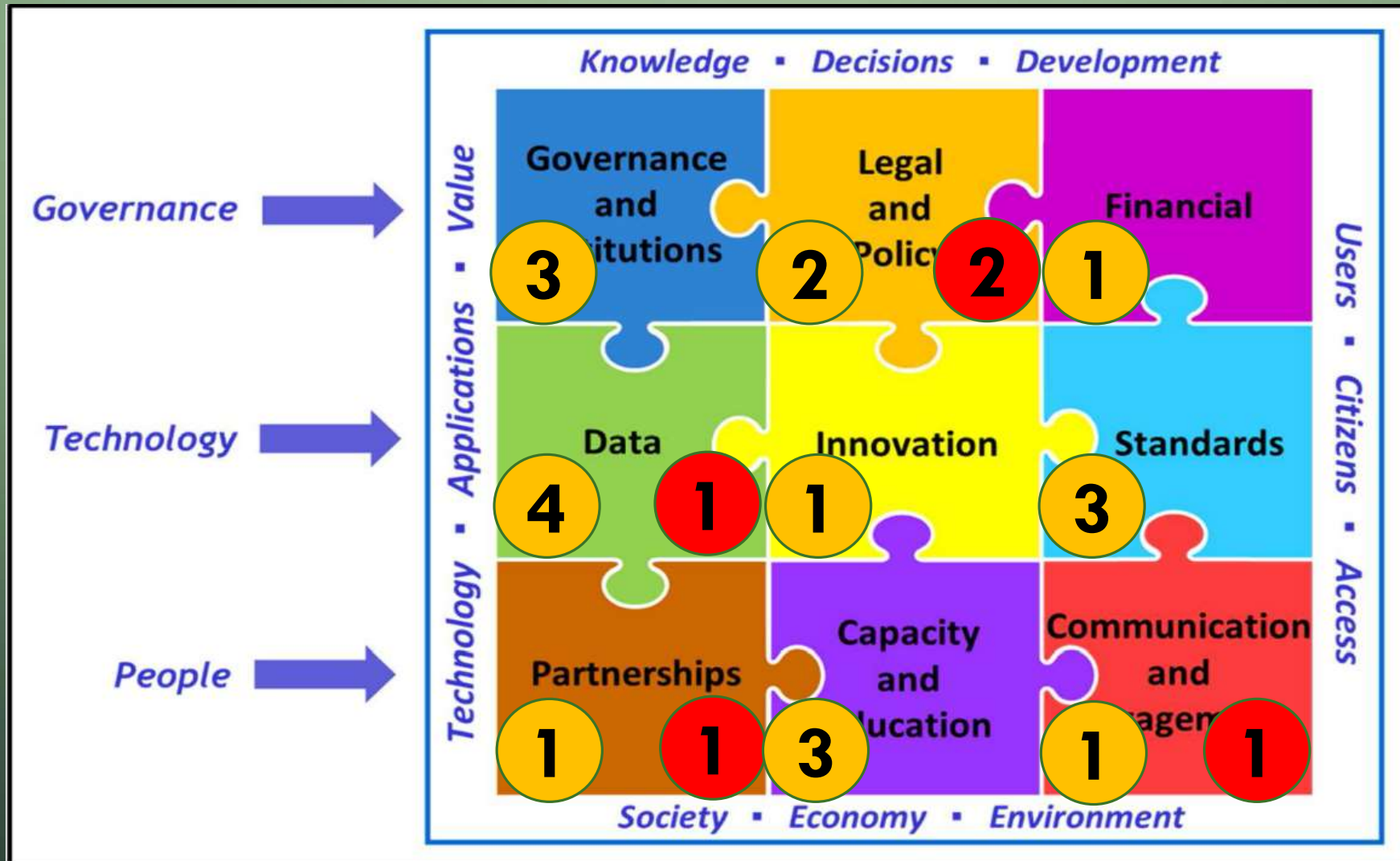
# NSDI / IGIF ACTION PLAN: STATUS (JAN-SEPT 2019)

ACTIONS: ■ COMPLETED ■ IN PROCESS ■ NOT STARTED



# NSDI / IGIF ACTION PLAN: STATUS (JAN-SEPT 2019)

ACTIONS: ■ COMPLETED ■ IN PROCESS ■ NOT STARTED



■ COMPLETED ■ IN PROCESS ■ NOT STARTED

# NSDI / IGIF ACTION PLAN: STATUS (SEPTEMBER 2019)

## STRATEGIC PATHWAY 1: GOVERNANCE & INSTITUTIONS



### ACTIONS

- Ministerial Approval of National Geospatial Policy (High Priority)
- Establish Geospatial Advisory Committee (GAC) (High Priority)
- Establish Working Groups (Medium Priority)

### KPIs

- Geospatial Policy (approval within 3 months)
- GAC and working groups established and operational within 6 months

■ COMPLETED ■ IN PROCESS ■ NOT STARTED

# NSDI / IGIF ACTION PLAN: STATUS (SEPTEMBER 2019)

## STRATEGIC PATHWAY 2: POLICY AND LEGAL



### ACTIONS

- Update Land Surveys legislation to support cadastral upgrading
- Create Data Sharing Agreement (High Priority)
- NSDI Regulations (Medium Priority)
- Data Protection and Pricing and Licensing (Low Priority)

### KPIs

- ▶ Update Land Surveys legislation within 12 months.
- ▶ Data sharing agreement in place and regular operational sharing between 5 organisations within 12 months.
- ▶ Regular operational sharing between all major stakeholders within 3 years.



■ COMPLETED ■ IN PROCESS ■ NOT STARTED

# NSDI / IGIF ACTION PLAN: STATUS (SEPTEMBER 2019)

## STRATEGIC PATHWAY 3:

### FINANCIAL



### Actions

- Develop long-term GLSC Business Model (Medium Priority)

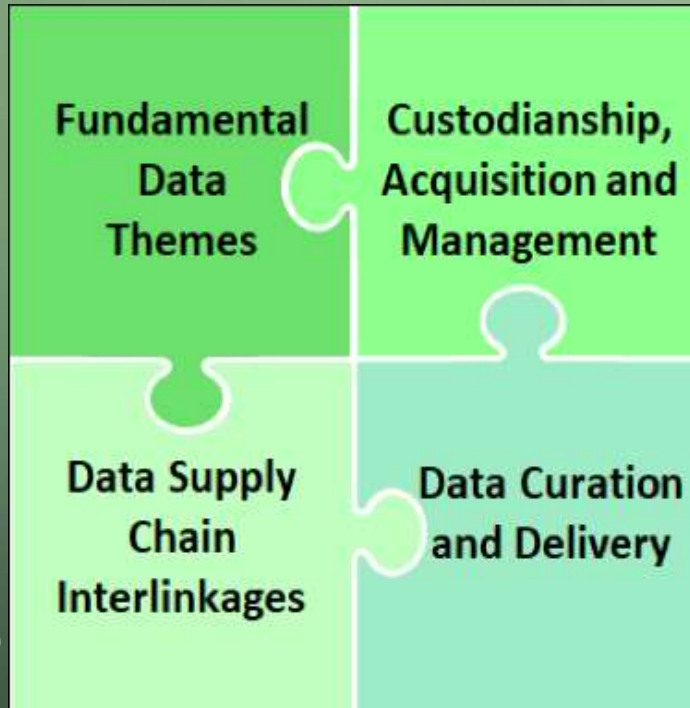
### KPIs

- Long-term GLSC Business Model approved within 18 months

■ COMPLETED ■ IN PROCESS ■ NOT STARTED

# NSDI / IGIF ACTION PLAN: STATUS (SEPTEMBER 2019)

## STRATEGIC PATHWAY 4: DATA



### ACTIONS

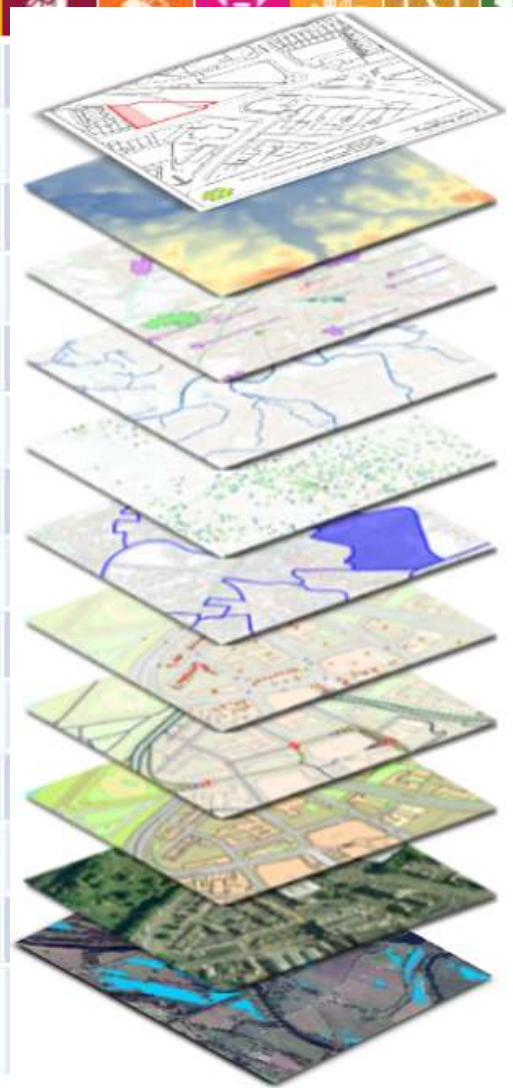
- Create National Discovery Geoportal (High Priority)
- Rationalise State Land Leasing Process (Very high Priority)
- National Access to Satellite Imagery (High Priority)
- Create a single National Street Address Database (High Priority)
- Hardware, Network and Software Needs to Support NSDI (Very High Priority)

### KPIs

- ▶ Discovery Metadata database populated with data from 10 key suppliers and openly accessible on the web within 6 months.
- ▶ Rationalise State Land Leasing process including new software live within 2 years.
- ▶ National street address database operational within 2 years.
- ▶ National coverage of updated topographic base mapping within 5 years.

# Data themes linked to Sustainable Development Goals

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Addresses					*		*	*										
Bldgs and Settlements		*		*	*		*	*										
Elevation and depth		*	*	*			*	*										
Functional Areas		*	*	*	*	*	*	*										
Geographical Names		*	*	*	*	*	*	*										
Geology and Soils			*	*			*	*										
Land Cover/Land Use		*	*	*		*	*	*										
Land Parcels		*	*		*													
Orthoimagery			*				*											
Physical infrastructure				*	*		*	*										
Population distribution		*	*	*	*	*	*	*										
Transport Networks			*	*														
Water			*	*			*	*										
Global Geodetic Reference Framework			*				*	*										



- Geodetic Reference Framework
- Geographical Names
- Addresses
- Functional Areas
- Settlements
- Land Parcels
- Transport Networks
- Elevation/Depth
- Population Distribution
- Land Cover/Use
- Geology/Soils
- Physical Infrastructure
- Ortho Imagery
- Water
- Utilities

■ COMPLETED ■ IN PROCESS ■ NOT STARTED

# NSDI / IGIF ACTION PLAN: STATUS (SEPTEMBER 2019)

## STRATEGIC PATHWAY 5: INNOVATION

### ACTIONS

### KPIs



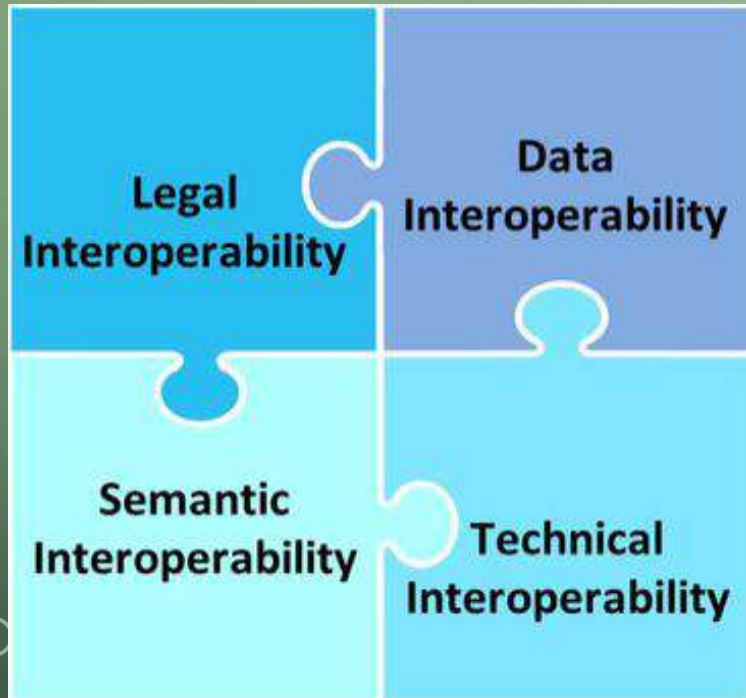
■ Guyana Centre of Geospatial Excellence (High Priority)

- ▶ Centre of Excellence terms of reference, funding and recruitment plans approved by GAC within 12 months
- ▶ Centre of Excellence fully operational within 2 years.

■ COMPLETED ■ IN PROCESS ■ NOT STARTED

# NSDI / IGIF ACTION PLAN: STATUS (SEPTEMBER 2019)

## STRATEGIC PATHWAY 6: STANDARDS



### ACTIONS

- Development and implementation of standards policy (High priority)

- Discovery Metadata
- Base Mapping / National Topographic Database
- Addressing

### KPIs

- ▶ Street Addressing content standard agreed with 12 months.
- ▶ Content standards for 10 fundamental data themes agreed within 3 years.

■ COMPLETED ■ IN PROCESS ■ NOT STARTED

# NSDI / IGIF ACTION PLAN: STATUS (SEPTEMBER 2019)

## STRATEGIC PATHWAY 7:

### PARTNERSHIP



### Actions

- Define Scope of a Partnership with International NSDI Organisations
- Support creation of Guyana Association for Geospatial Information

### KPIs

- Study visits to two countries completed within 12 months.
- Guyana Association of Geospatial Information formed within 2 years

■ COMPLETED ■ IN PROCESS ■ NOT STARTED

# NSDI / IGIF ACTION PLAN: STATUS (SEPTEMBER 2019)

## STRATEGIC PATHWAY 8: CAPACITY & EDUCATION



### ACTIONS

- Consolidate National Geospatial and Land Administration Capabilities at Tertiary Level (High Priority)
- Geospatial Information in the School Curriculum (Medium Priority)
- Foster Geospatial Entrepreneurship (Medium Priority)

### KPIs

- ▶ GIS Laboratory at University of Guyana opened within 12 months
- ▶ 3 new geospatial topics within senior school curriculum within 2 years
- ▶ Land management and land valuation courses graduating students within 3 years

■ COMPLETED ■ IN PROCESS ■ NOT STARTED

# NSDI / IGIF ACTION PLAN: STATUS (SEPTEMBER 2019)

## STRATEGIC PATHWAY 9: COMMUNICATION & ENGAGEMENT



### Actions

- Create Outreach Group (High Priority)
- Monitoring and Evaluation Framework (High Priority)

### KPIs

- Monitoring and Evaluation framework approved by GAC within 6 months
- Outreach group staffed and communications plan approved within 12 months





# THE INTEGRATED GEOSPATIAL INFORMATION FRAMEWORK : **IMPLEMENTATION IN GUYANA**

REFLECTIONS

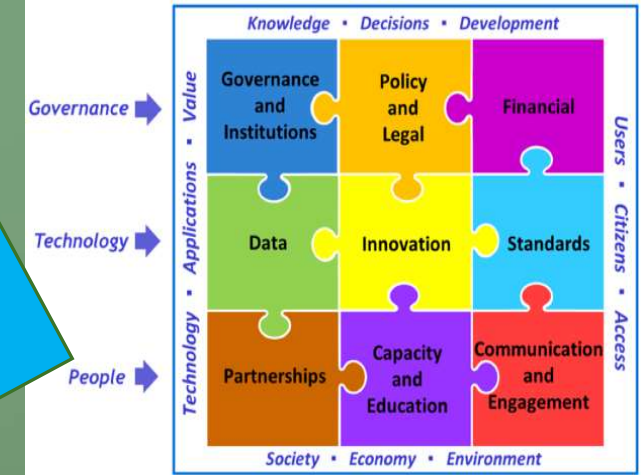


# REFLECTIONS ON THE IGIF I N GUYANA

1. Incorporation of IGIF began in Guyana (July 2018 with ECLAC workshop, Sept. 2018 with start of NSDI diagnostic) before and right after formal adoption of IGIF Part 1: Overarching Strategic Framework (August 2018) and without reference to IGIF Part 2: Implementation Guide.
2. IGIF Strategic Framework proved to be a useful, potent and easily communicated tool to lay out an approach to a daunting national project – the NSDI

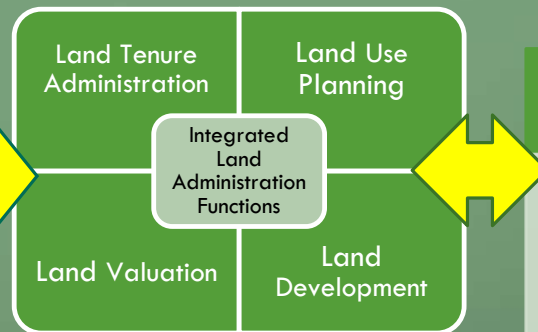


# CONTEXT: GLSC'S NATIONAL GEOSPATIAL INFORMATION SYSTEM CONCEPT MODEL



- VHR satellite imagery
- topography
- land tenure
- land use
- rental portfolio
- environmental issues
- risks
- ...

- Geodetic Reference Framework
- Geographical Names
- Addresses
- Functional Areas
- Settlements
- Land Parcels
- Transport Networks
- Elevation/Depth
- Population Distribution
- Land Cover/Use
- Geology/Soils
- Physical Infrastructure
- Ortho Imagery
- Water
- Utilities

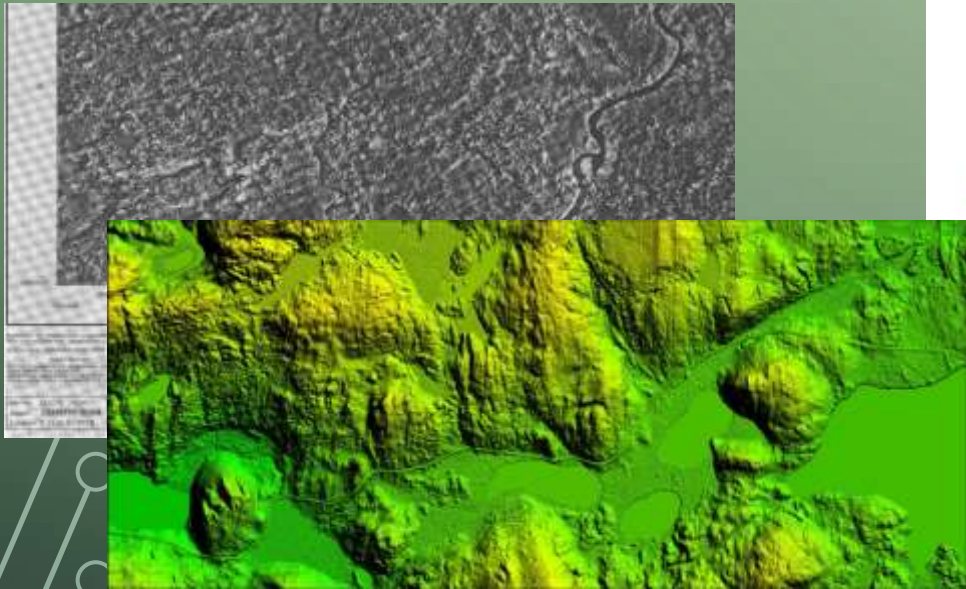


- Geoportals: Delivering**
- geospatial data inventory w/ metadata
  - solutions for use cases
  - land administration services
  - data for policy decisions
  - citizen participation (e.g. crowdsourcing)

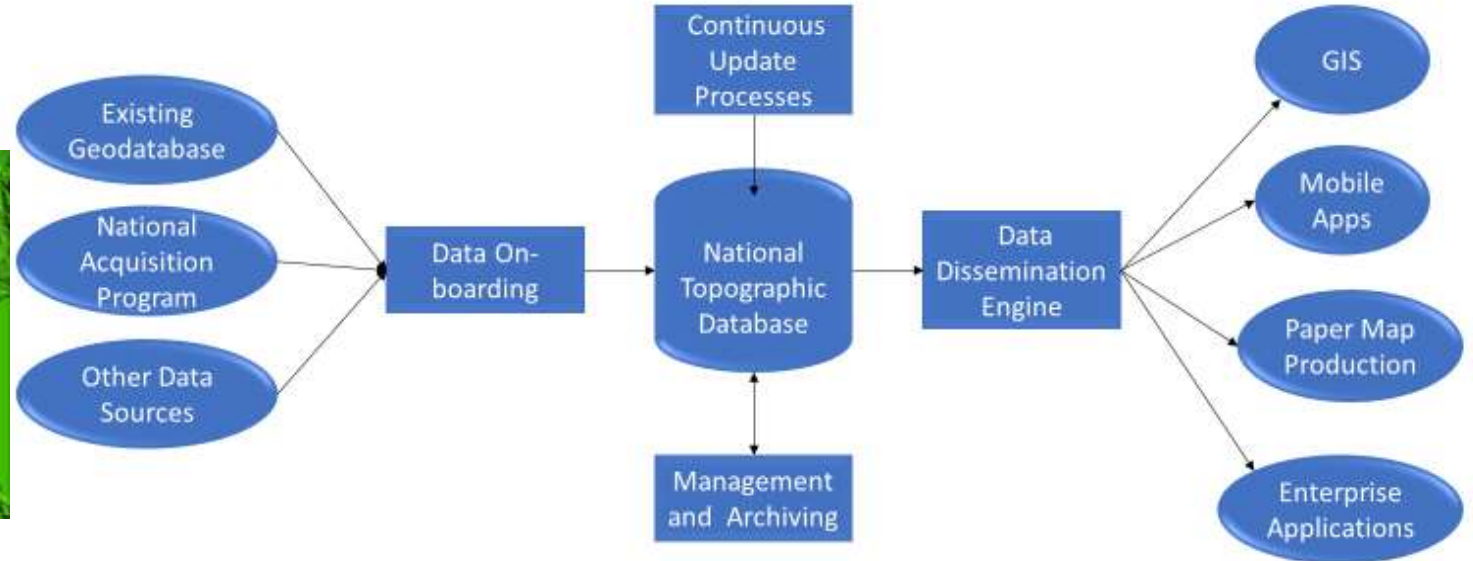


# REFLECTIONS ON THE IGIF I N GUYANA

3. Provided an opportunity to 'leapfrog' to innovations that will drive digital transformation (e.g. creating the national topographic database not just updating base mapping)



## NTDb Conceptual Architecture





# REFLECTIONS ON THE IGIF I N GUYANA

4. Gaps in capacity and education relating to geospatial sector have been highlighted and are being addressed. Partnerships are being sought in academic and technical areas.

# IGIF IMPLEMENTATION REFLECTIONS

General Area (IGIF Principle)	Opportunities	Challenges
<b>1. Strategic Enablement</b> (political and financial support)	<ul style="list-style-type: none"><li>- Strong political support,</li><li>- Some Financial support from SLDM Project</li><li>- Strengthen alignment with national development strategy (GSDS)</li></ul>	<ul style="list-style-type: none"><li>- Path to long-term financial sustainability still unclear</li><li>- Political climate with NCM and new elections pending</li></ul>
<b>2. Transparent and Accountable</b> (sharing of info. with citizens, within govt, academia, private sector)	<ul style="list-style-type: none"><li>- Growing awareness of need across GoG that geospatial information is to be shared and accessible (e.g. GLSC, MoF, BoS)</li></ul>	<ul style="list-style-type: none"><li>- Culture of data sharing to be nurtured</li><li>- Rationale for open data to be sold</li></ul>
<b>3. Reliable, Accessible &amp; Easily Used</b>	<ul style="list-style-type: none"><li>- To leverage technology with policy and standards</li></ul>	<ul style="list-style-type: none"><li>- Outdated data</li><li>- Data silos</li><li>- Inconsistent data standards</li></ul>

# IGIF IMPLEMENTATION ISSUES: CHALLENGES / OPPORTUNITIES

IGIF Principle	Opportunities	Challenges
<b>4. Collaboration and Cooperation</b>	<ul style="list-style-type: none"><li>- Tremendous avenues for international collab. – Mexico, UK (CORS), Norway (GRIF), UNFAO (SLDM), ECLAC, UNGGIM and possible Netherlands, Serbia</li></ul>	<ul style="list-style-type: none"><li>- Need to quickly coordinate numerous geospatial initiatives across GoG to avoid duplication of effort and wastage of resources</li></ul>
<b>5. Integrative Solution</b>	<ul style="list-style-type: none"><li>- NSDI Action plan developed with comprehensive UNGGIM IGIF framework</li><li>- Foundation laid by National Geospatial Policy and GLSC Act</li><li>- Integrative technology solutions are available</li></ul>	<ul style="list-style-type: none"><li>- Modern National Geodetic Reference Frame in its infancy (CORS Network)</li><li>- Formalisation of institutional arrangements, standards to be done</li><li>- Significant gaps in required geospatial capacity and skills</li></ul>

# IGIF IMPLEMENTATION ISSUES: CHALLENGES / OPPORTUNITIES

IGIF Principle	Opportunities	Challenges
<b>6. Sustainable and Valued</b>	<ul style="list-style-type: none"><li>- IGIF Action Plan drew from Alignment to national strategic drivers and basic socio-economic assessment</li></ul>	<ul style="list-style-type: none"><li>- 'Telling and selling' value of geospatial information (GI)</li><li>- Development of localised use cases / business cases &amp; models / studies for GI</li></ul>
<b>7. Leadership and Commitment</b>	<ul style="list-style-type: none"><li>- Strong leadership from CEO GLSC, Ministers of State and GoG Cabinet</li></ul>	<ul style="list-style-type: none"><li>- Political climate with NCM and new elections pending</li></ul>



Kaieteur Falls

# MUCHAS GRACIAS! PREGUNTAS?



- Guyana Lands and Surveys Commission
  - Email: [ceooffice@glsc.gov.gy](mailto:ceooffice@glsc.gov.gy)
  - Website: <http://www.glsc.gov.gy>