

2ND DRAFT

KENYA NATIONAL SPATIAL DATA INFRASTRUCTURE POLICY

KNSDI SECRETARIAT

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1. INTRODUCTION

Purpose of the Policy

This document establishes a policy for the collection, integration, distribution, use and sharing of geospatial information (GI) and services. The policy applies to GI activities of public private and civil society organisations in Kenya

Vision of KNSDI

To provide a national infrastructure for access and use of geospatial information in decision making at local, regional and national levels for sustainable development.

Mission of KNSDI

Promote the production, sharing and use of geospatial information for sustainable development

Objectives of KNSDI

- To develop national policy, institutional framework and administrative arrangements that provide mechanisms for data sharing and co-ordination of the development of geospatial datasets
- To eliminate wastage of resources and duplication in the production of geospatial information
- To develop acceptable standards for data, production and distribution
- To develop a solution for easy discovery and access of geospatial data
- To promote and co-ordinate national participation in international initiatives on the development of regional and global spatial data infrastructures

2. JUSTIFICATION

Kenya like any other country in the world has the responsibility to establish a national repository of its spatial data holdings and provide the mechanism that would enable its access, sharing and dissemination.

Development of a National Spatial Data Infrastructure (NSDI) is the technological process to ensure that the above responsibility is met.

Once established, the infrastructure, which in the Kenyan context is referred to as Kenya NSDI (KNSDI), will enable the following;

Markets Development

Having spatial information in the public domain will spar the information market which in turn will define and drive the need and use of spatial information. Citizens will demand for both spatial and non-spatial information, leading to expansion of infrastructures to encompass individual families, the land they

invest on and the environment in general. These expansions and increased awareness will necessitate the development of new markets.

Sustainable development

Sustainable development is realised when scientific innovation achieves effective and efficient economics within the physical limits imposed by ecological systems. Such is possible if information on environment and developmental issues is made readily available for full integration in decision making and policy formulations on exploitation and regeneration of natural resources. This is the domain of KNSDI.

Transparent and Participatory Governance

KNSDI will ensure availability of spatial information to the majority of citizens. This will initiate developmental planning at local level leading to participatory planning. The new developmental initiatives and concerns will demand more spatial information thus opening up governance to more and more transparency.

3. KENYA NATIONAL SPATIAL DATA INFRASTRUCTURE

Definition of NSDI

National Spatial Data Infrastructure (NSDI) can be defined as the technology, policies, standards and institutional arrangements that facilitate the availability of and access to spatial data. It promotes geo-spatial data sharing throughout all levels of government, the academia and the private sectors, thus enabling effective use of geo-spatial data for decision-making and development.

Purpose of NSDI

Governments need geo-spatial data, referenced and defined in the national context, to govern. Examples are in legislative and policy development, for the allocation and management of natural resources, for defence and public safety, in support of a variety of regulatory activities. Good governance also requires promoting the development and understanding of knowledge about physical, economic and human geography of the nation.

Geospatial data, properly managed and maintained, constitute critical resources in their own right that can be used and reused for research, education and as base information for planning and sustainable development. For these reasons it is important as a matter of policy that maximum benefits are derived from data once acquired.

The KNSDI Policy will provide common understanding and mechanisms for the production, access and use of information among the multi-sectoral GI community.

MULTI- SECTORAL USE OF GI

Sector	Typical Use of GI
Agriculture	Cultivation inventory, vegetation cover, soil study, River dams and irrigation, land use monitoring, crop yield monitoring, marine resources.
Forestry	Forest mapping, forest inventory, change detection, timber production.
Provincial Administration	International, national and local boundary delineation.
Transport and Communication	Roads and airport runway design, railways design, Aeronautic charts for navigation, surface modelling for communication, search and rescue operation.
Energy	Oil, gas and electricity exploration, electricity, exploitation, distribution, marketing and monitoring.
National Planning	National statistics, economic Planning, demographic studies
Land	Surveying and mapping, land reforms, urban and regional planning, urban renewal and change studies, feasibility study, land use mapping, land administration.
Environment	Risk zone mapping, environmental inventory and monitoring, desertification, flood and erosion monitoring, land degradation, environmental impact assessment.
Security	Defence, crime prevention and monitoring, logistical and rescue operations.
Tourism	Road network maps and street guides, tourist centres and hotel locations.
Local Government	Taxation, land use, new town development, utility services.
Health	Epidemic location, prevention and forecasting, facilities planning and distribution.
Education	Facilities planning, instructional/learning aids (e.g. school Atlases), location of institutions.
Culture and recreation	Facilities planning, development and management. Geo-referencing of historical locations, research study, culture preservation and sport development
Finance	Revenue generation, Customs and Immigrations, Taxation

4. GEO-SPATIAL DATASETS

Fundamental datasets

A variable number of data layers may be considered to be of common-use and of national or trans-national importance and referred to as “fundamental”. The concept of the “fundamental” or “core” dataset aims at sharing the datasets among users in order to facilitate the development of GIS.

The following datasets shall constitute the fundamental datasets for the KNSDI:

- a. Geodetic control
- b. Digital imagery
- c. Geographical names
- d. Administrative boundaries
- e. Parcel boundaries
- f. Transportation
- g. Hydrology
- h. Vegetation
- i. Elevation
- j. Utilities

Although different data providers may provide components of the fundamental datasets, the datasets they provide must conform to the national standard and must be integrated to develop the core data

Thematic datasets

Some geospatial datasets may be required for specific applications, and are often derived by adding value to one or more fundamental datasets. There are two categories of thematic datasets:

(a) Thematic datasets that are produced only by legally mandated agencies e.g. oil pipeline corridor map

(b) Thematic datasets that are produced according to specific user requirements, e.g.

- tourist map,
- soil map,
- meteorological datasets
- agricultural map

5. STANDARDS

The goal of KNSDI is information sharing, hence standardization is of paramount importance to enable interoperability of information systems. Tools, applications and data affect each other and therefore, processes for developing standards must consider the interactions. The aspects of standardization that are of importance to KNSDI include;

- data (production) standards,

- data presentation
- transfer/exchange standards,
- hardware and software standards

Standards for GI usage are reflected in three primary themes, namely:

- *Portability*: - the ability to use and move data, software, and custom applications among multiple computers and operating system environments without re-tooling or reformatting.
- *Interoperability and information access*:- this refers to the ability of users to connect and retrieve information from multiple systems.
- *Maintainability*: - addresses the use of standards to promote long-term and efficient updating, upgrading, and the effective use of computer systems and databases.

These standards should conform to both national and international standards.

6. METADATA

Metadata is data about data. It includes such details as the geographical extent of data, quality of data, currency of data and the supplier of the data. These details are described in a metadata structure and they enhance the use of GI in making appropriate decisions.

Metadata assist the user to determine how best to use the data. It also benefits the data producing agencies as well, because as personnel changes in an organization, undocumented data may lose their value due to little understanding of the contents and uses by the new staff. Moreover, lack of knowledge about other organization's dataset can lead to duplication of effort. The value of a dataset is therefore dependent on its documentation.

Geospatial data producers shall provide metadata for each dataset they produce and any subsequent updates. The metadata provided should conform to national and international standards

The metadata content shall include the following information at the minimum:

- Data quality (positional accuracy, attribute accuracy, temporal accuracy, lineage, completeness and logical consistency)
- Geospatial data organization
- Spatial reference (coordinate system, datum, map projection)
- Identification information (name of data, geographic coverage)
- Entity/attribute information (formats, type, measurement units)
- Distribution information (distributor, format, access protocol, procedure).

7. LEGAL FRAMEWORK

The existing legal framework does not adequately address the emerging legal issues on the KNSDI initiative. It is imperative that new legal framework be put in place to address such legal issues, and further that there be harmonious linkages with other related government policy documents such as the ICT policy, the draft National Land Policy and the e-government strategy.

Such emerging legal issues on the KNSDI initiative are;

Custodianship

- The custodianship of geo-spatial information is a crucial component of KNSDI. Since most fundamental datasets are provided by public organizations, it is often necessary to identify an authoritative source of datasets which are produced using public funds as this provides accountability for fundamental datasets
- The custodian shall be the person or organization who is responsible for the production, storage, management and distribution of the dataset on behalf of another organization (usually Government).
- The producer of public-funded data shall be the custodian and not owner, managing the data as a trustee for the community and the authoritative source of the fundamental dataset in its care.
- The custodian of a dataset shall be responsible for:
 - Quality control and assurance
 - Data content and formats
 - Validation and maintenance
 - Storage and security
 - Maintenance and updates of metadata
 - Accessibility of the data through supply of the metadata to the Clearinghouse.

Ownership

- The owner of a geospatial dataset shall be the person or organisation who privately funds data production, storage, management and distribution
- The owner of a dataset shall be responsible for:
 - Quality control and assurance
 - Data content and formats
 - Validation and maintenance
 - Storage and security
 - Maintenance and updates of metadata
 - Accessibility of the data through supply of the metadata to the Clearinghouse.

Confidentiality, Privacy and Liability

- Data providers shall disclose or make available their datasets on request unless it is prevented by law.
- Only geospatial data related to national security shall be granted confidentiality.
However, confidential data may be shared at the discretion of the custodian.
- A geospatial data custodian/owner shall not be accountable for the integrity of data that has been modified by a user
- A geospatial data custodian/owner shall be deemed to possess indemnity against any liability arising from unlawful use of her dataset.
- A user shall report, to the provider and the Clearinghouse, any error which in his/her opinion affects the quality of a geospatial data, and shall do so in the shortest time possible after discovering the error
- The user reporting any error shall provide sufficient information to enable the provider to identify the record(s) that contain error(s) that make the data unsuitable, and where possible, provide evidence of the error.

Copyright

- A geospatial data custodian/owner shall own the copyright of the data.
- For value-added data, the producer shall own the copyright of the new data and acknowledge the source of the original data.
- For integrated datasets, the producer of the data shall own the copyright provided that permission has been obtained from the copyright holder(s) of the individual base data.
- A geospatial data custodian/owner and user shall, prior to the utilization of any geospatial dataset to which the user has gained access, enter into a licensing agreement with regard to the use of the dataset. The licensing agreement shall provide for the following:
 - The duration of the agreement
 - The legal protection of the copyright of the custodian and any other interested party
 - A maximum number of permitted users within the organization where an organization is the beneficiary of the agreement
 - Any other provisions that the parties may deem necessary.
- A user shall not supply data to a third party unless this is covered by a licensing agreement between the user and the provider

8. PRICING

The high cost of geo-spatial products and services are seen as a barrier to free access by the majority of users. For publicly funded geo-information and services, the aim of this policy is not to achieve cost recovery, but to make geo-spatial information and services more accessible, affordable, and ultimately more effective and efficient. The purpose is to have a uniform policy in the public sector on pricing of spatial information and services.

9. DATA ACCESS AND SECURITY

One of the objectives of the KNSDI is to share data and thus avoid duplication of efforts. Data sharing is made possible through coordinated and structured access to documentation (metadata) about geospatial data owned by public and private sector organizations.

Transparent access to various geospatial data can provide relevant information for many applications leading to value-added services and market opportunities. Access to data is made possible through the implementation of metadata catalogue and establishment of Clearinghouse within a legal framework. However, data access protocols need to be developed in order to define a set of consistent and workable arrangements that can be used by the GI community to streamline access to data and derived information products while recognizing the rights of all parties (custodians and users).

There shall be two categories of data access, namely:

- Restricted access

Only geospatial data related to national security shall be granted restricted access; such data shall be available to users by agreement of data owner(s) on a case-by-case basis under conditions stated in a license agreement

NB - The NSDI concept precludes the restriction of geo-spatial datasets

- Free Access

There shall be free access under a legal framework to other public and private datasets.

Data may be reclassified from one access category to another as circumstances change over time, subject to the approval of the data custodian and agreement by stakeholders.

All archived data shall be made available to agreed parties as described in the access protocol.

An access registration system, which should be simple to understand and designed to minimize compliance costs, shall be put in place in the form of a search/order form. The form would require the user to specify queries for data with certain properties while providing such information as name and organization of user, address, intended use of data, etc.

The mode of access shall be defined in the access protocol and it may include on-line access (view-only, direct to user's database e.g. via ftp, brokered – providing specification of data access request to secondary access service,

etc.) or off-line access (hardcopy delivery or softcopy delivery on storage media such as CD-ROM).

The apex Clearinghouse shall be established at the main KNSDI focal agency. Each geospatial data-producing agency shall establish a metadata database server as a KNSDI node, linked to the apex Clearinghouse.

Reasonable security measures shall be put in place to minimize damage to, unauthorized access, modification and loss of current and archived data. These include access authentication devices, software devices, hardware devices, computer fire-wall protection, general fire protection, physical security, etc.

Each of the KNSDI Node will be on an Intranet – ensuring full security and “closed-user” access. The nodes would be linked to the master KNSDI Server – which will serve as the Gateway on the Internet for the Intranet Nodes. The KNSDI Gateway would be a web domain name (e.g., www.knsdi.gov.co.ke) with individual Nodes linked to the KNSDI domain. The KNSDI Gateway on the wide area protocol and the KNSDI Intranet would require sufficient bandwidth of a communication backbone.

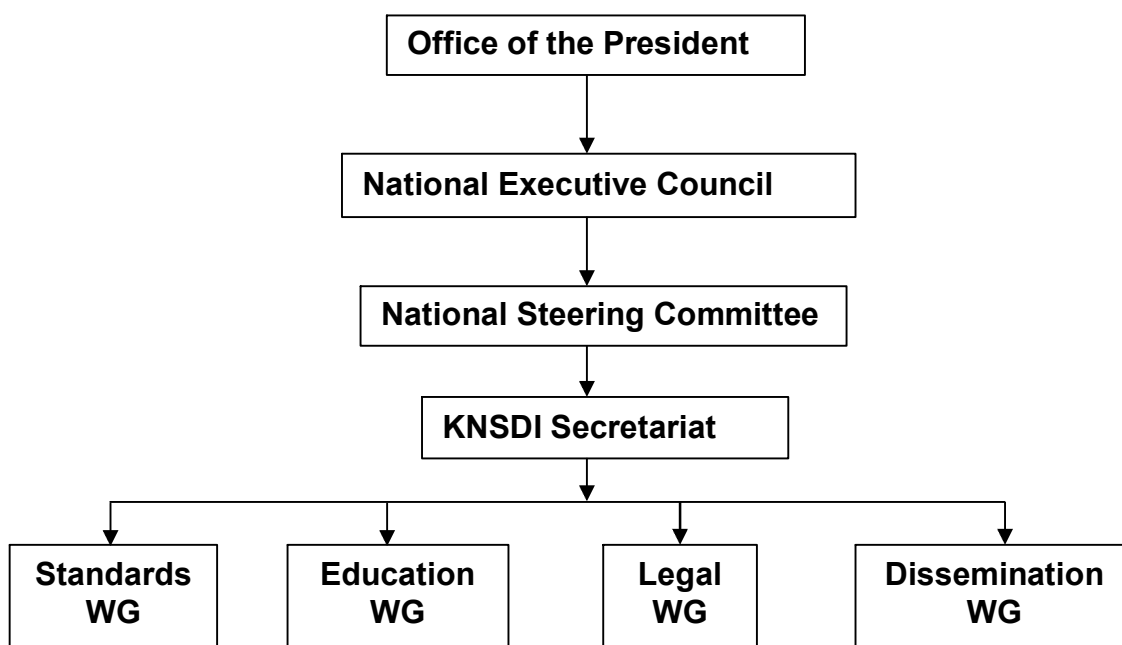
10. FUNDING

The top KNSDI organs will work out the mechanism for obtaining the finance for the operations of KNSDI. The options for funding include Government, Public-Private Partnership, public investment, international aid/loans, etc. However, it is envisioned that Government will take the lead and provide the enabling mechanism to generate finances for KNSDI including an annual budget to support operations for KNSDI sustainability.

With a national commitment obtained for KNSDI, each stakeholder could build up a fund base for its respective operations. It is also envisaged, that at an appropriate time after operationalisation of KNSDI, the KNSDI could explore ways of commercializing its operations.

11. ORGANISATIONAL STRUCTURE

The structure comprises Office of the President, National Executive Council, National Steering Committee, the KNSDI Secretariat and Working Groups.



FUNCTIONS

Office of the President

Function: Patron (President of the republic of Kenya)

National Executive Council (NEC)

Membership: Ministers of main stakeholders

Chair: Head of Civil Service

Function: Policy and funding

National Steering Committee (NSC)

Membership: Directors of partner organisations

Function: Report to and advice National Executive Council

Supervise implementation of KNSDI

KNSDI Secretariat

Membership: Appointed members

Conveners of WGs

Function: Coordinate NEC, NSC and Working Groups

Working Groups (WGs)

The Working Groups are technical task forces.

Membership: Experts from partner organisations

Function: Making recommendations on given terms of reference to the KNSDI Secretariat

TERMS OF REFERENCE FOR THE WORKING GROUPS

(Established at KNSDI II)

- **Standards WG**
 - Framework data (kinds, scale etc)
 - Coding System
 - Reference System (ellipsoid, projection)
 - Exchange format
 - Metadata Standards
- **Legal WG**
 - Copyright
 - Liability
 - Privacy
 - Data policy (access, restriction, pricing, enforcement of copyright for original data and secondary data, etc).
- **Education WG**
 - Training
 - Curriculum
 - Research
 - Sensitization
 - Liason
- **Dissemination WG**
 - Clearing House
 - Metadata
 - Website for NSDI

12. TRAINING AND CAPACITY BUILDING

Introduction

NSDI is a relatively new concept that rides on the technologies of Remote Sensing (RS), Geographic Information Systems (GIS) and Global Positioning Systems (GPS), otherwise referred to as geo-information Technologies.

Just as is the case in most African countries, the establishment of these technologies in Kenya is still at the infancy stage. This implies that there is an urgent need for training and capacity building for stakeholders, from both the public and private sectors, if the country is to fully embrace these technologies for her much needed socio-economic development. Focus on training and capacity building for NSDI, rests on five key pillars, namely, human resource training in geo-information, geo-information curriculum development, research in geo-information technologies and applications, public / user sensitization campaigns, and liaison with strategic partners.

Whereas there is need to create awareness in geo-information at the primary and secondary schools levels, the need to establish sound dynamic training and capacity building programmes at the tertiary level based on these five pillars cannot be overemphasized.

Policy Recommendations

- GI projects to include a training component for various grades of manpower (operators, supervisors, managers, etc) in relevant aspects of geo-information.
- The KNSDI coordinating agency and other stakeholders to carry out public awareness programmes from time to time on KNSDI related issues.
- All institutions of learning offering geo-information related programmes to review their geo-information curricula on a regular basis.
- Impact assessment of geo-information projects on the society to be carried out by the KNSDI stakeholders.
- Government, through the KNSDI coordinating agency to encourage research on new innovations in geo-information and its applications.
- Continuing Professional Development (CPD) for geo-information practitioners to be mandatory.
- Geo-information stakeholders to be encouraged to forge strategic liaisons with reputable local and international partners.
- Accreditation of geo-information training programmes based on international standards and practices to be encouraged.

13. IMPLEMENTATION PLAN

The following actions will have to be taken for the implementation of KNSDI

- a) Establishment of a KNSDI Task Force
- b) Preparation of the KNSDI Policy and Action Plan.
- c) Government approval of the KNSDI policy – with commitments from KNSDI stakeholders
- d) Formulation of NSDI Bill and its enactment through Parliamentary process
- e) Definition of NSDI Standards – Content, Design, Network, Exchange etc
- f) Design and Organization of KNSDI Metadata
- g) Development of KNSDI Search and Access Protocols
- h) Establishment of KNSDI Network (bandwidth and architecture)
- i) Establishment of KNSDI Nodes by NSDI stakeholders.

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IMPLIMENTATION PLAN

Goals	Purpose	Outputs	Activities	Actors	Inputs	Measurable Indicators	Means of Verification	Cost	Time frame	Assumptions
Efficient Provision of accurate, current and timely geospatial data to the people of Kenya and others for sustainable National Development	To develop national policy, institutional framework and administrative arrangements that provide mechanisms for data sharing and co-ordination of the development of geospatial datasets	KNSDI organizational structure	Create the KNSDI Structure (Patron, NEC, NSC, Secretariat, WGs,)	Stakeholders	Workshops Funding	KNSDI structure created	Workshop proceedings			Cabinet will approve the KNSDI policy and set asides funds for its implementation & maintenance
			Appoint the Membership of the KNSDI Structure	” ”	” ”	Membership of the KNSDI Structure Appointed	” ”		” ”	
			Assign the Functions of the KNSDI Members	” ”	” ”	Functions of the KNSDI Members Assigned	” ”		” ”	
	To promote and co-ordinate national participation in international initiatives on the development of regional and global spatial data infrastructures		Establish the Secretariat	Stakeholders Chairman to the secretariat	Office space & equipment for secretariat Workshops & work meetings Funding	Establishment of ; Secretariat	Workshop proceedings WGs progress Reports			” ”
			Establish WGs	Stakeholders WG conveners	Workshops & work meetings Funding	Establishment of ; WGs	WGs progress Reports			” ”
			Establish NSC	Stakeholders NSC conveners	” ”	Establishment of ; NSC	” ”			” ”
			Establish NEC	Stakeholders NEC conveners	” ”	Establishment of ; NEC	” ”			” ”
	To eliminate wastage of resources and duplication in the production of geospatial information		KNSDI Policy	Prepare the Draft policy	Secretariat WGs Stakeholders	Workshops & work meetings Related policies and documents Funding	Completion of the Final Draft Policy	Preliminary draft documents Workshop proceedings		
To develop acceptable standards for data, production and distribution		KNSDI Standards		Identification of Fundamental datasets	Secretariat Standards WGs	Workshops & Work meetings Funding	Final standards documents	Preliminary draft documents Workshop		

Goals	Purpose	Outputs	Activities	Actors	Inputs	Measurable Indicators	Means of Verification	Cost	Time frame	Assumptions
				Stakeholders	Existing standards		proceedings			participate effectively
			Data production standards,	” ”	” ”	” ”	” ”			” ”
			Data presentation standards	” ”	” ”	” ”	” ”			” ”
			Data transfer and exchange standards	” ”	” ”	” ”	” ”			” ”
			Hardware and soft aware standards	” ”	” ”	” ”	” ”			” ”
			Training standards	” ”	” ”	” ”	” ”			” ”
			Metadata standards	” ”	” ”	” ”	” ”			” ”
	To develop a solution for easy discovery and access of geospatial data	KNSDI Intranet (Metadata , Search and Access Protocols , Nodes)	Design and Prepare KNSDI Metadata	Secretariat Dissemination WGs Focal Agency Nodal Agencies	Workshops & Work meetings Standards Hardware and software Funding Capacity building	Establishment of Metadata	WGs progress reports Workshop proceedings			” ”
			Establish a Clearing House	Secretariat Dissemination WGs Focal Agency	” ”	Establishment of KNSDI Website & ClearingHouse	” ”			” ”
			Establish KNSDI Network	Secretariat Desemination WGs Focal Agency Nodal Agencies	” ”	Establishment of KNSDI Network	” ”			” ”
			Establish KNSDI Nodes	Secretariat Desemination WGs Nodal Agencies	” ”	Establishment of KNSDI Nodes	” ”			” ”

