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# UNITED NATIONS INTEGRATED GEOSPATIAL INFORMATION FRAMEWORK

A STRATEGIC GUIDE TO DEVELOP AND STRENGTHEN  
NATIONAL GEOSPATIAL INFORMATION MANAGEMENT

## PART 1: OVERARCHING STRATEGY SECOND EDITION 2023

## EXECUTIVE SUMMARY

Geospatial information describes the physical location of features around us, including what is on, above, and below the surface of the Earth. It also describes the relationships of these ‘geographic’ features with other features and associated information. Therefore, geospatial information provides the integrative platform for all digital data that has a location dimension to it and is fundamental to development. All countries and all sectors need geospatial information to address national priorities, for national development and for decision-making.

This Overarching Strategy provides an overview of, and high-level insights into, the United Nations Integrated Geospatial Information Framework (hereafter referred to as the UN-IGIF), a multi-dimensional Framework, adopted by the United Nations in 2018, that guides countries in the development, management, and refinement of their national geospatial information resources.

The UN-IGIF was originally developed as a collaboration between the United Nations and the World Bank, initially to provide a basis and guide for lower to middle income countries to reference when developing and strengthening their national and sub-national arrangements in geospatial information management and related infrastructures. However, as the UN-IGIF has evolved in the past five years and will continue to evolve as a living document in the years ahead, it has become apparent that many high-income and developed countries are also significantly benefitting from the integrative and inclusive strategic nature of the Framework.

The UN-IGIF provides the strategic guidance that enables country-specific action plans to be prepared and implemented. Direct benefits include encapsulating new and innovative approaches to national geospatial information management, implementing integrated evidence-based decision-making solutions, and maximizing and leveraging national information systems that are tailored to individual country’s situations and circumstances.

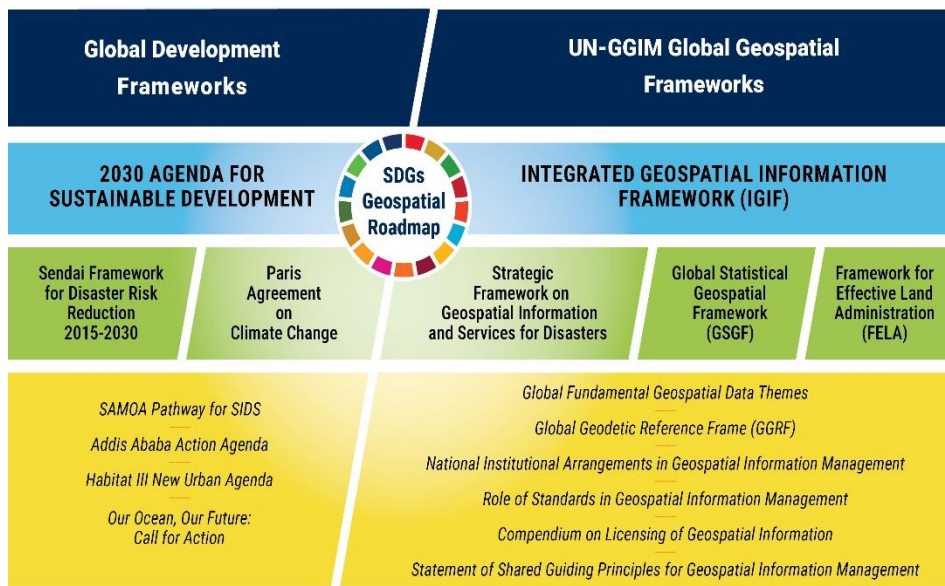
The UN-IGIF aims to assist countries to move towards e-economies, e-service and e-commerce to improve services to citizens, build capacity for using geospatial technology, enhance informed government decision-making processes, facilitate private sector and industry development, take practical actions to achieve a digital transformation, and to bridge



**The United Nations Integrated Geospatial Information Framework (UN-IGIF) provides a basis and guide for developing, integrating and strengthening national arrangements in geospatial information management.**

the geospatial digital divide in the implementation of national strategic priorities and the 2030 Agenda for Sustainable Development.

The UN-IGIF and its guidance build upon the existing body of work of the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) and now anchors the Committee’s programme of work to support implementation of the 2030 Agenda for Sustainable Development and other global and national development agendas. In a similar pattern to the 2030 Agenda, the UN-IGIF is a comprehensive overarching Framework which captures the globally adopted strategic frameworks, guides, methods, and standards that have been developed by UN-GGIM over the past decade (Figure 1). This has been recognized by UN-GGIM’s parent body, the Economic and Social Council (ECOSOC) which, in July 2022, reiterated the importance of strengthening and enhancing the effectiveness of UN-GGIM, particularly for the achievement of its operations focused on the SDGs and the UN-IGIF.



**Figure 1:** Global Geospatial Frameworks developed by UN-GGIM to support the implementation of Global Development Frameworks.

It is important to recognize that, due to the global and intergovernmental nature of UN-GGIM, work by the Committee of Experts has focused on concepts, methods, standards and guides to address global goals as well as the needs of countries. The UN-IGIF aims to translate all these concepts to more practical implementation guidance for use by Member States, the World Bank, international organizations, supporting NGOs, academia, the private sector and others. It does this by leveraging seven (7) underpinning principles, providing eight (8) goals and nine (9) strategic



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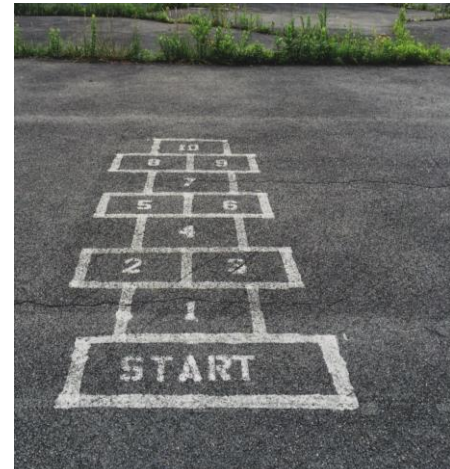
pathways as a means for governments to establish more effective geospatial information management practices and policies.

There is a specific focus within the UN-IGIF on issues related to the enduring sustainability of geospatial information management in a country. This means that particular attention is given to longer-term financial sustainability, multi-stakeholder approaches, capacity and capability development, and innovation and communication; while also addressing more technical aspects such as data maintenance and standards.

While the emphasis of the UN-IGIF is towards the nation and national government needs, the approach is applicable and scalable to other functional levels of government, including at regional and local levels. The intent is to provide an inclusive and engaging mechanism to bring collaboration, coordination and cohesion across a country, including government institutions and the private sector, for the purposes of developing, strengthening and integrating arrangements in national geospatial information management.

The UN-IGIF is also a mechanism for articulating and demonstrating national leadership, cultivating champions and developing the capacity of leaders to take positive steps to achieve the vision for the effective use of geospatial information to measure, monitor and achieve sustainable social, economic and environmental development - leaving no one behind.

It is recognized that the socio-economic aspirations of many countries converge around a more sustainable and resilient future where economic prosperity will benefit all of society and support the health and well-being of communities and individuals equitably. The successful pursuit of these goals means overcoming many data availability and data integration hurdles. Therefore, the UN-IGIF considers both the provider and user communities. Both must work together on this journey if tangible benefits are to be achieved for countries.



**The UN-IGIF is a mechanism for articulating and demonstrating national leadership, cultivating champions, and developing the capacity to take positive steps.**

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## INTRODUCTION

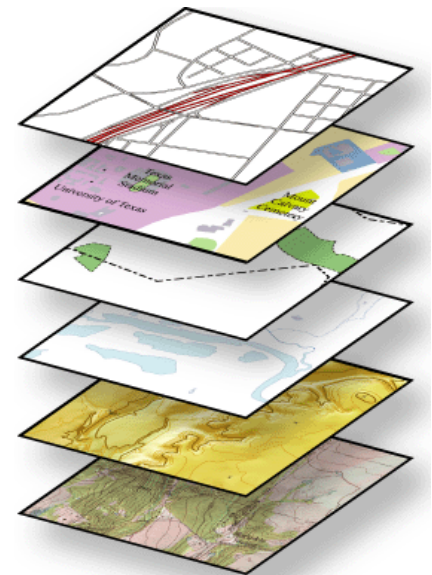
*“Everything happens somewhere”* – a well coined UN-GGIM phrase. For centuries maps have been used for defence, trade, navigation, land and resource management, infrastructure planning, and for administration. Decisions are made based on knowledge of the environment provided by maps; the better the maps the better the decisions.

Today, digital geospatial information provides far more value than just a map. Geospatial information is data that is referenced to a location or place, such as geographic coordinates, an address, a building, or even a vehicle travelling along a road, ships at sea, and satellites in orbit. It describes the location of ‘where’ all things are, and provides the digital connection between people, their place, their activities, and their environment.

It is an essential national information resource with proven societal, economic and environmental value that enables government systems and services, and national development initiatives, to be integrated using ‘location’ as a common and underpinning reference frame. With the development of hand-held devices and telecommunications technologies, we are already witnessing its use in what are now common applications and services – Uber, Airbnb, Amazon, etc. – to name a few.

Geospatial information reflects the digital version of our physical world, in which all human, economic and environmental activity takes place. Comprising both data and enabling technologies, geospatial information touches many sectors and thematic areas across the entire development paradigm. Geospatial data is a vital component of the overall information and management systems related to the Earth and human activities. It enables us to not only map the current situation on Earth, but also the modelling of nature’s processes or spread of disasters.

Citizens, communities, business sectors, governments, and many other stakeholders benefit, on a daily basis and often unknowingly, from the use of geospatial information and related location-based services. This is because geospatial information provides the digital connection between a place, its people and their activities, and is used to illustrate what is happening – where, how and why. It is also used to model and portray the impact of the past, the present and likely future scenarios.



**Geospatial information is a critical component of the national infrastructure and knowledge economy; a blueprint of what happens where, and the means to integrate a wide variety of government services.**

Due to its cross-cutting nature, geospatial information is a nation’s ‘digital currency’ for evidence-based decision-making. It is a critical component of a national infrastructure and knowledge economy that provides a nation’s blueprint of what happens where, and the means to integrate a wide variety of government services that contribute to economic growth, national security, sustainable social development, environmental sustainability and national prosperity.

All governments, both at the national and local levels, hold considerable quantities of geospatial information and location data, for example databases of schools and school performance, flood risk data and mobile phone ownership data. However, this information is often not current, shared or of sufficient quality for effective decision-making.

In contrast, a geospatially-enabled nation is one that shares, integrates and uses a wide range of data to achieve social, economic and environmental benefits. This use and associated benefits extend across governments, businesses and citizens, and from national to city and small community levels.

Governments by their nature understand applications that are more traditionally geospatially-enabled; many of which are expressed in the SDG, such as:

- Land administration and management
- Environmental protection
- Planning and land use
- Agriculture
- Water management
- Defence and national security
- Forest management
- Disaster management
- Infrastructure development
- Statistics and demographics
- Marine information
- Address management
- Telecommunications
- Urban planning

The strength of the UN-IGIF is that it also supports a far wider range of application areas and societal challenges, for example:

- Climate change
- Tourism
- Health and Education
- Economic development
- Industrial development
- Energy transition
- Water, energy and food nexus
- Smart cities
- Smart transportation
- Citizen engagement
- Risk management
- Crime investigation



**The strength of the UN-IGIF is that it supports a wide range of societal applications and needs. The use and associated benefits of geospatial information extend across governments, businesses and citizens, and from national to city and small community levels.**

- Social inclusion
- Population growth

Geospatial information is the underpinning infrastructure for all these applications, thematic areas, and disciplines. The integration of location-based information with other data of relevance to our lives and livelihoods is key to providing better, and useful information for better insights towards shared understandings, which in turn will enable us to better achieve local, national and international goals and informed decision-making for the benefit of all. The UN-IGIF now provides the mechanism for countries to act. It is designed to leave no one behind.

## CASE FOR CHANGE

Geospatial information has emerged as a major contributor to socio-economic transformation in many countries. Yet, there is still a considerable lack of awareness and understanding of the vital and integrative role of geospatial information and related enabling architectures, such as National Spatial Data Infrastructures (NSDIs), in contributing to national development.

This lack of awareness is particularly common at the policy and decision-making levels in developing countries. National policies, and technical capacities and capabilities, need to be better aligned and considerably strengthened so that all countries have the opportunity to develop and contribute to a vibrant national geospatial information ecosystem.

At the national government level, it is recognized that there needs to be more institutional collaboration, interoperability and integration across the various national data information systems and platforms that exist; particularly those related to people and place - statistics, administrative, environment, Earth observations, etc.

Essential data management policies, practices, integration and analytical capacities are currently limited in many countries and are a significant challenge in developing countries. Geospatial information has been typically collected in organisational silos; resulting in data duplication, and the use of different standards, formats and classifications. This has made data harmonisation, maintenance and integration problematic.



**There needs to be more institutional collaboration, coordination, interoperability and integration across the various national data information systems and platforms.**



The 2030 Agenda for Sustainable Development, the Sendai Framework for Disaster Risk Reduction 2015–2030 and the Small Island Developing States Accelerated Modalities of Action (SAMOA) Pathway unequivocally call for globally coordinated actions in new data acquisition and integration approaches. There is also a need for employing geospatial information for sustainable development and for disaster risk reduction, and to strengthen the availability and accessibility of geospatial data platforms.

To meet this ‘call to action’, countries need to develop, strengthen and modernize their approaches to geospatial information management, including aspects relating to geospatial information - policies and legal documents, governance, data integration and infrastructure, education, innovation, use and collaboration. This applies across institutions and infrastructures, capacities and capabilities, and citizen-centric and user-friendly delivery systems, to ensure investment leads to desired outcomes and benefits at all levels. In most low- and middle-income countries there is no internationally accepted framework for governments to determine how this can be implemented and how geospatial information can be integrated into national development strategies and agendas.

ECOSOC established UN-GGIM in 2011 to take concrete action to strengthen international cooperation in global geospatial information management. Now, more than a decade later, UN-GGIM has global mandates to make joint decisions and set directions on the production, application and use of geospatial information within national, regional and global policy frameworks, and to position geospatial information to effectively address global challenges, specifically in support of the 2030 Agenda for Sustainable Development. UN-GGIM critically provides a forum for Member States to develop and strengthen their national geospatial information management and systems capabilities and capacities.

In 2017 the United Nations and the World Bank agreed to collaborate on a joint vision to promote growth and prosperity through creating and strengthening geospatial information capacity and development. The objective being to develop an integrated geospatial information framework that countries can use to develop and enhance their own geospatial information management. The outcome is this UN-IGIF, which has been progressively developed and refined by UN-GGIM since 2018.



**To meet the ‘Call to Action’, UN-GGIM and the World Bank collaborated on a joint vision to promote growth and prosperity through strengthening geospatial information management.**

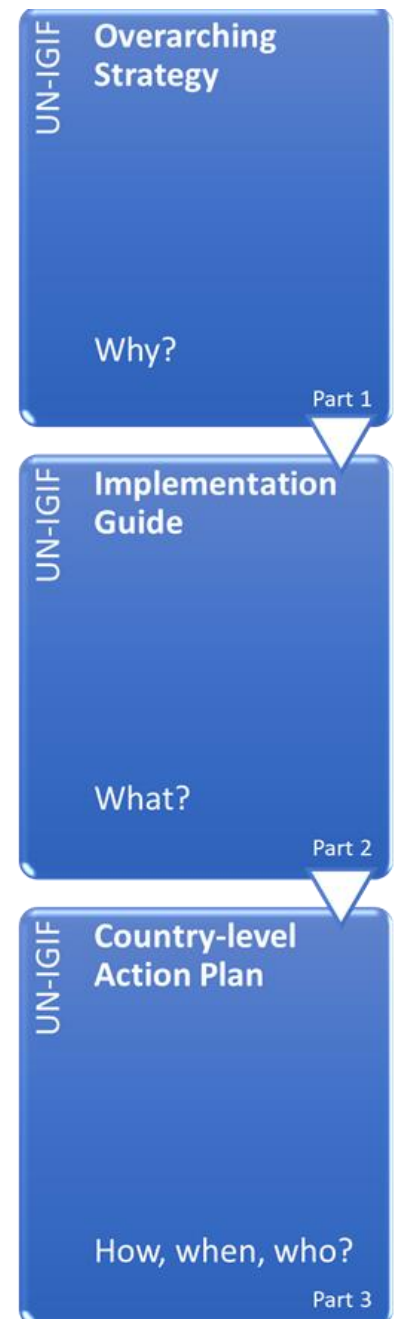
## DOCUMENT STRUCTURE

As shown in Figure 2, the UN-IGIF comprises three parts as separate, but connected, documents.

**Part 1: Overarching Strategy** presents the forward-looking strategic elements of the UN-IGIF, built on national needs and circumstances, and provides the overarching strategic messages and more expansive and integrated national framework, particularly focusing on policy, perspectives and elements of geospatial information. It sets the context of ‘why’ geospatial information management is a critical element of national social and economic development via seven (7) underpinning principles, eight (8) goals and nine (9) strategic pathways that lead to a national approach that takes account of national circumstances, priorities and perspectives. The Overarching Strategy of the UN-IGIF is intended for a wide range of stakeholders – these primarily being high-level policy and decision makers, institutions and organizations within and across government.

**Part 2: Implementation Guide** is the detail document that provides the ‘what’, the specific guidance and actions to be taken in implementing the UN-IGIF. Expanding on each of the nine strategic pathways, the Implementation Guide comprises reference guides, good practices and specific principles for each of the strategic pathways, including those generated through each of the Subcommittee, Expert and Working Groups of UN-GGIM. The aim is to provide a reference resource and guidance for governments to establish ‘nationally’ integrated geospatial information frameworks in countries in such a way that transformational change is enabled, visible and sustainable.

**Part 3: Country-level Action Plan** is specific to and completed by each country. Country-level Action Plan templates are available for countries to use and detail ‘how’ the guiding principles, options, and actions specified in the Implementation Guide will be carried out, when and by whom. The Country-level Action Plan is informed by the processes, templates and tools that are available through the Guide, in the appendices. Completing these steps is necessary to first develop a plan of action, and then operationalize the IGIF through its subsequent implementation, and aligned with national priorities. Importantly, the Country-level Action Plan is a plan, not a program that is implemented.



**Figure 2:** The 3 component documents of the UN-IGIF.

# UNITED NATIONS INTEGRATED GEOSPATIAL INFORMATION FRAMEWORK (UN-IGIF)

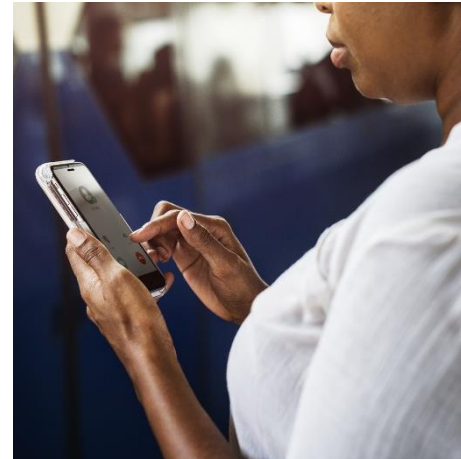
The United Nations Integrated Geospatial Information Framework (UN-IGIF) can be used to inform and contribute to national development plans (Figure 3). The Framework highlights how relevant geospatial information can be utilized while exploiting accessible and available technologies to support developing countries and regions to establish and enhance geospatial capabilities through the use of appropriate frameworks, methods, guidelines and standards which can be piloted, replicated and delivered within and across countries and regions.

The UN-IGIF presents a forward-looking approach that creates an enabling environment where national governments can coordinate, develop, strengthen and promote the efficient and effective use and sharing of geospatial information for policy formulation, decision-making and innovation. It establishes a common vision for all government agencies, expresses the goals that will realize the vision, the actions that need to be implemented to achieve the goals, and the outcomes and benefits necessary to support national development.

Importantly, the UN-IGIF is not an infrastructure. It is a standalone ‘framework’, independent of Spatial Data Infrastructures (SDIs), National Spatial Data Infrastructures (NSDIs) and any other infrastructures. However, the UN-IGIF fundamentally recognizes, builds upon, and augments previous investments and substantial achievements in planning and implementing SDIs and NSDIs.

The UN-IGIF also provides a mechanism by which citizens and the community can discover, view and obtain meaningful and accurate information about their country and community from different organizations; while reducing the burden on the user to locate, access, and use traditionally disintegrated data themes.

Community participation is an integral part of the UN-IGIF. Local knowledge, in conjunction with scientific methods and government data resources, enhances our understanding of our natural and built environments.



**The UN-IGIF is an enabler for coordinating, developing, strengthening and promoting the effective sharing of geospatial information for policy formulation, decision-making and innovation.**

<b>VISION</b>								
The efficient use of geospatial information by all countries to effectively measure, monitor and achieve sustainable social, economic and environmental development – leaving no one behind								
<b>MISSION</b>								
To promote and support innovation and provide the leadership, coordination and standards necessary to deliver integrated geospatial information that can be leveraged to find sustainable solutions for social, economic and environmental development.								
<b>STRATEGIC DRIVERS</b>								
National Development Agenda • National Strategic Priorities • National Transformation Programme • Community Expectations • Multilateral trade agreements • Transforming our World: 2030 Agenda for Sustainable Development • New Urban Agenda • Sendai Framework for Disaster Risk Reduction 2015–2030 • Addis Ababa Action Agenda • Small Island Developing States Accelerated Modalities of Action (SAMOA Pathway) • United Nations Framework Convention on Climate Change (Paris Agreement) • United Nations Ocean Conference: Call for Action								
<b>UNDERPINNING PRINCIPLES</b>								
Strategic Enablement	Transparent and Accountable	Reliable, Accessible and Easily Used	Collaboration and Cooperation	Integrative Solution	Sustainable and Valued	Leadership and Commitment		
<b>GOALS</b>								
Effective Geospatial Information Management		Increased Capacity, Capability and Knowledge Transfer		Integrated Geospatial Information Systems and Services		Economic Return on Investment		
Sustainable Education and Training Programs		International Cooperation and Partnerships Leveraged		Enhanced National Engagement and Communication		Enriched Societal Value and Benefits		
<b>STRATEGIC PATHWAYS</b>								
<b>Governance and Institutions</b>	<b>Policy and Legal</b>	<b>Financial</b>	<b>Data</b>	<b>Innovation</b>	<b>Standards</b>	<b>Partnerships</b>	<b>Capacity and Education</b>	<b>Communication and Engagement</b>
Governance model Leadership Value proposition Institutional arrangements	Legislation Policies, norms and guides Data protection, licensing and sharing Governance and accountability	Business model Opportunities Investment Benefits realization	Data themes Custodianship, acquisition and management Data supply chains Data curation and delivery	Technological advances Process improvement Innovation and creativity Bridging the geospatial digital divide	Standards governance and policy Technology and data interoperability Compliance testing and certification Community of practice	Cross-sector and interdisciplinary cooperation Private sector and academia collaboration International collaboration Community participation	Awareness Formal education Professional training Entrepreneurship	Stakeholder and user engagement Strategic messaging Strategy, plans and methods Monitoring and evaluation
<b>BENEFITS</b>								
Knowledge   Decisions   Development   Society   Economy   Environment   Users   Citizens   Access   Technology   Applications   Value Water   Health   Food   Education   Urbanization   Population   Climate   Disasters   Security   Infrastructure   Oceans   Industry								

**Figure 3: United Nations Integrated Geospatial Information Framework.**

## VISION AND MISSION

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The Vision and Mission statements communicate the overarching aim of the UN-IGIF to stakeholders. The vision statement describes a future state where integrated geospatial information is used to achieve sustainable social, economic and environmental development; and the mission statement is a call to action that will enable governments to achieve the vision.

### Vision

The vision is that governments are able to achieve sustainable social, economic and environmental development through the effective use of national and local geospatial information, systems and capabilities for evidence-based policy and decision-making. The vision statement is a future orientated and aspirational declaration of purpose and being.

The vision recognises the responsibility for countries to plan for and provide better outcomes for future generations, and our collective aspiration to leave no one behind.

Additionally, it recognizes that any national SDG implementations will be optimized using strategies and frameworks that integrate geospatial information into overall national social, economic and environmental development plans.

### Mission

The mission is for countries to promote and support the required innovation, leadership, coordination and standards in order to develop, strengthen, integrate and deliver national geospatial information policy, data, systems, tools, services and capabilities into their national government development policies, strategies and arrangements.

The mission is designed to stimulate action towards bridging the geospatial digital divide; to find sustainable solutions for social, economic and environmental development; and to influence inclusive and transformative societal change for all citizens according to national priorities and circumstances.

## Vision

The efficient use of geospatial information by all countries to effectively measure, monitor and achieve sustainable social, economic and environmental development - leaving no one behind.

## Mission

To promote and support innovation and provide the leadership, coordination and standards necessary to deliver integrated geospatial information that can be leveraged to find sustainable solutions for social economic and environmental development.

## GOALS

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To achieve the overarching vision, the UN-IGIF identifies eight (8) aspirational goals. The progressive achievement of these goals will move countries towards a future state where they have the capacity and skills to organize, manage, curate and leverage geospatial information to advance government policy and decision-making capabilities; bridge the geospatial digital divide; influence inclusive and transformative societal change; achieve economic prosperity and social development; and ensure effective environmental management. The eight goals are:

### **GOAL 1: Effective Geospatial Information Management**

Enabling geospatial information governance, policy and institutional arrangements that ensure effective geospatial information management, accommodate individual organizational requirements and arrangements, and that are aligned to national and regional priorities, and global policy frameworks.

### **GOAL 2: Increased Capacity, Capability and Knowledge Transfer**

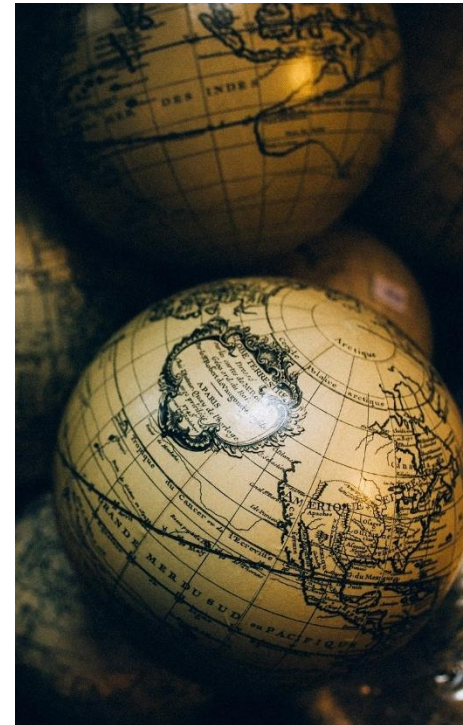
Mechanisms are established to raise awareness of the value and use of geospatial information, promote capacity and capability, and build an inventive and resourceful mindset across government, industry, academia, and the private and community sectors.

### **GOAL 3: Integrated Geospatial Information Systems and Services**

Geospatial information, including community information is integrated and accessible across the government sector and maximized for evidence-based policy and decision-making.

### **GOAL 4: Economic Return on Investment**

An economic return on investment, and other often intangible socio-economic benefits, is realized through best practice management, and the exploitation and innovative use of integrated geospatial information. Provides a means to account for the costs associated with all aspects of a national geospatial information program and the socio-economic value and realised benefits that result from these costs and investment.



**The eight goals reflect a future state where countries have the capacity and skills to organize, manage, curate and leverage geospatial information to advance government policy and decision-making capabilities.**

### **GOAL 5: Sustainable Education and Training Programs**

Education and training programs are established to grow the number of professionals in the fields of geography, data science and geospatial information technology, and to develop specialist skills related to geospatial financial systems, policy and law, and project management.

### **GOAL 6: International Cooperation and Partnerships Leveraged**

International cooperation and partnerships are leveraged and sustained in a way that fosters the management and exchange of geospatial information in support of national development interests. For developing countries, these mechanisms increase development capacity, enhance organizational knowledge and collaboration, and empower creativity and innovation.

### **GOAL 7: Enhanced National Engagement and Communication**

All stakeholder groups, and specifically high-level decision makers and champions, understand and are fully engaged in the value of integrated geospatial information for decision-making and socio-economic development. This creates a greater sense of trust in geospatial information, and in the organizations that provide it.

### **GOAL 8: Enriched Societal Value and Benefits**

Social and economic development, and environmental sustainability is enriched through increased levels of use of integrated geospatial information products and services. Drivers demonstrating the value and benefits of geospatial information include the global development Agendas, transforming government, community expectations, and bridging the geospatial digital divide.



**A major goal is to have well established international cooperation and partnerships that support national development and capacity building interests.**

## **SIGNIFICANCE**

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There is a growing and recognized consensus that interoperable, high quality and timely geospatial information and analysis are a prerequisite for good policymaking. Increases in the amount and variability of data, combined with recent advances in digital and communications technologies, have seen the emergence of geospatial information as a major contributor to better policy formulation and responses to many of

the current social, economic and environmental challenges facing citizens, communities and countries. This is particularly apparent given its ability to integrate both quantitative and qualitative information across multiple platforms and industry sectors and present this information to decision makers in innovative and informative formats.

Conversely, the absence of sufficient reliable, high quality and timely geospatial information leads to delayed and/or poor decisions; and at times no decision. It inhibits effective and efficient distribution of goods and services, restricts economic growth, limits opportunities for progress, and diminishes living conditions and livelihoods, especially where adequate planning is deficient.

Geospatial information has immense societal and economic value. Citizens, communities, academia, business sectors, governments, and many other stakeholders benefit, on a daily basis and often unknowingly, from the use of geospatial information and related location-based services. The most prevalent aspects of daily life employing geospatial information include simply seeing and knowing where we are on mobile devices and navigating from one location to another. Knowing where a road is, the name of the road and the level of use of the road, helps in diverse applications such as navigation, road maintenance, accident reporting, and potential economic development. The road feature becomes a strategic integrator when showing the relationship to postal addresses for delivering mail to a household or business, serving as a boundary of an administrative unit that links to statistical data used by a community to plan health facilities and the necessary health resources, school attendance, school district delineation, or school bus routing.

These same aspects extend to emergency services when responding to an incident or disaster in a timely way - saving lives and property. This is because geospatial information shows characteristics of the population such as different age groups, and the number of senior citizens or those who are disabled, and links this information to current weather conditions and forecasts. Forecasting supports predictive modelling of the likely impacts of flooding to small neighbourhoods and large communities, and whom may be at risk – including the disabled and senior citizens.

The electric grid is a critical component of the infrastructure of a country. Geospatial information is critical in showing the location of the grid, the need to expand and extend the grid and managing service to electricity



**Geospatial information has immense social and economic value. Citizens, communities, business sectors, governments, and many other stakeholders benefit every day.**



customers, including identifying the location of outages. Geospatial information can also be vital to show the extent of coverage of broadband internet service and other forms of communication, and to plan for improvements to offering these services. These are just a few examples of how geospatial information underpins other forms of critical infrastructure for a country, region or sub-national government. Further, the spread of information and communications technology and global interconnectedness has great potential to accelerate human progress, to bridge the digital divide, to develop knowledge societies, and leverage scientific and technological innovation.

## BENEFITS

### Societal Benefits

Most improvements in government activity have a direct impact on improving lives for citizens. For example, providing health facilities and access to education, clean water and sanitation improves the social well-being of citizens. Good geospatial information integrated with planning, census and health data enables efficient allocation of resources. The same approach allows integrated urban planning incorporating education, employment, health and resilience. The same applies to gender equality, derived from a range of measures, such as improved health and education, security of land tenure and access to transport and employment, all of which are better enabled by geospatial information. Citizen connectivity is increasing, with geospatial information playing a greater part in smartphone applications. This leads to greater demand by industry for quality geospatial information, and equally leads to greater citizen expectations for digital government services.

### Economic Benefits

Economies depend on successful businesses, whether large or small. Geospatial information is used across sectors, from marketing through logistics to insurance, utilities to telecoms. Banks use it for fraud detection and governments to improve taxation. It is estimated that the global economic value of geospatial services is in the order of 0.2% of global gross domestic product. However, these studies cannot be easily extrapolated nation to nation. The ultimate benefit, including the considerable economic benefit, of integrating and strengthening national geospatial information management is that it is a strategic enabler for all levels of government and the broader community.



**The ultimate benefit of integrating and strengthening national geospatial information management is that it is a strategic enabler for all levels of government and the broader community.**

## Environmental Benefits

Sustainable management of the environment, particularly water sources and lakes, forestry, oceans and coastal zones, national parks and crop yield prediction, relies upon geospatial information. Management of climate change impact, and of scarce resources, is a driver for geospatial information, often bringing satellite remote sensing to the fore. Geospatial information brings better measurement of the current situation, monitoring change, planning mitigation, evidence-based decision-making, and then delivering mitigation projects. This is particularly important to small island developing States and other countries highly susceptible to climate change and natural disasters.

## DRIVERS FOR CHANGE

### Benefits are a Key Driver for Change

Many socio-economic and environmental benefits can be measured and, through demonstrating a positive return on investment, help to make a compelling business case for action. But there are other drivers that governments will need to consider. These are discussed below.

### Strategic Alignment to Global Agendas

Contributing to, and aligning with, global development agendas is frequently a driver for maintaining quality geospatial information to better inform government policy and demonstrate national progress globally. At present the 2030 Agenda for Sustainable Development, Sendai Framework for Disaster Risk Reduction, Paris Agreement, New Urban Agenda, and others are global drivers, with geospatial information helping assess and measure and monitor progress, as well as supporting target delivery. Agenda 2063, the future we want for Africa, is a regional driver, and equally INSPIRE, backed by legislation, is a driver for European countries. These frameworks respond to both the global and regional agendas.

### Community Expectations

Community expectations evolve with advancements in technology and the increase in computer literacy. Governments are recognizing the need to maintain relevance with prevailing societal needs. This generates a need to deliver up-to-date geospatial information in a way that can be visualized and integrated anywhere, anytime and on any electronic



**Global development agendas are a major driver for maintaining quality geospatial data to better inform policy and demonstrate national progress.**

device. Staying abreast of community expectations and having a sense of where the best public value lies is a key responsibility of government. This Framework responds to these community aspirations.

### Transforming Government

Geospatial information management is a core element to governments following transformation agendas. It enables integration of shared data, improving transparency and evidence-based decision-making. In so doing, it is also reducing costs to government. In many governments geospatial information is a key component of government open data agendas, stimulating opportunities, including effective and efficient citizen-centric government delivery systems.

### Bridging the Digital Divide

Geospatial information management technologies and processes, from satellite sensors through geospatial cloud services to smartphone applications, can give governments, businesses and communities an opportunity to improve efficiency and encourage innovation. There are two types of outcomes going forward: (a) national institutions can be 'left behind', and governments become reactive to the drivers of non-government organizations; or (b) countries can 'leapfrog' other contemporary institutions using the most advanced and cost-effective methods to bridge the digital divide without delay and deliver benefits early.



**Recognising the importance of geospatial information is the first step towards overcoming barriers to implementation and bridging the digital divide.**

## BARRIERS TO SUCCESS

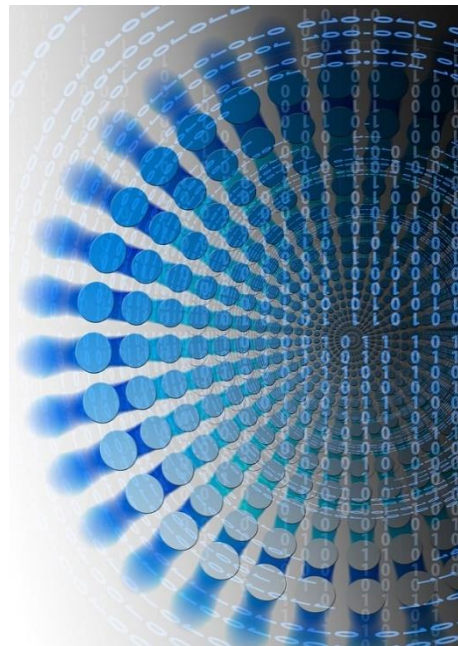
Barriers do exist in making the case for acknowledging the need for, and benefits of geospatial information, particularly as the benefits often accrue long after the initial investment. It is then often intangible, or at least difficult, to ascertain the role and value of geospatial information in the outcome. Reluctance to invest in geospatial information, prioritising resources, resistance to change, and the absence of a geospatial information use and policy culture, are examples of the major barriers that impede progress and success. Explaining what geospatial information is, why it is important, and how it contributes to the mandate, vision, goals, and objectives of a government or organization is a first step in offering a path forward.

Recognition of the importance of geospatial information is followed by the need to invest. There are costs and resource commitments required to plan and implement a successful, functional geospatial capability. Having access to funding, either through a government-provided investment or other source, such as a donor, is needed. How much investment is required is then determined by the scope and approach.

Starting small by addressing one national priority is one approach; planning for a full implementation is another. In either case, the level of funding required is estimated based on the proposed approach and the anticipated outcomes. It is important to consider where functional and technical capabilities are developing so that plans are not hampered by a dated or defunct approach. For example, not long ago the only option for processing voluminous amounts of geospatial data was to procure, install, and maintain large servers, which translated into costs for hardware, technical expertise, and space. With the introduction of the Cloud, new capabilities are possible that shift internal responsibilities to external services. Rather than scaling and paying for the maximum storage and processing throughput, customers only pay for what they use. This also relieves an organization from some of the IT burdens associated with managing comparable services in-house.

Human resources are another potential barrier to effective planning, implementation and maintenance of geospatial information and services. Knowledge of geography, geospatial information technology, and data management are key skills that are preferable for success. In situations where these skills are not yet developed or available, other options include hiring the necessary expertise, training staff in core capabilities, or acquiring external help by donors or consultants. Maintaining qualified staff is another challenge where techniques to minimize staff turnover contribute to stability of the program. Retention techniques include offers of training, pay and benefits incentives, increased program responsibility, position promotion, and travel opportunities supporting the program. Outsourcing certain functions, especially those that involve the need for high level skills, is another option.

Data sharing is a barrier that reflects the culture and/or policy of a government or an organization. There is value to each instance of geospatial information and there's greater value when that data is joined, shared, compared, or integrated. Either with other geospatial data, or other data types such as geospatially referenced statistical data. For example, an administrative area, such as a city boundary, can be linked



**Barriers to storing vast amounts of data can now be overcome with the introduction of the Cloud. New capabilities make it possible to shift internal responsibilities to external services.**

using geocodes to the poverty level of its inhabitants (statistical data); the resulting integrated information is visually informative on its own on a map, but can also be compared with other cities throughout the region or nation. The result is a knowledge indicator for planning, decision-making and monitoring. When the practice of an organization either does not allow for the geospatial data use, not only is the data underutilized, but it precludes innovative uses of various data types for different purposes. Making data available, and collaboration across organizations that encourage data sharing and data use, are examples of mitigations to the barrier.

## UNDERPINNING PRINCIPLES

The UN-IGIF identifies seven (7) underpinning principles. These principles represent the key characteristics and values that are to be used by countries as a guide when implementing the Framework. How these principles are applied will depend on the implementation approach adopted by each country. The principles are the generic compass for implementation but allow for methods to be tailored to individual country needs and circumstances. Adherence to these principles will deliver consistent geospatial information management, resulting in more open, accountable, responsive, and efficient government. The seven principles (and values) that underpin the UN-IGIF are:

### **PRINCIPLE 1: Strategic Enablement**

The implementation of the Framework requires political and financial support to be fully ‘enabled’ and should therefore align with and support government’s strategic directions on issues such as economic growth, social well-being, job creation, poverty reduction, natural resource monitoring, and environmental management and preservation.

### **PRINCIPLE 2: Transparent and Accountable**

Government geospatial information is developed and shared according to key accountability and transparency guidelines so that all citizens, government agencies, academia and the private sector have access to this valuable and underpinning national information resource.



**The principles are the key characteristics and values that provide the compass for implementing the UN-IGIF, and allow for methods to be tailored to individual country needs and circumstances.**

### **PRINCIPLE 3: Reliable, Accessible and Easily Used**

Geospatial information is reliable and authoritative, and made accessible and usable so that it can be leveraged for decision-making, research and development, used to stimulate innovation, and to support the creation of sustainable services and products to advance social, economic and environmental development.

### **PRINCIPLE 4: Collaboration and Cooperation**

Collaboration and cooperation (between government, business, academia, civil society and donors) are factored into the implementation of the Framework to strengthen information-sharing between providers and users, reduce duplication of effort across the government sector, make for a robust information system, as well as providing coordination and clarity on roles and responsibilities.

### **PRINCIPLE 5: Integrative Solution**

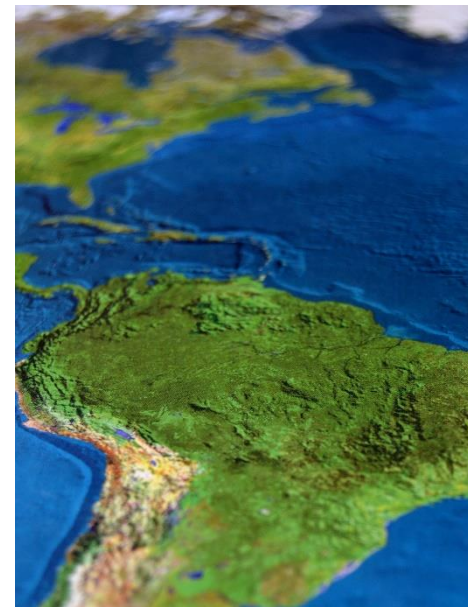
The implementation of the Framework is to be integrative in nature – and consider how people, organisations, systems, and policy and legal structures work together to form an effective and holistic system for managing geospatial information and its use within the data ecosystem.

### **PRINCIPLE 6: Sustainable and Valued**

The implementation of the Framework will be conducted in such a way that it enhances national efficiency and productivity; is enduring and sustainable in the long term; and is deployed in a way that provides improved and valued government services to citizens.

### **PRINCIPLE 7: Leadership and Commitment**

Importantly, the implementation of the Framework will require strong leadership and commitment, often at the highest level, to enhance the long-term value of investments in geospatial information. This will be achieved through careful analysis, prioritization and sequencing to develop an action plan that carefully applies interventions in the short, medium and long-term, and that can receive high-level endorsement and support by government.



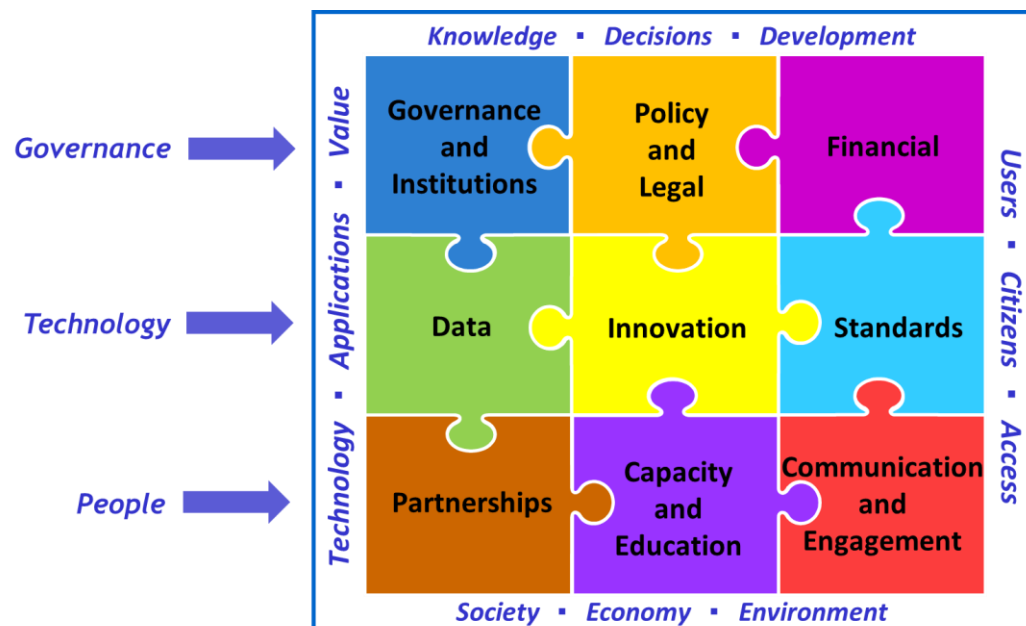
**A key principle is that collaboration and cooperation are factored into the implementation of the UN-IGIF to strengthen information sharing.**

## STRATEGIC PATHWAYS

The UN-IGIF is anchored by and implemented through nine (9) strategic pathways in three (3) main areas of influence: governance; technology; and people. The objective of these strategic pathways is to guide governments towards implementing integrated geospatial information systems in a way that will deliver a vision for sustainable social, economic and environmental development.

The strategic pathways are presented as separate pieces of a jigsaw puzzle in recognition that there are many aspects and dimensions to each individual pathway, and that when joined together, the UN-IGIF is connected, integrated and implemented. Figure 4 illustrates the nine strategic pathways surrounded by some of the benefits that can be realised when implemented together.

Each strategic pathway contains four key elements as the enabling components or requirements for the strategic pathway to be implemented. The key elements are a derivative of the pathways at a lower level of detail and are intended to enable concepts to be more concrete and understandable for countries. Each of the nine strategic pathways and their four key elements are expanded and explained in some detail below. These then form the basis for the more detailed specifics and actions to be taken in implementing the UN-IGIF in Part 2: Implementation Guide.



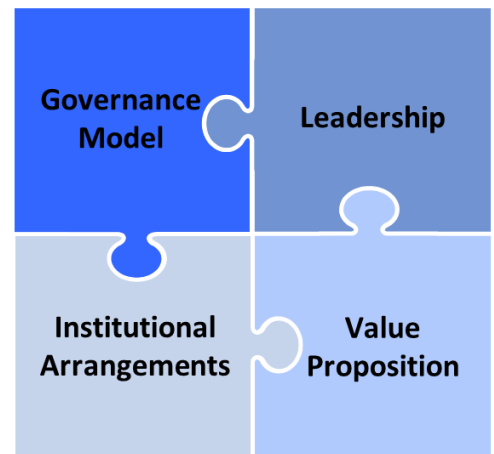
**Figure 4:** The UN-IGIF is anchored by nine strategic pathways and three main areas of influence. Once implemented, the strategic pathways realize many benefits.

### STRATEGIC PATHWAY 1

## Governance and Institutions

This **strategic pathway** establishes the leadership, governance model, institutional arrangements and a clear value proposition to strengthen multi-disciplinary and multi-sectoral participation in, and a commitment to, achieving the UN-IGIF.

The **objective** is to attain political endorsement, strengthen institutional mandates and build a cooperative data sharing environment through a shared vision and understanding of the value of the UN-IGIF and the roles and responsibilities to achieve the vision.



### STRATEGIC PATHWAY 2

## Policy and Legal

This **strategic pathway** establishes a robust policy and legal framework that is essential for instituting effective, efficient, and secure management and exchange of geospatial information - nationally and sub-nationally.

The **objective** is to address current policy and legal issues by improving the policies and laws associated with, and having an impact on, geospatial information management. This is achieved by proactively monitoring the policy and legal environment, including mandating responsibility for the production of data, and keeping abreast of issues and challenges arising from the evolving, innovative and creative use of geospatial information and emerging technologies.

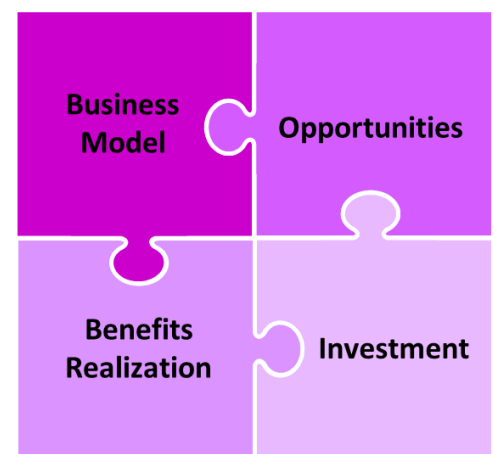


### STRATEGIC PATHWAY 3

## Financial

This **strategic pathway** establishes the business model, develops financial partnerships, and identifies the investment needs and means of financing for delivering the UN-IGIF, as well as recognizing the milestones that will achieve and maintain momentum to realize benefits.

The **objective** is to achieve an understanding of the financial plans required to establish and maintain the UN-IGIF, as well as the longer-term investment program that enables government to respond to evolving societal, environmental and economic demands for geospatial data.



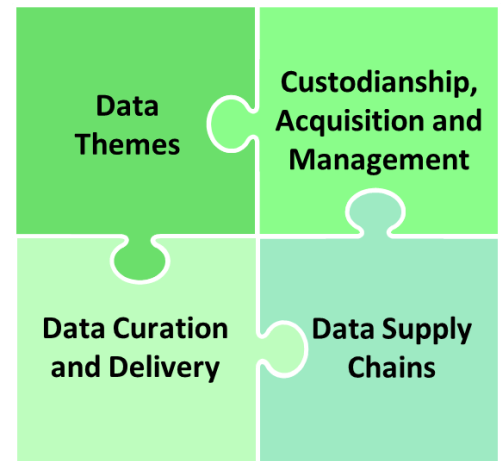


#### STRATEGIC PATHWAY 4

## Data

This **strategic pathway** establishes a geospatial data framework and custodianship guidelines for best practice collection and management of integrated geospatial information that is appropriate to establish and sustain cross-sector and multidisciplinary collaboration.

The **objective** is to enable data custodians to meet their data management, sharing and reuse obligations to government and the user community through the execution of well-defined data supply chains for organizing, planning, acquiring, integrating, managing, maintaining, curating, publishing and archiving geospatial information.

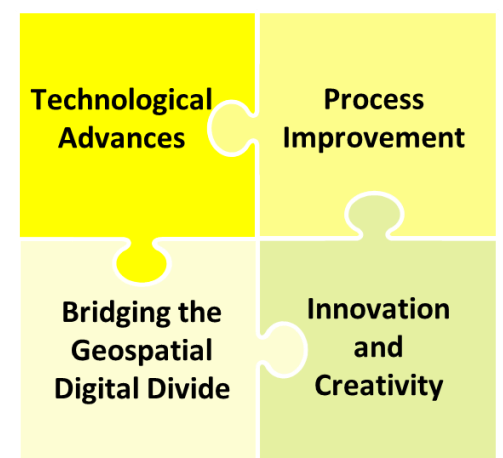


#### STRATEGIC PATHWAY 5

## Innovation

This **strategic pathway** recognizes that technology and processes are continuously evolving; creating enhanced opportunities for innovation and creativity that enable governments to quickly bridge the digital divide and transition towards the future geospatial information ecosystem.

The **objective** is to stimulate the use of the latest cost-effective technologies, process improvements and innovations so that governments, no matter what their current situation is, may leapfrog to state-of-the-art geospatial information management systems and practices.

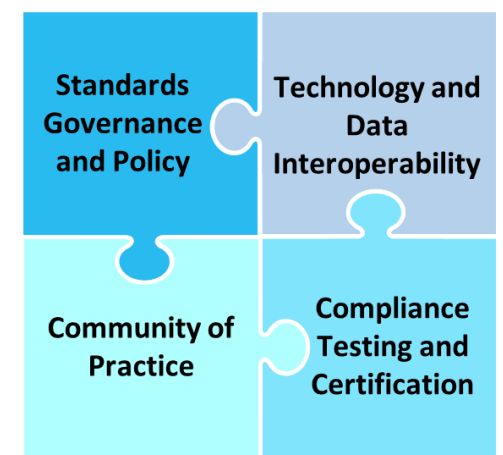


#### STRATEGIC PATHWAY 6

## Standards

This **strategic pathway** establishes and ensures the adoption of standards and compliance mechanisms for enabling data and technology interoperability to deliver integrated geospatial information and to create location-based knowledge.

The **objective** is to enable an efficient and consistent approach for different information systems to be able to discover, manage, communicate, exchange and apply geospatial information for a multitude of uses, improved understanding and decision making.



## STRATEGIC PATHWAY 7

### Partnerships

This **strategic pathway** establishes cross-sector and interdisciplinary collaboration, cooperation and coordination with all levels of government, the geospatial industry, private sector, academia, and the international community, as an important premise to developing and sustaining the UN-IGIF.

The **objective** is to create and sustain the value of geospatial information through a culture based on inclusion, trusted partnerships and strategic alliances that recognize common needs, aspirations and goals, towards achieving national priorities and outcomes.



## STRATEGIC PATHWAY 8

### Capacity and Education

This **strategic pathway** establishes enduring capacity development and education programs so that the value and benefits of integrated geospatial information management is sustained for the longer term.

The **objective** is to raise awareness, build and strengthen knowledge, competencies, skills, instincts, processes, resources, and innovative entrepreneurship that organizations, communities and individuals require to utilize geospatial information for evidence based decision-making and effective service delivery.



## STRATEGIC PATHWAY 9

### Communication and Engagement

This **strategic pathway** recognizes that stakeholder identification, user engagement and strategic communication are essential to successfully deliver UN-IGIF arrangements nationally and sub-nationally for sustainable social, economic and environmental development.

The **objective** is to ensure effective communication and engagement to enhance and deepen participation and contributions from all stakeholders and at all levels. Commitment, mutual understanding, collaboration, cooperation and communication are essential to successfully implement the UN-IGIF with organizations and stakeholders.



## SUMMARY

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As a Framework for all countries, the UN-IGIF is taking a globally prominent role. While it was designed specifically for low to middle income countries and small island developing States, it is also being used to improve and coordinate activities to achieve alignment between and across existing national agency capabilities and NSDIs in developed countries.

The UN-IGIF has allowed many countries to conduct the processes necessary to promote the efficient and effective use and sharing of geospatial information, including helping with the implementation of NSDIs, through different levels of government and society for decision-making and innovation. It is also being implemented and referenced in national geospatial policies and strategies, including by development partners, as a tangible means to create an enabling environment where national governments can coordinate, develop, strengthen, and promote the efficient and effective use and sharing of geospatial information for policy formulation, decision-making, and innovation. The UN-IGIF is also an engagement tool to bring about understanding, coordination, collaboration and coherence across government when working towards strengthening national geospatial information management.

Noting the increased significance of the UN-IGIF, as an instrument that is now embedded across all the work areas of UN-GGIM, and which is continuously evolving, in 2020 UN-GGIM established the High-level Group of the Integrated Geospatial Information Framework (HLG-IGIF) to provide the ongoing strategic leadership, coordination and oversight to ensure the sustained success of the UN-IGIF, and to maintain its momentum and refinement.



**Strengthening geospatial information management will assist countries in bridging the geospatial digital divide, secure socio-economic prosperity, and leave no one behind.**