NELGA

NELGA GOOD PRACTICES:

Enabling Digital Infrastructure for Improved Land Governance and Geospatial Services in Ethiopia

The Network of Excellence on Land Governance in Africa (NELGA) is a partnership of leading African universities and research institutions with proven leadership in education, training and research on land governance. Currently NELGA has more than **70 partner institutions** in over 40 countries and is organized in 6 regional and 1 technical nodes supported by a Secretariat.

Background Information

Despite the critical role that land data and geospatial information play in achieving global, regional, and national development goals – including the United Nations Sustainable Development Goals (SDGs) indicators on land tenure security (1.4.2) and women's land rights (5.a.1 and 5.a.2), and the broader aspirations of Agenda 2063, many countries, including Ethiopia, continue to experience significant data management gaps that jeopardize their national goals.

The key challenges in Ethiopia include gaps in data governance, standardization, data quality, and timeliness, as well as the absence of an enabling environment such as robust policy and legal frameworks, adequate technology, sustainable funding, and skilled human resources. In recent years, the Government of Ethiopia has prioritized addressing these challenges to establish reliable digital information services and support evidence-based decision-making.

These national efforts are fully aligned with Agenda 2063, the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) vision, and NELGA's core functions to generate reliable data that informs policy development, legislative reforms, dialogue, research, education, and advocacy on land issues in Africa.

In this context, NELGA and its partner universities and research institutes – through GIZ's Strengthening Advisory Capacities for Land Governance in Africa (SLGA) programme - have supported the Ethiopian Space Science and Geospatial Institute in advancing land data and geospatial information management in Ethiopia. Key achievements include the establishment of a pilot national spatial data infrastructure, and development of standards for land use, geodesy, and photogrammetry.

The implementation of a scalable pilot of national spatial data infrastructure in December 2024, combined with the newly developed standards have an immense potential to considerably improve land data management, decision-making, and innovation, while supporting national priorities, Agenda 2063, and SDGs.

Methodological Approach

This good practice takes a holistic approach to improving the management of land, geospatial, and statistical data through four interconnected processes.

The first process, "forming cooperation and partnership"

Focuses on building a strong foundation for data management through good governance, leadership, and collaboration. It encourages aligning national strategies with international frameworks such as the AU Framework and Guidelines on Land Governance in Africa, the Framework for Effective Land Administration (FELA), and the Integrated Geospatial Information Framework (IGIF) to ensure consistency with global standards.

The second process, "taking action"

Emphasizes setting clear data standards and using appropriate technologies to strengthen land data systems. This includes developing a National Spatial Data Infrastructure (NSDI) that supports data sharing and collaboration among government institutions, researchers, and other stakeholders.

The third process, "tracking success,"

Focuses on monitoring and evaluating how data is used and how well systems are performing. This helps identify gaps and continuously improve data management.

The forth process, "deriving value"

Highlights how better data sharing and management contribute to social, economic, and environmental benefits. It demonstrates how reliable data can lead to more informed decisions, improved services, and sustainable development outcomes.

Together, these processes show Ethiopia's commitment to using data as a driver for good governance and development.
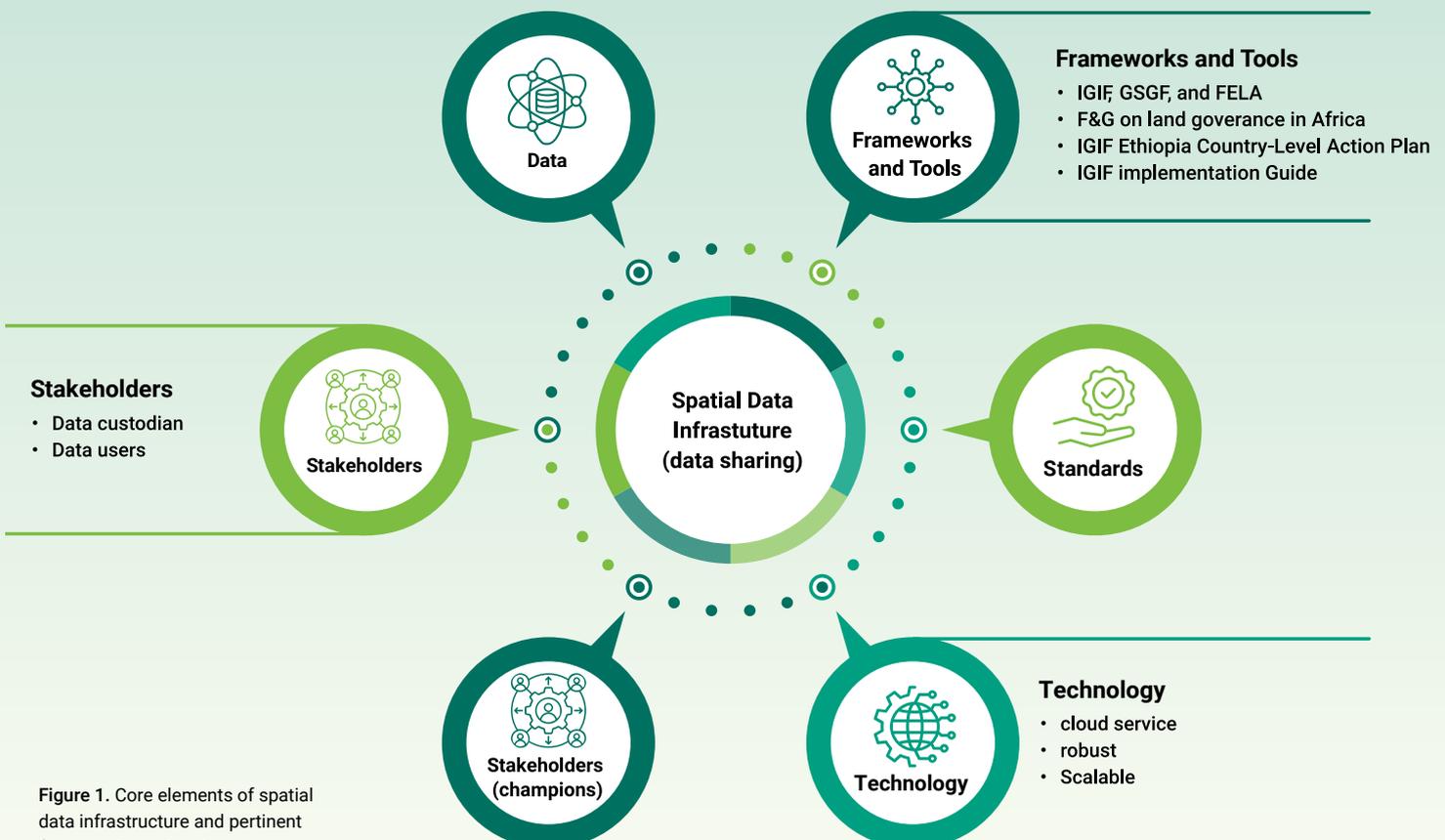

Figure 1. Core elements of spatial data infrastructure and pertinent frameworks and tools.

Data

Frameworks and Tools
- IGIF, GSGF, and FELA
- F&G on land goverance in Africa
- IGIF Ethiopia Country-Level Action Plan
- IGIF implementation Guide

Frameworks and Tools

Stakeholders
- Data custodian
- Data users

Stakeholders

Spatial Data Infrastuture (data sharing)

Standards

Stakeholders (champions)

Technology

Technology
- cloud service
- robust
- Scalable

FORMING COOPERATION AND PARTNERSHIP

1. Governance Model
- stakeholder engagement strategy (SP9), business model (SP2), formalized data supply chains (SP4)

2. Leadership
- governing board/steering committee, geospatial/data coordination unit, specialized working groups

3. Setting strategies and theory of changes
- review of geospatial strategy, IGIF Ethiopia country-level action plan with special focus on Data (SP4), Innovation (SP5), Standards (SP6),Partnerships (SP7),
- interconnected actions such as capacity assessment and gaps analysis (SP8), policy and legal review (SP2), Data inventory and data gaps analysis(SP4), ICT needs assessment and gaps analysis (SP5), standards baseline survey (SP6) creating a Plan of Work

TAKING ACTION

- Roll out spatial data infastructure
- Develop, adopt and mainstream standards
- Apply a business model for data sharing
- Implement data sharing agreement
- Strengthen technical capacities of stakeholders
- Create awareness and promote data sharing

TRACKING SUCCESS

- implementation of monitoring and evaluation tools (digital dashboard)
- establishment of success indicators

DERIVING VALUE

- Economic value assessment (commitment taken by space science and geospatial institute)

Figure 2. The 4-step processes and tools for strengthening national geospatial information management arrangements. SP stands for strategic pathways of the United Nations Integrated Geospatial Information Framework.

Outcomes and Impacts

The establishment of a spatial data infrastructure marks a transformative milestone in enhancing data exchange and interoperability among institutions. By fostering collaboration between public and private sectors, the spatial data infrastructure strengthens data management practices that are vital for improving essential government services and streamlining coordination between regional and federal land and geospatial information systems.

Key Outcomes

- Integrated data governance and coordination mechanisms established through technical working groups and a central coordination unit.
- Enhanced institutional collaboration for data standardization and exchange.
- Improved technical capacity and infrastructure for digital land and geospatial services.

Potential Impacts

The continued evolution of the spatial data infrastructure is expected to yield numerous benefits

- Better data access for evidence-based decision-making.
- Increased efficiency in public service delivery.
- New opportunities for data analytics and artificial intelligence - driven research and innovation, strengthening strategic collaboration between NELGA, policy implementing institutions, civic societies, development partners, and the private sector.

Lessons Learned

- Spatial data infrastructure enables more than data sharing, it drives system integration, geo-artificial intelligence innovation, and stronger stakeholder collaboration for broader impact.
- Measuring the impact of spatial data infrastructure through monitoring tools is essential to assess its contribution to social, economic, and environmental goals.
- Leveraging established frameworks, such as the Environmental Systems Research Institute's technology and expert support, enabled the pilot spatial data infrastructure to accelerate system integration and platform development, effectively turning latecomer status into a strategic advantage.

Challenges

The effective implementation of the spatial data infrastructure is hindered by several significant challenges:

- Absence of clear legislation and a formal governance framework constrained data sharing among institutions.
- Inconsistent data quality and interoperability limited the effective use of spatial data.
- Insufficient technical capacity and inadequate ICT infrastructure, including storage and connectivity, slowed implementation progress.

Scalability and Sustainability

The pilot spatial data infrastructure aims to improve data access and sharing among national data custodians, addressing digital divides and promoting sustainable development while safeguarding human rights. To achieve scalability and sustainability, a phased approach is recommended, focusing on:

- **Strengthening Governance Structures:** Establishing robust legal frameworks and governance structures to support data sharing and management.

- **Data Standardization:** Implementing data standards to ensure interoperability and enhance data quality.

- **Financing and Human Capacity Development**: Securing funding and developing human capacity to support the ongoing operation of the spatial data infrastructure.

- **Fostering Partnerships:** Engaging with political leaders, decision-makers, and various stakeholders to expand the network of data custodians and improve data integration with digital government services.

This overarching strategy should align with Ethiopia's digital transformation goals, the broader African digital strategy, and global digital initiatives, while adhering to a human rights-based approach (HRBA) to data. The HRBA to data emphasizes integrating human rights principles into all aspects of data collection, management, and dissemination to promote and protect the rights of individuals and communities. By prioritizing HRBA principles, organizations can enhance trust, transparency, and accountability in their data practices, ensuring that data collection and sharing respect individual rights and promote equality and non-discrimination.

Gender Equity/Gender Transformative Approach

a. Reach level

The spatial data infrastructure design and implementation have successfully adopted a gender transformative approach by actively involving women in various roles, including decision-making and technical contributions. Notably, the national coordination unit for the spatial data infrastructure is led by a woman, reflecting a commitment to gender equality at leadership level.

Additionally, women experts have played vital roles in technical working groups that support the development of data standards and implementation of the spatial data infrastructure. A continued engagement of women experts and decision-makers is crucial for the operationalization, upscaling, and sustainability of the infrastructure, ensuring more inclusive practices in spatial data governance.

b. Benefit level

The implementation of the spatial data infrastructure, alongside the establishment of relevant standards and frameworks, has significantly empowered women in the field. Women decision-makers have gained valuable insights that enhance the operationalization of pilot spatial data infrastructure, focusing on strategies that promote scalability and sustainability. Moreover, women technical experts have developed essential knowledge and skills, improved their technical capacities and facilitated the effective adoption of standards.

This empowerment enables women to contribute more effectively to the broader expansion of the spatial data infrastructure, creating a ripple effect that benefits the entire community. However, it is important to acknowledge that while progress has been made, the initiative has not yet fully achieved gender equity. Continued efforts are needed to ensure that women not only participate but also lead and influence decision-making processes at all levels. Addressing systemic barriers and promoting a more equitable environment will be essential for realizing the full potential of gender equity within the spatial data infrastructure framework.

Conclusions

The establishment of Ethiopia's national spatial data infrastructure (NSDI) marks a transformative milestone in the management and sharing of geospatial data, directly supporting improved land governance and broader national development priorities. By integrating diverse datasets - including land, geospatial, statistical, and climate information - Ethiopia is transitioning decisively away from fragmented data management to a cohesive digital ecosystem that enables research, innovation, evidence-based decision-making, and cross-sector collaboration.

This achievement positions Ethiopia as a regional leader in land and geospatial data governance and offers a compelling model for nations seeking to build integrated, well-functioning and agile geospatial and land information ecosystem. Central to this progress is the Ethiopian Space Science and Geospatial Institute, whose leadership – supported by NELGA and its partner universities and research institutions – has established the governance structures essential for multi-stakeholder engagement and long-term sustainability of the NSDI.

Looking forward, continued investment in strengthening national expertise, advancing digital capabilities, and promoting innovation and knowledge exchange will further elevate the NSDI's impact, enabling Ethiopia to leverage cutting-edge technologies and global partnerships to improve land and geospatial data management. Beyond national benefits, Ethiopia's experience provides an inspiring blueprint for other developing countries, demonstrating how strategic investments in NSDI can drive research, innovation, policy reform, evidence-based decision making, and sustainable development regionally and globally.

Sources of further information

Fundamental Data Themes Geodetic Surveying Standard National Land Use Land Cover Standard Orthoimagery Standard
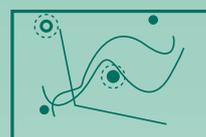
National Spatial Data Infrastructure Proof of Concept Deployment Report in Support of the Government of Ethiopia.

SLGA Ethiopia Country Component Factsheet

Implemented by

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cooperation
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für Internationale
Zusammenarbeit (GIZ) GmbH

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