[March 2025]

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.*

Summary

A strong and enabling policy and legal environment is essential for effective geospatial information management. These frameworks are particularly important as they influence many other strategic pathways within the Integrated Geospatial Information Framework (IGIF). Policy and legal considerations can be categorized into instruments—some binding, others non-binding. Both types are crucial to addressing the wide range of legal and policy issues that affect the collection, use, storage, and distribution of geospatial information. While some issues are directly tied to geospatial information management, others, though more indirectly related, are still vital for the overall framework

Well-designed policy and legal frameworks proactively support the development of geospatial information management and the effective and efficient use of geospatial information, facilitating the realization of its benefits and for the public good. A robust policy and legal environment is key to organizing and improving geospatial information arrangement, optimizing the use of geospatial information, and safeguarding national interests. Countries are encouraged to leverage the full potential of robust policy and legal frameworks by implementing coherent, public-sector-wide policies and interoperable legislation, ensuring alignment with broader national strategies to achieve the country's strategic priorities.

The purpose of this pathway is to promote and support the effective and secure management and application of geospatial information while balancing national security and privacy concerns. All policy and legal frameworks share four key elements essential for creating and maintaining an enabling environment for geospatial information management, while actively adapting to technological advancements.

These four elements are:

- **Legislation** – laws and regulations that provide the legal framework in which geospatial policies must operate. These laws and regulations may be specific to geospatial information management or closely related.

- **Policies, Norms and Guides** – are typically aspirational and relatively straightforward to develop and implement. They include proven practices that provide good direction for strengthening geospatial information management.
- **Data Protection, Licensing and Sharing** – are used to address complex legal issues with data, including risks and safeguards, sharing and dissemination, and licensing issues including copyright and public domain status, which impact the availability, accessibility and application of geospatial information.

- **Governance and Accountability** – the policy and legal framework within a country or jurisdiction that fosters effective management and use of geospatial information and leads to, promotes and support good governance, data-driven decision-making, efficient implementation and accountability.

These elements are underpinned by principles that lead to sound and robust policy and legal framework, adaptable to each country's needs. These principles are operationalized through several strategic actions that proactively consider, address and deliver key legal and policy instruments and provisions for strengthening integrated geospatial information management. The overall structure for this policy and legal strategic pathway is illustrated in and anchored by Figure 2.1.

When implemented the actions (and their interrelated actions[1]) will enable the achievement of the four elements, which in turn will deliver significant and sustainable national outcomes and benefits for a country. These outcomes include:

- A well-defined, sound and enabling policy and legal environment that maximizes the value and utility of geospatial information while safeguarding national and institutional interests;
- Effective and secure management, sharing, integration and application of geospatial information;
- Policy and legal frameworks that evolve over time, respond to societal progress and technological advancements, keeping pace with rapidly changing demands; and
- Clarity in responsibilities and mandates, strengthening governance, accountability, and institutional coordination in geospatial information management.

[1] The interrelated actions across all Strategic Pathways are described in detail in the introductory chapter; Solving the Puzzle: Understanding the Implementation Guide.

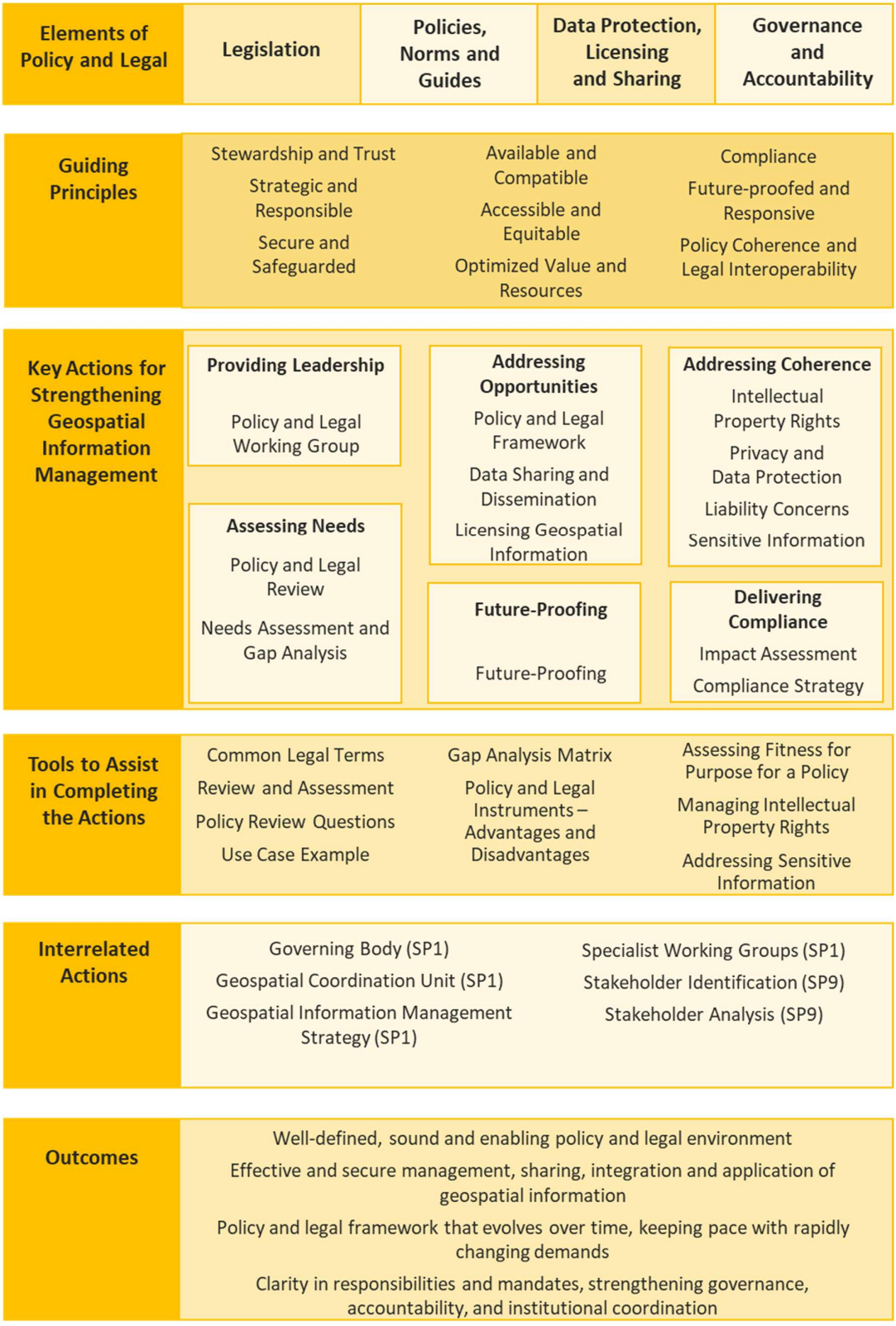

Figure 2.1: *The overall structure for the Policy and Legal Strategic Pathway - showing the four key elements, guiding principles, actions and interrelated actions, and the tools provided in the Appendices to support and achieve the outcomes.*

2.1 Introduction

Policies, laws and regulations have a significant influence on geospatial information management.

Policies, laws, and regulations[2] encompass a wide range of legal instruments, including treaties, legislation, presidential or executive orders, administrative measures, and geospatial information licensing arrangements. These may be specifically related to geospatial information or have broader applications, such as privacy, licensing, and liability. International and regional obligations, including treaties and bilateral agreements, also play a significant role.

When implementing the IGIF, it is essential to consider the current policy and legal environment, assess how existing frameworks impact geospatial information management, as well as the effects of technological advancements and evolving user needs. Identifying necessary changes to achieve the desired outcomes is a critical step. A key priority is fostering participatory and inclusive policy development that leads to robust legal and regulatory frameworks for integrated geospatial information management. In many countries, policy and legal frameworks continue to evolve, particularly in areas related to information technology, data governance, and open data initiatives.

Not all laws and policies governing information technology or data explicitly address geospatial information. In some cases, there may be no legal or policy frameworks directly related to geospatial information management, its accessibility, or its application. Therefore, a key initial step is to establish a comprehensive and enabling policy and legal environment specifically tailored to support the effective management and use of geospatial information.

The IGIF strongly emphasizes the importance of a sound and enabling legal and policy framework, as it underpins many of the other strategic pathways. Policy and legal instruments directly influence the availability, storage, accessibility, exchange, application, and overall management of geospatial information. Additionally, it is crucial to consider how to 'future-proof' policy and legal frameworks to keep pace with technological advancements. The rapid advancements in technologies used to collect, analyze and visualize geospatial information, such as using remotely piloted aerial systems or through machine learning, raise a number of unique policy and legal issues.

This Strategic Pathway provides recommended actions to develop adaptable policy and legal frameworks that evolve alongside emerging technologies, software applications, and societal needs. Furthermore, well-designed policy and legal frameworks can proactively support the development of geospatial information management, ensuring that decision-making processes contribute effectively to the broader 'public good'.

The implementation of the 2030 Agenda for Sustainable Development respects national policy space for sustained, inclusive and sustainable economic growth, in particular for developing countries. While remaining consistent with relevant international rules and commitments[3], the Agenda takes into account different national realities, capacities, and levels of development, as well as respecting national policies, laws and priorities.

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[2] A list of supporting common legal terms is included in Appendix 2.1.

[3] Transforming our World: The 2030 Agenda for Sustainable Development (A/RES/70/1), Para 21.

2.2 Context and Rationale

There is a critical need to continually keep abreast of policy and legal issues relating to geospatial information and its application.

Geospatial information is essential for national development, policymaking, and decision-making across all sectors. It is presented in various forms and serves as an integrative platform for digital data with a location component. A new and evolving 'data ecosystem' for sustainable development is emerging—one where collaborative, comprehensive, and well-coordinated information systems provide critical evidence on places, activities, and events. This data ecosystem underpinned by geospatial information enables the timely and reliable delivery of information, supporting residents, organizations, and governments in making accountable, evidence-based decisions. However, these benefits can only be realized when the ecosystem is anchored by clear and well-understood policy and legal frameworks.

The United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM)[4] recognizes the importance of a robust and strong policy and legal framework, a foundation for effective integrated geospatial information management. The geospatial community is urged to actively participate in creating and shaping these frameworks, otherwise, they risk being developed by entities that may not fully understand the complexities and dimensions of geospatial information.

As geospatial information usage expands, users must have confidence that the data they access is 'fit-for-purpose' and accompanied by clear guidance on its use. This becomes particularly important as the demand shifts from geospatial products to geospatial services and solutions, which often require 'future-proofing' to ensure compliance with regulations, such as intellectual property rights and licensing restrictions.

Addressing Disruptive Technologies and Emerging Challenges

The rapid evolution of technology necessitates continuous monitoring of policy and legal frameworks related to geospatial information, as emerging innovations do disrupt existing regulations and policies. Advancements such as robotic sensors, remotely piloted aerial systems, smart infrastructure, the Internet of Things (IoT), autonomous vehicles, pervasive mobile applications, large language models, artificial intelligence, and the digital economy introduce new challenges. Some of these technologies are perceived as intrusive and may test the limits of existing laws, particularly in areas such as privacy, data protection, and good governance. To ensure responsible and adaptive policy and legal frameworks, the policy, legal, and geospatial communities must proactively engage with these developments and refine the frameworks accordingly.

The digital transformation of societies and economies is reshaping conventional practices, particularly where geospatially-enabled information systems support cutting-edge digital business transformations through location-based services. However, not all countries are experiencing this transformation at the same pace. Many face challenges in the availability, storage, accessibility,

[4] UN-GGIM Future Trends in Geospatial Information Management: The five to ten-year vision and its second edition. http://ggim.un.org/documents/Future-trends.pdf and http://ggim.un.org/documents/UN-GGIM-Future-trends_Second%20edition.pdf

exchange, application, and management of geospatial information—issues that span across all levels of government, the economy, and society. Additionally, clarity is needed on data custodianship and governance, both at the national level and for regional and international applications that extend beyond national jurisdictions.

The Need for Forward-Looking Policy and Legal Frameworks

Appropriate policy and legal frameworks can address challenges related to data governance, sharing, and integration while also leveraging the benefits of a forward-looking legal and regulatory approach. The ultimate goal is to establish laws, regulations and policies that maximize the utility of geospatial information while protecting national, jurisdictional, or organizational interests from potential risks related to business, security, and legal liabilities.

Geospatial information management does not operate in isolation—it intersects with broader government information policies and those governing e-Government, national security, export controls, privacy, intellectual property, data availability, open data, standards, education, and statistical and administrative data. Additionally, trade and collaboration with the private sector are often shaped by existing market regulation and stimulus policies. Governments must assess how these existing policies apply to geospatial information management and determine whether refinements or realignments are necessary.

Establishing Fit-for-Purpose Legal and Policy Frameworks

Governments must also consider which policies, regulations and laws should be developed specifically for geospatial information management and which existing laws, regulations and policies in related areas—such as information technology (IT) or open data policies—can be adapted to include geospatial aspects.

Some countries begin with administrative measures, executive orders, or decrees to establish a governing body (see SP1: Action 1.6.1) or a geospatial coordination unit (see SP1: Action 1.6.2) when implementing the IGIF. Others require a more comprehensive approach, such as formal legislation with regulatory provisions. When enacting new laws, policymakers must decide whether to amend existing legislation to incorporate geospatial considerations or create a dedicated law for integrated geospatial information management.

In some cases, geospatial policies evolve into laws, while in others, they are translated into operational guidelines for government agencies. Policymakers must balance the need for specific geospatial legislation with the broader legal framework that already governs areas such as national security, privacy, intellectual property, and liability. For example, space laws may influence a country's ability to collect or share satellite remote sensing data, while privacy and national security concerns may impose restrictions on geospatial data sharing, limiting its potential value. Striking the right balance between data protection and accessibility is essential to ensure that third parties can utilize, adapt, and generate value—both commercial and societal—from geospatial information.

A Country-Specific Approach to Policy and Legal Development

Each country has distinct approaches, circumstances, and priorities that influence the development of policy and legal frameworks for geospatial information management. Regardless of the chosen approach, inclusive participation, stakeholder engagement, and effective coordination are essential.

Clear communication of roles, responsibilities, and objectives—from data accessibility and governance to education and market regulation—is critical to ensuring effective and efficient integrated geospatial information management.

2.3 Approach

The way forward relies on improving policies, regulations and laws, proactively monitoring the policy and legal environment, mandating responsibility and keeping abreast of emerging trends and technologies.

The approach for establishing a sound and enabling policy and legal environment is to address current policy and legal issues. This requires improving existing policies, regulations and laws, proactively monitoring the policy and legal frameworks, mandating responsibility for the production of data, and keeping abreast of the issues and challenges arising from the evolving, innovative and creative use of geospatial information and emerging technologies.

The approach includes four key elements that are a guide for countries to successfully implement the IGIF. These elements include **legislation** to provide the legal framework, appropriate **policies, norms and guides**, **data protection, licensing and data sharing** arrangements, and effective **governance and accountability.** These elements are explained in more detail in section 2.4 below. To implement this strategic pathway, as in all strategic pathways, the approach is dictated by national circumstances. Country-specific priorities and needs may be influenced by existing capabilities, resourcing potential, cultural and other practicalities.

The approach includes strategic pathway actions that are recommended as a means to achieve the four key elements. These actions, which are underpinned by guiding principles, provide the step-by-step guidance to implement and achieve the desired outcomes. While most of these actions may be unique to this strategic pathway, there are several interrelated actions detailed in other strategic pathways that are needed to be completed prior to, or in conjunction with, the strategic pathway actions. Tools to assist in completing the actions are available in the appendices to the strategic pathway. The approach for Strategic Pathway 2: Policy and Legal is illustrated in Figure 2.2 and explained in the following sections.

The actual implementation approach of each strategic pathway action will depend on country-specific needs, which may be influenced by country priorities, existing capabilities, resourcing potential, culture and other practicalities. Regardless, each action should reference the guiding principles below (See Section 2.5) as these describe what is important for effective and efficient geospatial information management.

2.4 Elements

2.4.1 Legislation

Legislation or laws provide the legal framework within which geospatial policies, programs and projects are able to operate.

Legislation or laws refer to a feature of a policy and legal framework that are binding. It is important to note that there are many other equivalent terms that are used that have essentially the same meaning. These include decrees, executive orders, codes, ordinances and regulations. For the purposes of this document, the term 'legislation' or 'law' apply to all of these types of legal instruments. Legislation and laws may be specific to geospatial information (such as legislation on geospatial data sharing) or closely related (i.e., privacy, liability, intellectual property rights management).

Although laws can be generated or created in a number of different ways, each have several similarities, including having force (and thus helping create compliance), and they take a long time to create, amend or change. Well drafted legislation promotes and provides a sound and enabling policy and legal environment for integrated geospatial information management.

2.4.2 Policies, Norms and Guides

Policies, norms and guides are not enforceable under law but have an important role in geospatial information management and use.

Policies, administrative measures, norms, guides and other instruments, often tend to be aspirational, non-binding features of a policy and legal framework. These instruments are useful because they are relatively easy to publish, and can be changed or updated fairly easily., but do not have the force of law and can be difficult to enforce. Nonetheless, these instruments play an important role in the utilization of geospatial information in a country[5].

There are benefits associated with non-binding features of a policy and legal framework. Norms are ultimately what shape behavior and while not legally binding, are key to compliance and to ensuring cultural stability and/or shifts. They are also useful for clarifying the interpretation of the legislative framework and fostering a consistent implementation. Policies, Norms and Guides may not be legally binding but are usually the source documents referred to by organizations adopting them in their decision-making process.

[5] For example, until recently, one of the primary documents outlining the roles of government organization in the collection and sharing of geospatial information in the United States was OMB Circular A-16 (the "Circular"). The Circular is not law, but simply "provides direction for federal agencies that produce, maintain, or use spatial data either directly or indirectly in the fulfillment of their mission and provides for improvements in the coordination and use of spatial data." Moreover, in time, these informal provisions can become law. For example, many components of OMB Circular A-16 were incorporated into the recently passed Geospatial Data Act.

Figure 2.2: *The approach includes actions that are recommended as a means to achieve the four key elements.*

One of the primary benefits of policies, norms and guides is that they are much easier to develop and implement than laws and regulations. As a result, they can be more flexible, which makes them easier for adoption. They can also remain in force longer than an agreement and can apply to both the public and private sectors. In addition, they are the easiest to modify to adapt to new technologies or legal issues that may arise. However, there are also limitations that need to be considered. Since policies, norms and guides are non-binding, they generally cannot be enforced in a court, and only apply to a limited group that has usually 'self-selected' to abide by them. That said, market pressure and integrating non-binding features in formal legal instruments (such as including standards in contracts) can increase their adoption.

2.4.3 Data Protection, Licensing and Sharing

Data protection, licensing and sharing agreements impact the flow of geospatial information.

Many of these are addressed as part of a country's broader policy and legal framework. For example, a Data Protection Act will mandate the process of safeguarding important information, including individual or personal data, from corruption, compromise and/or loss. Also, contracts, agreements, data sharing agreements or licenses are relatively easy for parties to change. However, the arrangements will always remain subject to the applicable policy and legal framework of the country.

Contracts and other forms of agreements between parties can enable the utilization of geospatial information. For example, agreements between local governments and the national government for geospatial data collected by local government contribute to a national fabric of geospatial information to support government programs, policies, and better decision-making. Many agreements are legally enforceable. There are several benefits to using an agreement to address legal issues that restrict or limit geospatial information management access, and use. One benefit is that it often takes less time to negotiate and subsequently sign an agreement. However, agreements have several limitations. One limitation is that typically they are only enforceable between the organizations that enter into the agreement. In addition, agreements will generally terminate after a certain period, after which time they must be renegotiated. As a result, their role can be limited, even though they play an important role in a policy and legal framework in enabling geospatial information management and use.

2.4.4 Governance and Accountability

Governance and accountability are required to lead the development of policies and laws, and enable the mechanisms to strengthen geospatial information management.

There is a need for good governance and accountability to ensure a sound and enabling policy and legal environment leading to the widest use of geospatial information for transformational and sustainable societal, environmental and economic benefits. A robust policy and legal framework addresses the issues that are impacting integrated geospatial information management. In addition, policies and laws provide the compliance mechanisms for effective and efficient integrated geospatial information management; and to address which organization(s) will be responsible for implementing and sustaining the IGIF.

A critical consideration in governance and accountability is whether to designate a lead organization that is primarily responsible for geospatial information management within a country. Then, there is

the collection, production and provision of geospatial information, and whether this may be limited to certain approved entities. For example, national mapping authorities, military mapping units within the national defense force, or commercial operations. A further consideration is appropriate financing, not only to collect geospatial data but also for its maintenance, storage and making it available to third parties. These aspects work together, not in isolation, enabling good leadership, governance and accountability. The potential of robust policy and legal frameworks is maximized through coherent public sector-wide polices and interoperable legislations aligned with, and able to deliver, the country's strategic priorities.

2.5 Guiding Principles

By applying the guiding principles, countries can make progress in strengthening their geospatial information management.

There are specific guiding principles and elements common to a robust policy and legal framework leading to a sound and enabling environment for integrated geospatial information management. While policy and legal instruments will differ between countries and the process for creating and revising these instruments varies, these guiding principles promote robust geospatial legislation, regulations, policies and agreements. Replicating a successful policy and legal framework from one country to another will not work. That said, using and leveraging good ideas and successful implementations, 'adapt to adopt', across countries is encouraged. The guiding principles for policy and legal are:

- **Stewardship and Trust**: Managing geospatial data as trustees for the country and the community, enable its integration with other information. Confidentiality, privacy, security and intellectual property rights are preserved.
- **Strategic and Responsible**: The planning, acquisition and use of geospatial information achieves the most strategic use of resources and avoids duplication of effort.
- **Secure and Safeguarded**: Ensure secure and trustworthy data sharing, dissemination and use. Geospatial information are stored, maintained and accessed in a secure environment and through secure methods.
- **Available and Compatible**: Compatible and consistent with internationally recognized standards, guidelines and good proven practices, facilitates the ease of discovery, accessibility, interoperability and reusability.
- **Accessible and Equitable**: Provision is made for easy, efficient and equitable access to geospatial information where technology, data formats, organizational arrangements, location, costs and conditions do not inhibit its widest and highest use.
- **Optimized Value and Resources**: Geospatial information management is managed and accessed in a way that optimizes resources and maximizes its value and net benefits to the country and the community.
- **Compliance**: There are clear guidelines to help organizations adhere to policies and laws.

- **Future-Proofed and Responsive**: A Framework that is cognizant of and responsive to the changing and emerging technological, economic, societal and personal landscapes with adequate provision for long-term care and value.
- **Policy Coherence and Legal Interoperability:** Policies, laws and regulations working together, through coherent public sector-wide polices and interoperable legislations, to strengthen integrated geospatial information management.

2.6 Actions

The strategic pathway actions are recommended as a means to achieve the four key elements of the Policy and Legal strategic pathway.

Country-specific actions may be influenced by factors such as country priorities, existing legal frameworks, national circumstances, resources, culture and other practicalities. These will influence approaches for implementing each strategic pathway and their related actions.

For ease of use, particularly to assist countries in the initial and early stages of developing and strengthening their national geospatial information management arrangements, the actions are presented in a sequential step-by-step structure. A road map illustrating this order and where the actions typically occur and are completed, is presented in Figure 2.3. However, it is acknowledged that countries, depending on existing national arrangements, may also wish to start their actions at different steps along the pathway, and in a different sequence. Therefore, a less structured road map is additionally presented in Figure 2.4.

Some actions may have interrelated and/or prerequisite actions that need to be achieved prior to, or in conjunction with, the strategic pathway actions. These interrelated actions are also illustrated in Figures 2.3 and 2.4, are referenced in the text, and detailed under other strategic pathways.

Whatever the implementation approach, each action needs to take into account the guiding principles in section 2.5, as these describe drivers for a sound and enabling legal and policy environment for effective and efficient geospatial information management.

The actions for the Policy and Legal Strategic Pathway are divided into six categories, which are:

1. Providing Leadership
2. Assessing Needs
3. Addressing Opportunities
4. Future-Proofing
5. Addressing Coherence
6. Delivering Compliance

The following actions are typically used to address gaps in capability. They serve as a guide to developing the necessary capacity and capabilities to strengthen integrated geospatial information management processes and systems.

Figure 2.3: *Policy and legal includes several actions and tools designed to assist countries to establish a robust policy and legal framework that is essential to implementing and sustaining the Integrated Geospatial Information Framework. The actions are divided into six categories and reflect the order with which these actions are typically completed.*

Figure 2.4: *Policy and legal includes several actions and tools designed to assist countries to establish a robust and enabling policy and legal framework that is essential to strengthen integrated geospatial information management. The interrelated actions provide key linkages to other strategic pathway actions.*

2.6.1 Policy and Legal Working Group

The Policy and Legal Working Group is often established to provide government with advice relating to geospatial information-related policy and legal matters. It usually comprises legal practitioners, policy experts and geospatial professionals who understand geospatial information-related policy and legal matters.

This includes advice on the implementation of a policy, a law or a set of regulations, the drafting and consultation of policy and legal instruments, and advise on the review, revision, approval, and promulgation of policies and laws impacting integrated geospatial information management.

The Policy and Legal Working Group, typically comprises data users and data providers from government, the private sector, academia and the community is a step towards gaining various perspectives on technical and legal issues. Importantly, the Policy and Legal Working Group will also consist of legal practitioners and professionals who understand geospatial information-related policy and legal matters – issues, challenges and opportunities – facing the various stakeholders.

The Policy and Legal Working Group works in tandem with the Governing Body (See SP1, Action 1.6.1) and/or the Geospatial Coordination Unit (See SP1, Action 1.6.2), and aims to bring together representatives from various stakeholder groups to create an inventory of policies and laws that impact geospatial information management.

Additionally, the purpose of the Policy and Legal Working Group is to review, assess and understand the country's existing policy and legal framework (See Action 2.6.2). The Policy and Legal Working Group considers, recommends and/or decides what policy and legal are to be created or updated to implement the IGIF.

Common Legal Terms are included in Appendix 2.1.

See Interrelated Actions on Governing Body, Geospatial Coordination Unit, Geospatial Information Management Strategy, and Specialist Working Groups (SP1); Stakeholder Identification (SP9); and Stakeholder Analysis (SP9).

2.6.2 Policy and Legal Review

One of the first priorities for the Policy and Legal Working Group in progressing towards an effective and robust policy and legal framework is to review, understand, and assess the environment within which the laws, regulations or policies for geospatial information management will operate.

When implementing the IGIF, there is a need to consider the current policy and legal environment, the impact that it has on existing geospatial information management practices, the evolving technological and user requirements. The geospatial community often asks whether 'geospatial is special'. From a policy and legal standpoint – it is. There are several important considerations when developing an appropriate policy and legal framework for integrated geospatial information management.

When reviewing the existing policy and legal environment it is important to consider, understand and document the following (Appendix 2.2):

- geospatial ecosystem and existing geospatial strategies and plans;
- the different laws impacting geospatial information management and regulated/non-regulated geospatial markets;
- the legal system itself;
- policy instruments;
- types of geospatial information;
- the way in which geospatial information is used;
- pricing and licensing provisions
- the laws and policies and how they balance risk and benefits;
- the changing geospatial technology landscape; and
- the changing societal and personal norms.
- Designated responsibilities for collecting, managing, and disseminating geospatial information.

Importantly, there is often legislation that relies on, mentions or uses spatial references, and this aspect needs consideration. For example, definitions of jurisdictions are defined in legislation using different methods, such as verbal descriptions, survey plans or place names, as well as legislation that refers to statistical geographies or statistical definitions of a place.

Due to these considerations, there is no single prescribed policy or law that can be used by all countries. Each country must review their current situation to understand and develop their own policy and legal framework so that it addresses the unique legal system, culture, history and circumstances of the country.

An example of Review and Assessment is provided in Appendix 2.2.

The first step in this review process is to understand existing policies and laws, including decrees, measures, ordinances and regulations, that impact geospatial information management before deciding what additions or changes are needed, or what needs to be created for integrated geospatial information management. This review process includes:

- Bringing together representatives from stakeholders across the country's geospatial ecosystem including both technical and legal experts; and

- Classifying policies and laws (groupings will differ for each country) (Figure 2.5).
- Conducting an inventory of policies and laws that impact geospatial information management.
- Using a data lifecycle model as a starting point to document the existence of laws, regulations and policies that impact geospatial information management (See Appendix 2.2). An explanation of the Data Lifecycle Model components of a data lifecycle model can be found in SP4 – Data.
- Surveying stakeholder views using a questionnaire/survey.

Geospatial Information 'Lifecycle' Policies	Technology	Governance and Accountability	Strategic Alignment	Laws and Regulations
• Data Sharing • Data Custodianship (Acquisition and Management) • Data Classification • Intellectual Property Rights Management • Data Access/Release • Licensing and Pricing • Policy and Legal Tools: Roles and Responsibilities; Mandates; Guidelines; Procedures; Checklists	• Cybersecurity • Business and Digital Continuity • Data Security (Transmittal and Storage) • ICT Standards • Data Exchange Protocols • Data Standards • Records Management (Retention/ Disposal)	• Policy and Legal Register • Communication Strategy • Compliance Strategy and Audit • Policy and Legal Review and Impact Assessment • Economic Incentives, e.g., payment credits to incentivize outcomes • Data Integrity and Risk Management Reporting	• Geospatial Strategy • Government Digital Transformation Strategy • Open Data Initiative • Innovation Program • National Development Strategy, Priorities and Action Plan • Other National Strategies and Priorities	• Data Sharing Act • Data Collection, e.g., Surveying Act, Drone Regulations, Competitive Neutrality, Privacy and Confidentiality • Data Management and Access, e.g., Freedom of Information; Data Protection • Related Laws, e.g., Environment, Mining, Biodiversity, Land Tenure, Heritage, Conversation

***Figure 2.5**: An example of classifications used to develop a policy and legal framework.*

An example of types of Policy Review Questions is provided in Appendix 2.3.

2.6.3 Needs Assessment and Gap Analysis

Once the policy and legal environment has been understood and assessed, and the policy and legal inventory is completed, it is useful to conduct an analysis of the gaps and opportunities to systematically determine policy and legal needs with respect to integrated geospatial information management.

The difference between the current and the desired policy and legal framework are the gaps and opportunities. The needs arising from the analysis will help improve the policy and legal framework and lead to strengthening integrated geospatial information management.

Such an analysis identifies how the current policy and legal frameworks impact geospatial information management, what is needed for a sound and enabling policy and legal environment, and what are the policies and laws necessary to achieve the desired integrated geospatial information management. Another aspect to consider is the impact of other policies and laws on responsibilities associated with

geospatial information management. For example, if there is an "open data" policy, it is important to determine how such an existing policy impacts geospatial information.

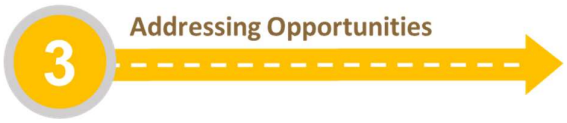
The Policy and Legal Working Group, preferably working with the Governing Body and/or the Geospatial Coordination Unit (See SP1: Governance and Institutions) and representatives from key partners (See SP7: Partnership), also identify how the current policy and legal framework can be improved. One method to accomplish this step is to conduct a workshop that involves relevant stakeholders. This could include one or more tabletop exercises. or For example, a tabletop exercise based on a use case involving the collection, use, storage, distribution of geospatial information that is important to the country, can be used to draw out policy and legal issues, identify gaps, and consider future opportunities that can arise through new or amended policies and laws.

Workshops should ideally include key stakeholders from government, academia, and the private sector. (See SP9: Action 9.6.4 - Stakeholder Identification) so that their respective perspectives, requirements and contributions are considered. Stakeholders include both data collectors, producers, custodians and users, as well as legal practitioners and professionals to provide guidance on legal issues, such as Intellectual Property, licensing, regulations etc.. The results from the tabletop exercises are then analyzed to determine what policies and laws may need to be changed or added to reach the stated goal.

An example of a Use Case is provided in Appendix 2.4.

An example of a Gap Analysis Matrix template for analyzing gaps and opportunities is provided in Appendix 2.6.

See Interrelated Actions on Governing Body; Geospatial Coordination Unit; and Stakeholder Identification (SP9).



2.6.4 Policy and Legal Framework

It is important to understand, identify and agree on the needs to be addressed. Once these needs and related issues are understood, possible solutions and options can be identified.

When the geospatial community discusses policy and legal frameworks, there is often an assumption that what is needed is an overarching law that addresses all the key issues. However, there are many other instruments to consider. Some of these instruments, such as policies, laws, and agreements, are binding and some are non-binding and are based upon common or reciprocal consent, such as the adoption of best practices. Non-binding instruments can be upgraded to formals instruments, such as MOU's, regulations and laws, over time.

Some policy and legal instruments, like privacy legislation, are used in both public and private sectors of the geospatial ecosystem, while others, such as the Land Tenure Act, mainly apply to one domain. It is important to understand the role of each, their relative strengths and challenges (Figure 2.6 and

Appendix 2.7), and how they apply within their national circumstances, history, culture and legal system.

When developing or revising a policy and legal framework, it is important to understand, identify and agree on what needs to be addressed. Opportunities may include improving efficiencies in data sharing, processing and acquisition; expanding functions and responsibilities to meet societal needs, and/or removing barriers that preclude actions that are needed to strengthen geospatial information management. Once these needs and related issues are understood, possible solutions and options can be identified. These possibilities are typically deliberated by the Policy and Legal Working Group (See SP2: Action 2.6.1), which makes recommendations to the government via the Governing Body on how best to address these needs, gaps or opportunities.

Figure 2.6: *Laws and policies have different levels of influence.*

One way to approach this step is to consider the instruments within the policy and legal framework as tools in a toolbox. In this way, the Policy and Legal Working Group considers which tool or instrument – e.g. law, regulation, policy, good practice, agreement, etc. – works best to address each of the needs, gaps or opportunities that have been identified. It will involve consideration of which solution presents a more feasible option e.g. is a policy or a law is better option.

Any design and development, either of a policy or law, generally involves consideration of:

- **Designation of lead organization:** One critical consideration is whether to designate a lead organization that is primarily responsible for geospatial information management in a country. would coordinate activities among stakeholders and serve as the focal point for budget and financial matters (See SP3: Financial). A designated lead organization plays a vital role in initiating, implementing, managing, and sustaining the IGIF.
- **Data collection and governance:** Another consideration that is typically addressed in a policy and legal framework is whether any particular government organization - or private sector party licensed and/or approved by a regulatory body - has exclusive authority to collect certain types of geospatial data. There are several reasons for the collection of geospatial data to be limited to certain approved entities such as national security, data accuracy or regulatory oversights.

- **Sector specific provisions:** Many policies and laws directly impact the geospatial community, particularly in sectors like land administration, utilities management, and navigation safety. Others, such as those governing satellite remote sensing, aerial imagery, LiDAR, and photogrammetry, are subject to broader aviation and telecommunications regulations. Understanding sector-specific provisions is crucial for ensuring the availability and proper management of geospatial information within a country. All sector specific policies and laws have an important role in the availability of geospatial information within a country, and are identified in the Legal and Policy Framework.
- **Financing:** Financing integrated geospatial information management is another critical consideration when developing policy or laws for integrated geospatial information management. Considerations should include but not limited to funding mechanisms, cost-sharing models, and long-term financial planning (See SP3: Financial).
- **Compliance -** the backbone of a robust and effective policy and legal framework for geospatial information management. Clear compliance mechanisms ensure that policies are not just well-intended but actively followed, fostering accountability, trust, and responsible use. A well-designed framework must define compliance standards, monitoring processes, and enforcement mechanisms to uphold data integrity, security, and accessibility. Without strong compliance, even the most comprehensive policies risk being ineffective, leading to legal uncertainties, misuse of geospatial information, and missed opportunities for innovation and public benefit.

Addressing the gaps and opportunities is closely related to general government information policies, and those related to e-Government, national security, privacy, intellectual property rights, data sharing, data integration, open data, standards, education, statistical and administrative data. Trade and collaboration with the private sector may already be described in market regulation and market stimulus policies. Governments need to consider how these policies already apply to geospatial information management and where they will require adaptation or alignment.

To assist countries in understanding the difference between legislation and laws, contracts and other agreements, and treaties and other international obligations, and their advantages and disadvantages, please refer to Appendix 2.7.

Policy and Legal Instruments – Advantages and Disadvantages is provided in Appendix 2.7.

An example of assessment criteria for Assessing Fitness for Purpose for a Policy is provided in Appendix 2.8.

2.6.5 Data Sharing and Dissemination

Officials at all levels of governments are concerned that the broad availability of certain types of geospatial information is a risk to homeland or national security.

A crucial instrument in a policy and legal framework for integrated geospatial information management is a data sharing arrangement for geospatial information. In particular, it is important to address how data that is collected by government organizations is then shared and disseminated to

third parties. This is because in order for geospatial information to be fully utilized, government organizations must be willing to make it available and accessible – share and disseminate. Such sharing and dissemination can take place between government organizations, as well as with provincial, municipal or local government agencies, international organizations, academia, the private sector or civil society.

There are many reasons for a lack of data sharing. For example, having control over information is often considered to be power. Therefore, any sharing of geospatial information is considered to be a weakening of an organization's authority. Another concern in sharing is that the organization will be responsible – either legally or in the court of public opinion - if the geospatial information is used improperly or is otherwise not fit for purpose. Some claim national security concerns as a valid reason for not sharing data, and privacy concerns are also commonly cited as impediments.

Data sharing can be encouraged, promoted or enabled with an appropriate data sharing arrangement that can take a number of forms – a national policy, a set of sectorial guidelines, a memorandum of understanding, a data sharing agreement or contract, a license agreement (See SP2: Action 2.6.6), or a piece of legislation, such as, a law for a National Spatial Data Infrastructure, to cite a few possibilities. Importantly, the chosen instrument must be able to adequately address the concerns by balancing the needs of the data provider with those of the data user.

A data sharing arrangement should balance protections for providers and usability for users. Overprotection may hinder users from generating benefits, while too few protections might expose government organizations to liability for misuse of geospatial information.

Government data is increasingly being made available through 'Open Data' initiatives. The requirement to make data open may be pursuant to a law. However, more often these initiatives begin as government policies. Sometimes these initiatives are led by the government organization that create geospatial information. In many cases though, these initiatives are imposed upon the organization responsible for geospatial information by other government organization. As a result, these open data policies often do not take into consideration the unique aspects of geospatial information. Therefore, it is critical for a country's geospatial community to actively participate in government-wide open data discussions to ensure its interests are understood. A more detailed discussion of Open Data Licenses for geospatial information can be found in the Compendium for the Licensing of Geospatial Information.[6]

2.6.6 Licensing Geospatial Information

A geospatial information license agreement is a legal instrument in which one party (the 'Licensor') grants another party (the 'Licensee') certain rights in geospatial information that the Licensor either owns or has rights to license or sub-license.

While a geospatial information provider gives up all rights in a sale (i.e., rights, title, and interest pass to the acquiring party), in a license agreement. the Licensor retains the rights it does not grant to the Licensee, including ownership. Because both the Licensor and the Licensee have rights in the same

[6] Compendium on Licensing of Geospatial Information, UN Committee of Experts on Global Geospatial Information (E/C.20/2018/9/Add.2)

geospatial information, the relationship between the parties is ongoing and therefore can be much more complex than in a sale. The geospatial information license agreement is critical in documenting the parties' respective rights and responsibilities.

One of the challenges in understanding geospatial information license agreements is that geospatial information is an intangible item. This can make it difficult to understand the applicability of certain legal principles. There are several important aspects to consider when discussing geospatial information licenses. First, many government agencies are making geospatial information 'open'. However, even if data is 'open', generally it is subject to a license agreement, unless governments are willing to give up their copyrights in the geospatial information by placing it into the public domain. While these open licenses generally have fewer restrictions than a commercial proprietary license, many do contain conditions or restrictions that a Licensee must follow.

It is also important to recognize that the purpose of a geospatial information license agreement is more than to grant rights (i.e. a license) from the Licensor to the Licensee. It also serves as a means to allocate certain operational and legal risks between the parties. In a geospatial information license agreement one such risk might be whether the Licensor has any legal responsibility to the Licensee if the geospatial information is of insufficient quality for the purpose for which the Licensee intends to use it. Another foreseeable risk is the liability of the Licensee should its use of the geospatial information violate local law or injure a third party.

Finally, geospatial information is not solely licensed through a stand-alone geospatial information license agreement. For example, a license for geospatial information may be included in the terms of a cloud hosting agreement, as the cloud provider will need certain rights in order to host or store the geospatial information. It is also increasingly common for businesses that offer Software as a Service (SaaS) and Data as a Service (DaaS) to include geospatial information in their offerings. As a result, geospatial information licensing terms are often included in their Terms of Service (ToS) or similar types of documents.

The earlier referenced Compendium on Licensing of Geospatial Information refers to a geospatial information license agreement generally as any type of legal document in which geospatial information is licensed. The Compendium outlines twenty considerations or elements within a geospatial information licensing arrangement or agreement (Figure 2.7).

Figure 2.7: *Elements for consideration in a standard licensing agreement.*

2.6.7 Future-Proofing

It is important to 'future-proof'[7] a policy and legal framework as much as possible so that it does not quickly become outdated or obsolete. This is because Technologies that collect and process geospatial data, and the applications that utilize geospatial information, are undergoing tremendous change.

One of the challenges in developing a robust policy and legal framework for integrated geospatial information management is that the technologies that collect and process geospatial data, and the software applications that utilize geospatial information, are undergoing tremendous disruptive technological change. For example, mobile devices, cloud computing, remotely piloted aerial systems (also known as drones) and small satellites are already having a significant impact on the geospatial community. In the future, the internet of things (IoT), artificial intelligence, deep learning and machine-learning and autonomous vehicles are likely to significantly disrupt how geospatial data is collected, used, stored and distributed.

Associated policy and legal issues impact – and are impacted by – these new technologies. Moreover, the immediate reaction to these disruptors is to introduce a law or regulation to address the perceived risks associated with the technology; often before the potential benefits are understood. This is not the best approach.

Future proofing the policy and legal framework requires policies and laws on geospatial information management to be technology agnostic. Future-proofing requires scrutinizing existing or proposed legislation to ensure that it is in line with the objective of integrated geospatial information management, regardless of how the information is collected, processed, or disseminated (i.e., regardless of the particular technology/platform used).

While some legislation may be technology specific, or not specific to geospatial data at all, the overall lens/perspective applied needs to be consistent with the objective for integrated geospatial information management. For example, the appropriate management and use of geospatial information needs to be supported by policies and laws (e.g., privacy, IP/copyright, licensing, etc.) regardless of a specific data type and technology used.

Future-proofing a policy and legal framework considers two scenarios:

- Whether existing laws and policies need to be changed in order to address new data types, technologies and innovative software applications e.g. do they specifically mentioned software or a methodology; and

[7] To **future-proof** something is to design or change it so that it will continue to be useful or successful in the future if the situation changes.

- Whether new laws or policies need to be introduced to enable the use of new data types, technologies and innovative applications. For example, in many countries remotely piloted aerial systems (drones) are not able to operate in the national airspace without new laws.

There are several ways in which policy and legal frameworks can be future-proofed. This is important because the development of technologies typically continues to outpace the changes in legal and policy frameworks. As a result, new products and services that collect and use geospatial information will face increasing resistance due to outdated, and in some cases inconsistent, legal and policy frameworks.

A method that is often used, is to initially address the challenges raised through informal or non-binding provisions or instruments. For example, a government organization might issue a policy to address how a new technology is to be used within the government for the collection of geospatial data, or an industry group may adopt voluntary good practices. These are relatively easy to adopt, and they can be either updated or turned into law as the implications become clearer.

If the decision is made that a law or regulation needs to be developed, it is possible to include triggers to prompt a future review. For example, a clause can be put into a law that it expires unless it is re-adopted by the proper authority. These provisions, sometimes called 'sunset clauses', give stakeholders the opportunity to review the impact of both the technology and the law to make sure there are no unintended consequences, and that the issues raised have been properly addressed. Alternatively, a law can include language that requires the law to be reviewed after a certain period of time. For example, a legislative body may require a government organization to report back on an annual basis on the impact that the law is having, so as to determine whether it is still fit-for-purpose or needs to be updated.

The Policy and Legal Working Group (SP2: Action 2.6.1) plays an important role when considering how and when to 'future-proof' policies and laws. However, because disruptive technologies and innovative applications are often developed by non-traditional geospatial sectors, it is critical to ensure their perspectives and contributions are included in policy and legal frameworks. Traditional stakeholders may perceive these advancements as a threat to their established roles and attempt to resist their adoption, while new stakeholders may downplay potential risks or overstate benefits. For example, remotely piloted aerial systems (drones) — as a new remotely sensed data collection platform — can capture higher-resolution imagery and real-time geospatial data beyond the capabilities of satellites or conventional aerial surveys. While this presents opportunities for disaster response, urban planning, and environmental monitoring, for example, it also raises concerns regarding privacy, airspace regulations, and data security. Similarly, newly developed applications are revolutionizing traditional user experiences, addressing previously unmet needs, and unlocking new applications of geospatial information. These innovations require careful consideration to foster innovation while mitigating risks. A well-designed and formulated policy and legal framework must navigate these complexities, ensuring that all stakeholders — traditional and emerging ones, are

informed, engaged and informed[89]. Similar concerns and the proposed approaches also apply to new data types, including non-geospatial information, when used as part of data integration.

One of the biggest developments in the geospatial policy and legal environment has been the growing awareness by the international community of the impact that laws and policies can have on the collection, use, storage and distribution of geospatial information. This awareness supports future proofing. Lawmakers and policy-makers alike are beginning to understand the governmental, economic, environmental and societal benefits of geospatial information, and this has led to the two communities to work together to make sure geospatial information can be developed while taking into account differences in legal and policy approaches.

Communicating the policy and legal framework is key to long-term sustainability. This is because geospatial products and services cut across many different technologies and industry domains, and therefore, organizations that wish to use geospatial information from different providers will need to understand and comply with each set of regulations or laws, where they apply.

2.6.8 Intellectual Property Rights

Intellectual Property Rights (IPR) in data differ from those in other intangible assets and must be clearly defined and effectively managed.

A robust policy and legal framework will need to clarify intellectual property rights in respect to geospatial information for both data providers and users. Geospatial products and services are increasingly created by combining geospatial data from a variety of sources. However, the intellectual property rights in data are different than in other non-tangible assets, such as software. For example, in many countries, copyright does not apply to a simple compilation of facts – which includes many types of geospatial information products. In other cases, such as those in Europe, countries provide certain intellectual property protections to databases.

In addition, there is much uncertainty as to how to apply intellectual property rights to geospatial products or services that are created by aggregating several different data sets. The issue is likely to become more complicated with sensors collecting new types of data, and in near real-time.

This uncertainty can have a significant impact on integrated geospatial information management within a country. It can result in complex data licenses, as the data providers try to protect their rights

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[8] The recent report, "Drones Under the Horizon: Transforming Africa's Agriculture", highlights the need to future-proof a policy and legal framework. The report highlights the tremendous value that remotely piloted aerial systems (drones) offer in Africa, but warns that "UAV regulations are still in its infancy in Africa, the making and the presence of too restrictive, or even disabling regulations governing the import and use of UAVs can hinder the development of a very promising industry...". The report goes on to state that appropriate regulations should balance competing security concerns with the need to encourage innovation, economic development and youth entrepreneurship. It recommends developing a continental regulatory framework for the use of UAVs in Africa, and harmonizing policies across countries and regions.

[9] According, to the report, only 26% of African countries have drone regulations in place. See Drones Under the Horizon: Transforming Africa's Agriculture; African Union, New Partnership for African's Development (2018). p. 11.

through contract rather than through law. This complexity increases the difficulty for data users to determine if and how they can use or consume the geospatial information.

The intellectual property challenge is particularly complex when data providers have their own data licenses. Sometimes data providers may be unwilling to offer certain data in a country if they do not feel their intellectual property rights receive adequate protection. For example, if existing law allows a competitor to scrape their websites and resell data that was collected and organized at significant cost.

Principles on Managing Intellectual Property Rights are provided in Appendix 2.9.

A country wishing to provide data providers more protection might adopt a law that protects intellectual property rights in databases. Alternatively, a government may place government-generated information in the public domain, essentially giving up all ownership rights in the data, or make the information available under an open data license with few restrictions. Additionally, efforts can be made to encourage legal practitioners and professionals to learn more about the various types of geospatial information, and how it is collected and used, so that they will be better prepared to advise their clients.

2.6.9 Privacy and Data Protection

Data protection laws and policies are often introduced without fully considering their impact on integrated geospatial information management.

Globally, data protection and privacy laws are being introduced (or updated) to address concerns with all types of Big Data, not just geospatial information. Therefore, efforts to introduce data protection laws and policy will often occur without considering the impact on the geospatial community. In such instances, there is a real risk that the laws and policies that develop will have an unintended impact on a policy and legal framework for geospatial information management. Therefore, it is critical for the geospatial community within a country to participate in this process.

Since data protection is generally a trade-off between the benefits of the data being used (both public and private) and the risks, it is important for the geospatial community to highlight the many uses and benefits of geospatial information. It is also important to explain to lawmakers and policymakers the potential impact – including unintended consequences – of proposed data protection laws on integrated geospatial information management.

There is also a growing trend to regulate the collection and use of personally identifiable information that could be used to identify an individual or infringe upon privacy. Increasingly, government regulators are recognizing that geospatial information can be used to infringe upon an individual's rights. As a consequence, laws are being passed to regulate the collection and use of certain types of geospatial information.[10] Currently these laws do not include satellite and aerial imaging or traditional

[10] Examples include the General Data Protection Regulation (GDPR) (https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32016R0679) and the California Consumer Privacy Act of 2018 (https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180AB375) (accessed June 30, 2018)

mapping technologies. However, this may change as concerns grow, for example, with remotely piloted aerial systems, robotic sensors or mobile location-based applications.

Currently, there are limited legal opinions that regulate the collection or use of geospatial information for privacy/data protection purposes. However, even if traditional geospatial information is not regulated, there is a risk that broad data protection laws may limit the ability to access and use the vast amount of new geospatially-enabled information that is now being collected or aggregated.

Laws and regulations that treat geospatial information collected by some platforms (i.e. remotely piloted aerial systems) differently than others (i.e. satellites or manned aircraft) are likely to confuse data users. In addition, over time, lawmakers and policymakers will begin to focus on regulating the data instead of the platform to acquire data. This will have a significant impact on the broader geospatial community.

2.6.10 Liability Concerns

As applications of geospatial information expand, so do disputes over data quality and misuse, making clear liability provisions essential.

As applications that utilize geospatial information grow, so will disagreements over which organizations are responsible for data quality issues or the misuse of geospatial information. Consequently, it is helpful for a policy and legal framework for geospatial information management to clarify issues of liability.

A lack of certainty around liability issues often impacts the adoption of new technologies or the promotion of innovative applications. For example, the testing of autonomous vehicles has been slowed due in part to concerns over which parties are responsible in the event of an accident. Some of these issues concern data quality. Similarly, some government organizations are reluctant to use crowd-sourced data as they are unsure as to the quality of the information and do not want to be liable if someone, as an example, is injured or dies.

There are several ways in which a policy and legal framework can address liability concerns associated with geospatial information. For example, in some countries, government organizations are protected by sovereign immunity – i.e. they are immune from being sued for actions they take that are related to their governmental function. Such protections can be included in a country's constitution or in its laws. Another way to allocate risks associated with data quality is through agreements. For example, a government organization can obligate its vendors to comply with certain geospatial standards. If these standards are not followed, the vendor can be responsible for any damages that arise. Alternatively, government organizations can include in their contracts with vendors provisions that waive or limit the liability of vendors. This will make it easier for vendors to perform tasks that have inherent risks associated with data that are difficult to quantify.

2.6.11 Sensitive Information

Concerns persist that the widespread availability of certain geospatial data poses a national security risk.

Government officials at all levels continue to be concerned that the broad availability of certain types of geospatial information, whether real or perceived, are a risk to national security. In part, because

in many countries geospatial technologies were initially developed and/or used by military or intelligence services. As a result, these organizations are often concerned about any new geospatial technologies and/or new applications that collect or use geospatial information. While such apprehension is understandable, given the respective services' mandates described above, the overly restrictive laws and policies that are intended to limit the collection and use of geospatial information for national security purposes, will often have much broader consequences.

Concerns over national security can have a significant impact on the availability of geospatial information. For example, the commercial remote sensing industry in the United States is hampered by limitations on the resolution of electro-optical imagery. In addition, national security concerns are also responsible for the slow roll-out of other sensors on satellites, such as radar. Similarly, national security concerns associated with accurate maps have resulted in some countries restricting the creation of mapping applications.

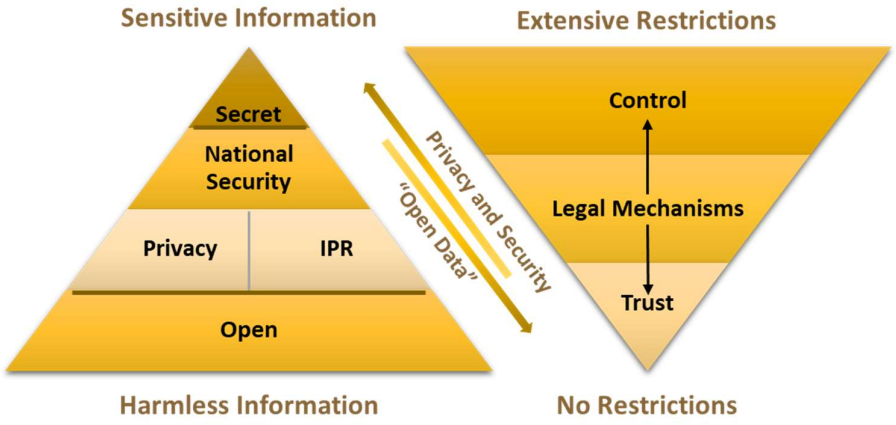

Figure 2.8: *Sensitive information is subject to extensive restrictions.*

Sample guidelines and examples for Addressing Sensitive Information are provided in Appendix 2.10.

There are also certain classes of geospatial data that need to be withheld from public access and usage e.g. the location of precious gem deposits, rare fauna and flora, or what is considered critical infrastructure, etc. As each country has a unique set of internal and external security concerns, it is impossible to develop a single approach to address this issue. However, when developing a policy and legal framework, it is important to realize that such restrictions will have a broader impact on integrated geospatial information management as a whole within a country (Figure 2.8). As a result, it is useful to have a mechanism to assess the sensitivity associated with geospatial information. For example, the Federal Geographic Data Committee has guidelines for providing appropriate access to geospatial information in response to security concerns.[11]

[11] See e.g. "Guidelines for Providing Appropriate Access to Geospatial Data in Response to Security Concerns", Federal Geographic Data Committee (2005) (*https://www.fgdc.gov/policyandplanning/Access%20Guidelines.pdf*) and Mapping the Risks: Assessing the Homeland Security Implications of Publicly Available Geospatial Information, Rand Corporation, 2004)

2.6.12 Impact Assessment

Identifying and addressing necessary policy and legal changes enhances the value of geospatial information while mitigating potential risks.

There is the need to bring together stakeholders and their key representatives to identify the factors that both promote and inhibit integrated geospatial information management. Identifying and addressing what needs and changes to the policy and legal framework are required, enables countries to maximize the value of geospatial information while still protecting against potential risks.

The implementation of the IGIF considers the:

- Current legal and policy environment, whether it is sound and enabling enough to promote the highest and widest use of geospatial information;
- Impact that it has on existing geospatial information management, its arrangements, infrastructures, practices, products and services;
- Impact from evolving and emerging technological and user requirements, including creative and innovative applications of geospatial information; and
- Changes that must be made to reach the desired goals and outcome.

As government seeks to foster a sound and enabling legal and policy environment for integrated geospatial information management, it will begin by identifying and assessing several important factors. For example, a country's geospatial community is a diverse network, consisting of government agencies, private sector, non-governmental organizations (NGOs), citizens, research institutions and universities. Each can be a data provider and a data user, depending upon the context. As a result, a policy and legal framework must consider and cater for each of the stakeholders (Table 2.1).

Important Considerations	Impact
The geospatial community is diverse network.	Need to consider impact of laws and policies on a variety of stakeholders
Geospatial information cuts across legal and policy disciplines	A Policy and Legal Framework is complex and there is a need to consider an extensive set of policies and laws
Geospatial information technology is rapidly changing	Continually need to review and update a framework
Jurisdictions have different legal systems	No one size fits all solution

Important Considerations	Impact
Jurisdictions' geospatial information management are at various stages of development	No one size fits all solution
Many diverse types of geospatial information	Important to consider impact of a framework on a wide range of data types
Geospatial information is versatile	Many potential uses impact a wide variety of sectors in a society
Geospatial has its own nomenclature	Nomenclature needs to align with other segments of government and society
Balancing benefits and potential risks	Difficult given the many benefits of geospatial information
Geospatial data (particularly when linked with other data) contains confidential and personal information	Important to consider the protection of privacy of data, and potentially national security.

Table 2.1: *Policy and Legal Framework - considerations and impact.*

2.6.13 Compliance Strategy

A well-designed policy and legal framework should include a compliance strategy that outlines enforcement mechanisms, promotes adherence, and defines compliance monitoring processes.

Laws are binding and must be complied with. Laws may include economic incentives (e.g. fines) to encourage compliance. In some organizations, there may be a compliance officer or a designated officer responsible for monitoring the applicable policies and laws, including to monitor compliance and report accordingly.

However, when designing a policy, it is important to include an accompanying Compliance Strategy that defines how organizations and individuals are encouraged to comply and how compliance will be monitored. The type of Compliance Strategy will depend on how clearly the policy defines the expected rights, restrictions and responsibilities or expected outcome, action and decision. The following strategies for encouraging compliance are based on the six metaphors for compliance strategy styles advocated by Quinn *et al* (2010) and include Sticks, Carrots, Hurdles, Fast Tracks, Enlightenment, and Conversion.

- **Sticks:** A stick compliance strategy clearly defines the implications for not complying with the policy/procedure. It is important that non-compliance can be monitored and implications for non-compliance are achievable. For example, a user's access to data and systems may be suspended if they have breached the ICT Appropriate Use or Information Security Policies.
- **Carrots:** A carrot compliance strategy influences compliance by providing a motivation (positive acknowledgement or reward) to comply with the policy/procedure.

- **Hurdles:** A hurdle compliance strategy coordinates the policy compliance, by putting checks points in place to encourage policy as part of a process. For example, accepting terms and conditions on a website or data catalog before proceeding to the next step.
- **Fast Tracks:** A fast-track compliance strategy 'makes it easier' to comply with the policy. For example, providing a staff briefing for a new policy will fast track the knowledge transfer of the policy content.
- **Enlightenment:** An enlightenment compliance strategy is more likely used for a procedure. It helps the party understand why they should comply.
- **Conversion:** A conversion compliance strategy is best described by an organization's *Code of Conduct*. The *Code of Conduct* outlines what is morally expected e.g. compliance with policy, and seeks to change the culture of an organization where policy implementation is concerned.

A compliance strategy can also be considered during the design and development of policies, laws and regulations. The level of risk posed by non-compliance can be used to identify a better approach for monitoring compliance. For example, a policy on managing sensitive information has a high level of risk and requires designated officers to be responsible for monitoring breaches of non-compliance and enforcing the policy or law.

2.7 Deliverables

The list of deliverables below are the outputs typically created as a result of completing the actions in this strategic pathway. They are key success indicators in realizing an Integrated Geospatial Information Framework. Examples include:

- A Policy and Legal Review Group (or Committee or Council) and agreed terms of reference;
- A review of the existing policy and legal framework including an inventory of polices, laws and regulations (or equivalent);
- A Needs Assessment and Gap Analysis (including materials and documents for conducting the analysis such as use case, tabletop exercise, analysis matrix, etc.);
- Considerations of various policy and legal instruments options available to address gaps and opportunities;
- A document that clarifies intellectual property rights, privacy and data protection, liability concerns and sensitive information;
- A methodology that considers evolving personal, societal, economic and technological progress, developments and norms so that the existing Policy and Legal Framework keeps pace with the times;
- Policies and/or legislation designed and developed in alignment with national strategic priorities, and prevailing policies and legislations, such as e-Government, open data, innovation or economic transformation); and
- A sound and enabling policy and legal environment for integrated geospatial information.

2.8 Outcomes

The following outcomes result from establishing robust policy and legal frameworks for integrated geospatial information management:

- A well-defined, sound and enabling policy and legal environment that maximizes the value and utility of geospatial information while safeguarding national and institutional interests;
- Effective and secure management, sharing, integration and application of geospatial information, that respects national security and protect personal information;
- A Policy and Legal Framework that evolves over time, responds to societal progress and technological advancements, keeping pace with rapidly changing demands; and
- Clarity in responsibilities and mandates, strengthening governance, accountability, and institutional coordination in geospatial information management.

2.8.1 Evolving Operating Environment

Integrated Geospatial Information Management and the evolving operating environment

The rapid advancements in artificial intelligence (AI) and geospatial artificial intelligence (GeoAI) are reshaping the landscape of integrated geospatial information management. AI-driven technologies are enhancing the way geospatial data is collected, processed, analyzed, and applied—automating workflows, enabling real-time decision-making, and uncovering patterns that were previously undetectable. Machine learning algorithms can now interpret vast amounts of satellite imagery, detect changes in land use, predict environmental risks, and optimize infrastructure planning with unprecedented speed and accuracy. The integration of AI into geospatial applications is revolutionizing how governments, industries, and societies engage with location-based information, services and intelligence.

However, with these opportunities come new policy and legal challenges that demand urgent and perhaps deliberate attention. AI-generated geospatial data raises critical issues around data privacy, intellectual property, liability, bias, and responsible use. Automated decision-making, if unchecked, may introduce algorithmic bias, leading to unintended consequences. Additionally, AI-driven surveillance and geospatial intelligence tools pose concerns about civil liberties and national security, necessitating stronger governance to ensure transparency, accountability, and responsible use.

A sound and robust policy and legal framework is fundamental to harnessing the benefits of AI and GeoAI while mitigating risks. Governments must adopt forward-looking policies that balance innovation with regulation, ensuring that AI-powered geospatial systems remain trustworthy, inclusive, and aligned with societal values. This includes clear compliance mechanisms, ethical AI guidelines, and legal safeguards that address issues such as data ownership, consent, liability, and equitable access to geospatial intelligence. International cooperation will also be crucial, as AI-enabled geospatial data transcends borders, requiring standards and approaches that ensure fair and responsible global use.

As digital transformation accelerates, policy and legal frameworks must evolve dynamically to support an open, interoperable, and resilient geospatial information ecosystem. The future of integrated

geospatial information management will depend on the ability to embrace artificial intelligence responsibly, uphold public trust, and ensure that technological advancements serve the greater public good.

2.9 Resources

As part of the work programme of UN-GGIM, there are a number of related initiatives and activities including by the Subcommittee, Expert and Working Groups of the Committee of Experts. These initiatives and activities are multi-stakeholder when arriving at outcomes and outputs. This inclusive and participatory nature of work has allowed the preparation of a number of resource documents/publications that are helpful and useful when addressing the complexities in ensuring a sound and enabling policy and legal environment for integrated geospatial information management. These include:

- Integrated Geospatial Information Framework: Guidance and recommended actions aligned with Strategic Pathway 2 - Policy and Legal, Working Group on Legal and Policy Frameworks for Geospatial Information Management (2019);
- Compendium on Licensing of Geospatial Information, UN Committee of Experts on Global Geospatial Information Management (Working Group on Legal and Policy Frameworks for Geospatial Information Management) (2018);
- The Global Fundamental Geospatial Data Themes, UN Committee of Experts on Global Geospatial Information Management (2019);
- A Guide to the Role of Standards in Geospatial Information Management, UN Committee of Experts on Global Geospatial Information Management (2018);
- Future Trends in Geospatial Information Management: the five to ten-year vision, UN Committee of Experts on Global Geospatial Information Management (2016);
- National Institutional Arrangements: Instruments, Principles and Guidelines, Working Group on Trends in National Institutional Arrangements (2017);
- Foundational Guide to National Institutional Arrangements Instruments for Geospatial Information Management (Asia-Pacific), Working Group on Trends in National Institutional Arrangements (2019); and
- Statement of Shared Guiding Principles for Geospatial Information Management, UN Committee of Experts on Global Geospatial Information Management (2015).

2.10 References

Quinn, R.E.; Faeman, S.R.; Thompson, M.P.; MaGrath, M. St. Clair, L.S. (2010*) Becoming a Master Manager: A Competing Values Approach*, 5th Edition, September 2010, ©2011. Pg. 161.

2.10.1 Additional Reading

"Building Ethics into Privacy Frameworks for Big Data and AI", Global Pulse and International Association of Privacy Professionals (2018)

"Data as IP and Data License Agreements", Glazer, Lebowitz, Greenberg, Practical Law (2013)

"Data is Different: Why the World Needs a New Approach to Governing Cross-border Data Flows" (Center for International Governance Innovation – Susan Ariel Aaronson) November 2018

The Dissemination of Government Data In Canada: Guide to Best Practices; v2, GeoConnections (2008)

Geographic Data and the Law: Defining New Challenges, Janssen & Compvoets, Leuven University Press (2012)

Geographic Information Service: Mastering the Legal Issues, Dr. George Cho, Wiley (April 2008)

Geospatial Law, Policy and Ethics: Where Geospatial Technology is Taking the Law, K D Pomfret, Routledge (August 2024)

"GIS Data Dissemination and Intellectual Property Rights", P Jothimani and K Venugopai, Indian Cartographer (2002)

Guidance on the 'Regulation on access to spatial data sets and services of the Member States by Community institutions and bodies under harmonized conditions' INSPIRE: DT Data and Service Sharing (September 1, 2013)

"Guidelines for Providing Appropriate Access to Geospatial Data in Response to Security Concerns", Federal Geographic Data Committee (2005)

"Intellectual Property Law and Geospatial Information: Some Challenges", Teresa Scassa and D.R. Fraser Taylor, The WIOP Journal: Analysis of Intellectual Property Issues; Vol 6, Issue 1 (2014)

"Legal Interoperability of Research Data: Principles and Implementation Guidelines", RDA-CODATA Legal Interoperability Interest Group (September 8, 2016)

Licensing Geographic Data and Services, National Research Council on the National Academies (2004)

Mapping the Risks: Assessing the Homeland Security Implications of Publicly Available Geospatial Information, Rand National Security Corporation (2004)

"Open Content Licensing of Public Sector Information and the Risk of Tortious Liability for Australian Governments", Cheryl Foong, eLaw Journal (2011)

"The Protection of Maps and Spatial Databases in Europe and the United States by Copyright and the Sui Generis Right", Katleen Janseen, Jos Dumortier, John Marshall Journal of Computer & Information Law (2007)

"Public Transit Data Through an Intellectual Property Lenses: Lesson About Open Data", Teresa Scassa, Fordham Urban Law Journal: Vol. XLI, Issue V, Article VIII (2015)

Volunteered Geographic Information and the Future of Geospatial Data, C.E.C. Campelo, M. Bertlotto and P. Corcoran, IGI Global, (March 2017)