



Analysis of data sharing environment and major challenges currently being faced in data sharing in Rwanda

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Introduction

This study presents a discussion on:

- **challenges in data sharing in Rwanda**
- **framework data sets which are in existence in Rwanda and their Custodians**
- **the proposed workflow of data sharing for Rwanda**
- **Finally, the potential steps towards the effective use of geospatial science for sustainable development in Rwanda**

Background

In Rwanda there is a growing interest on creating a National Spatial Data Infrastructure (NSDI) and the achievement of building such an infrastructure will:

- make geo-information data accessible
- and will support governmental decision-making processes.

The Rwandan government organizations have long been engaged in:

- building spatial databases
- and maintaining collections of digital datasets like road network, property and forest databases.

Background

In October 2006, a conference on SDI (Spatial Data Infrastructure) took place, at the Intercontinental Hotel in Kigali, where different levels of government, industry and academia were present.

Considerable emphasis has been placed to:

- Initiate the process of the implementation of a National Spatial Data Infrastructure (NSDI) in Rwanda.
- Promote the notion and understanding of NSDI in Rwanda
- Encourage partnerships among organizations to support the continuing development of an overall plan of action draft for NSDI in Rwanda
- Further actions and to establish/extend a regional and international NSDI partnership network.

Challenges in data sharing in Rwanda

In Rwanda there are many servers for spatial data in different institutions, for instance :

- At MINAGRI (Ministry of Agriculture and Livestock in Rwanda) there is a database for soil.
- At CGIS-NUR, the Center for Geographic Information Systems and Remote Sensing of the National University of Rwanda (NUR) has spatial data servers for forest, National Parks, administrative boundaries, hydrology etc...
- At Kigali City Council, servers are available with a Cadastral Database for Land & Revenue Management.

However, nowadays, the ability and possibility to use the information is more important than just to possess it.

Challenges in data sharing in Rwanda

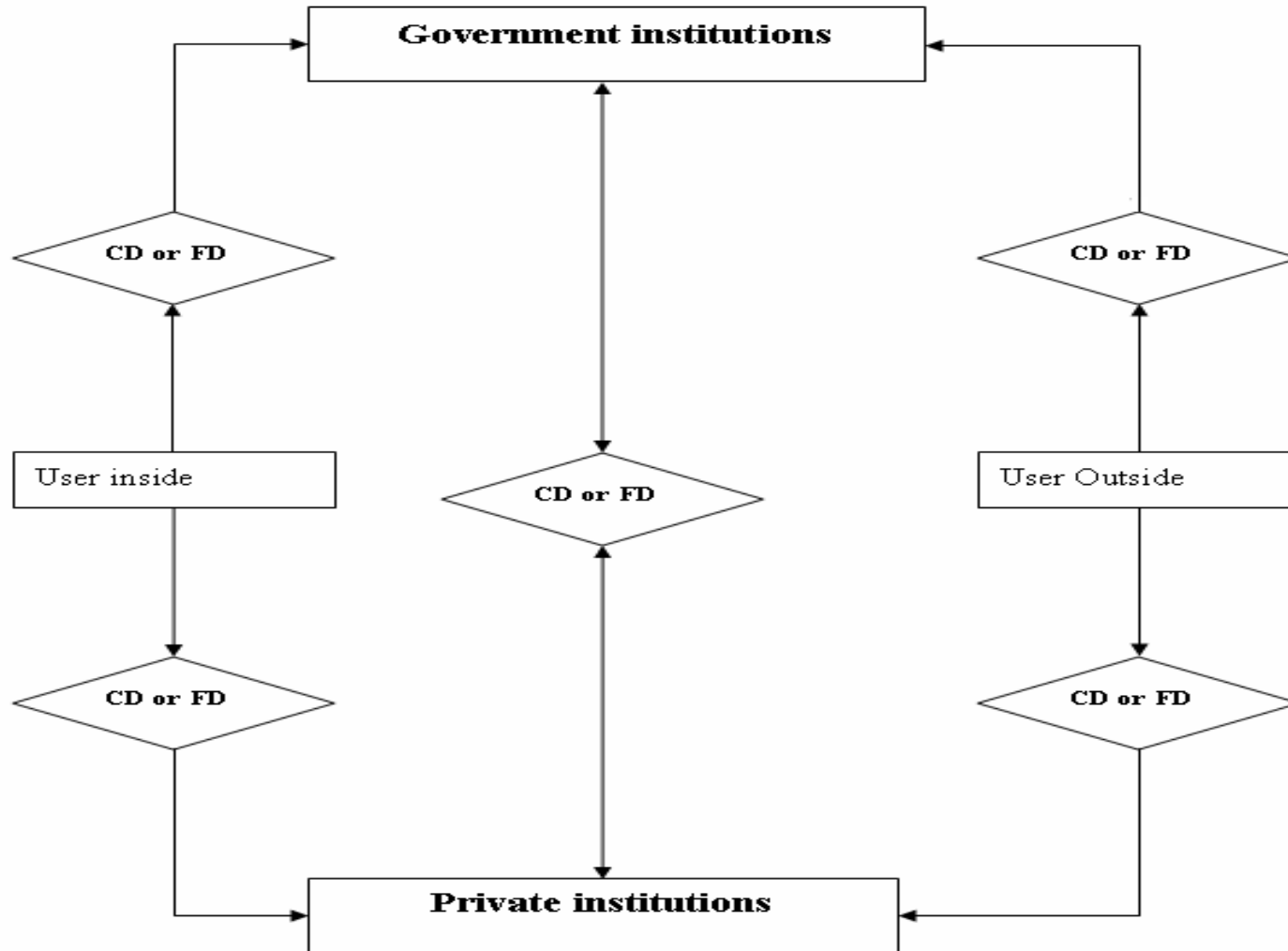
Although much data and information are available in Rwanda:

- they are scattered in various formats among several ministries, local agencies, research institutes and universities.
- there is no central repository (e. g. node) or access point using websites (e.g. clearinghouse) for geographic data for Rwanda.
- All these data servers are standalone servers and scattered around the country in different institutions.
- There is no access point to these servers via internet or website/clearinghouse in order to put this information to the benefit of the public.

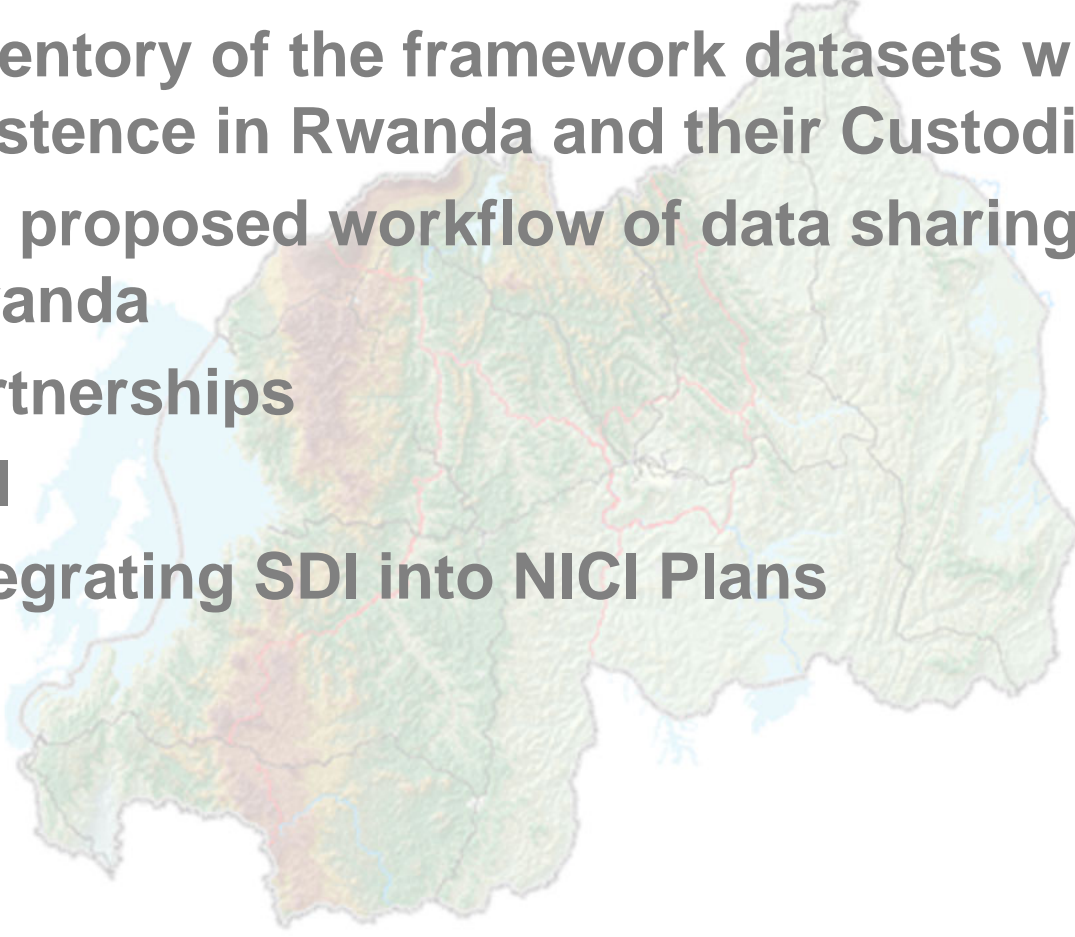
The current system of data sharing in Rwanda

- **Government institutions:**
 - Users inside the government institutions use CD or FD to share data within this institution.
 - Users outside the government institutions use CD or FD to get data from these institutions.
 - **Private institutions:**
 - Users inside the private institutions use CD or FD to share data within this institution.
 - User Outside the private institutions uses CD or FD to get data from these institutions.
- **Government and private institutions exchange data between them using CD and FD.**

Workflow of the current system of data sharing in Rwanda



Potential steps towards the effective use of geospatial science for sustainable development in Rwanda:

1. Inventory of the framework datasets which are in existence in Rwanda and their Custodians
 2. the proposed workflow of data sharing for Rwanda
 3. Partnerships
 4. SDI
 5. Integrating SDI into NICI Plans
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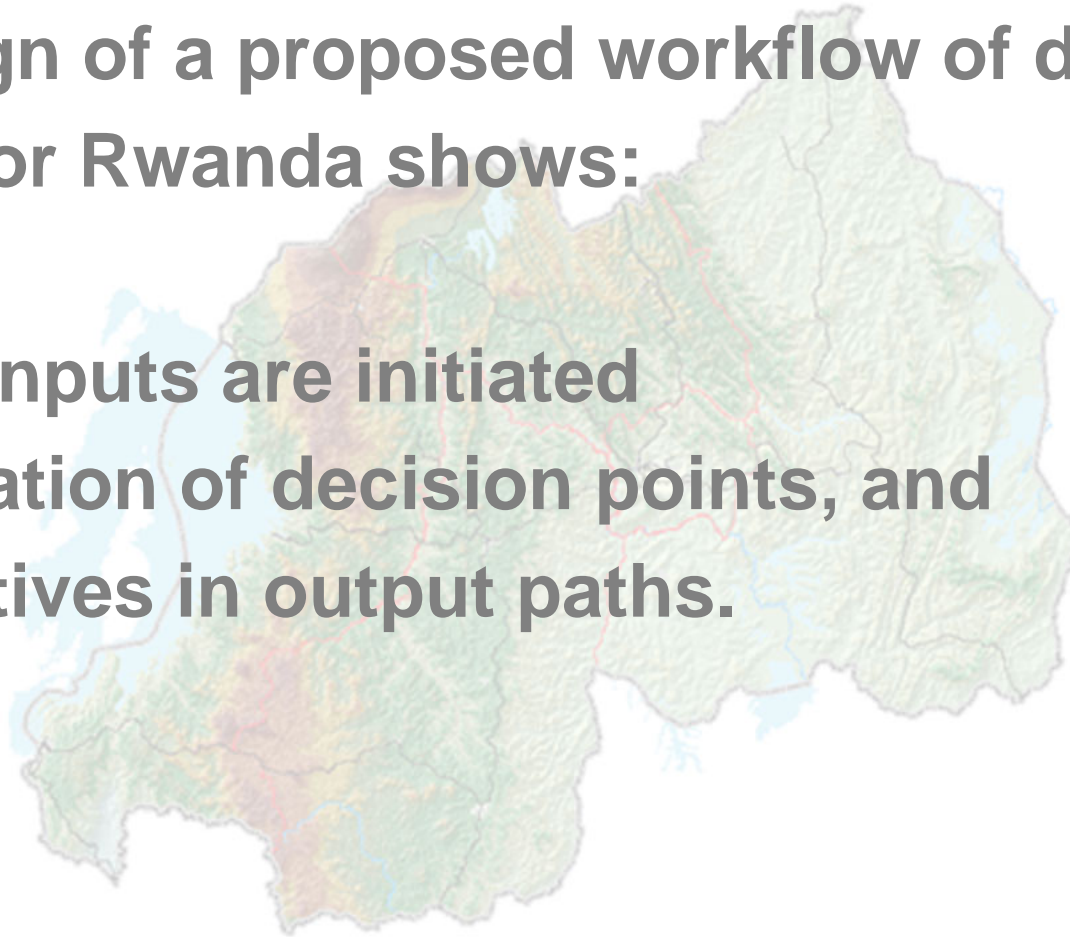
1. Framework data sets which are in existence in Rwanda and their Custodians

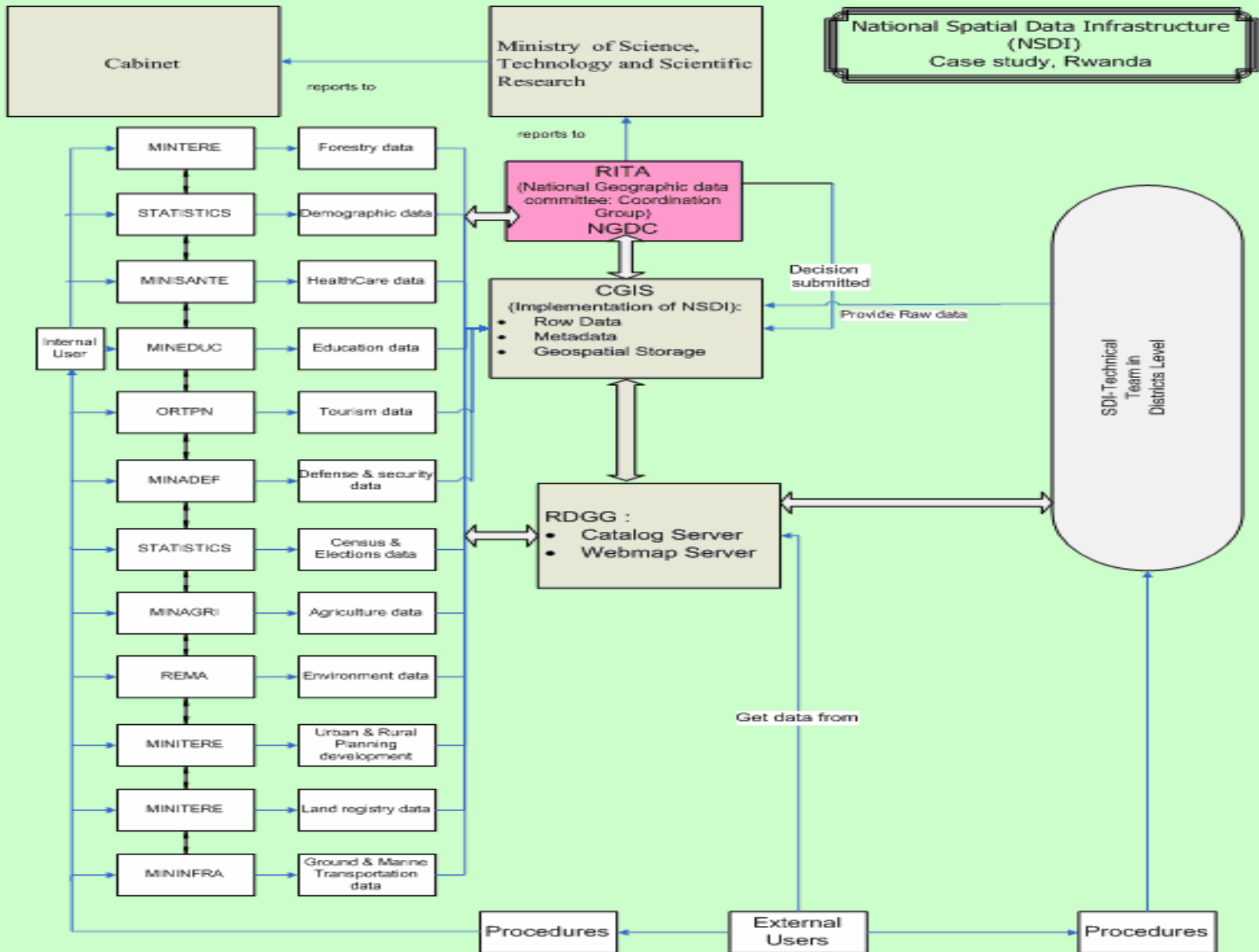
Custodians (departments responsible)	Feature	data sets	Attribute
Ministry of Agriculture and Animals Resources	Agriculture	Soils, vegetation and cattle	Dominant soils, Biomes and Vegetation types
Ministry of Local Government, Good Governance, Rural Development and Social Affairs.	Administrative Boundaries	National Boundary	Name of the country
		Province Boundaries	Name of the provinces
		District Boundaries	Name of the districts
		National Park Boundaries	Name of the park
Ministry of Land, Environment, Forestry, Water and Mines.	Environment	Temperature	Low, Average, Maximum annual temperatures
		Rainfall	Variation in annual rainfall
		Evaporation	
		Wind	Frequencies of wind from different directions
Ministry of Land, Environment, Forestry, Water and Mines.	Land	Geology	Major rock formation and sequences
		Land usage	Type of land use
		Mines	Name of mines, type, status
		Land Cover	Category of Land Cover
		Land ownership	Categories of land ownership
		Land control Conservation	Categories of control over land Areas allocated and proposed for conservation
Ministry of Infrastructures	Infrastructures	Land forms	Category of land forms
		Power Lines	Number of power lines

2. Proposed workflow of data sharing for Rwanda

The design of a proposed workflow of data sharing for Rwanda shows:

- where inputs are initiated
- the location of decision points, and
- alternatives in output paths.





3. Partnerships

Partnerships at:

- National level (eg. among producers of spatial data)
- Regional level (eg. East African comminute)
- and Global level

Partnerships:

- are the glue all the components of the NSDI (i. e. clearinghouse, metadata, framework data).
- extend local capabilities into technology, skills, logistics, and data.
- Partnerships minimize costs and save time.

4. Spatial Data infrastructure (SDI)

In August 2007 in Rwanda took place a SDI-Training on “GIS Portal Toolkit”


The outcomes from the SDI-Training are:

- The construction of a prototype for a National Portal which is available on the data server at RITA (Rwanda Information Technology Authority).
- On construction of a Geo-Portal for CGIS (visit this URL: <http://www.cgis.nur.ac.rw/Portal/>).



4. Spatial Data infrastructure (SDI)

A Geo-Portal at CGIS-NUR

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<p>Metadata Portal</p> <ul style="list-style-type: none"> ✱ Home ☐ Launch Map Viewer ☐ Advanced Search ☐ Login <p>Username <input style="width: 80%;" type="text"/></p> <p>Password <input style="width: 80%;" type="password"/></p> <p style="text-align: right;"><input type="button" value="Login"/></p> <p>Create a new account! Forgot Password?</p>	<p>Home</p> <hr style="border-top: 1px dashed #ccc;"/> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <input style="width: 80%; border: 1px solid #ccc;" type="text"/> <input style="margin-left: 10px; border: 1px solid #ccc;" type="button" value="Search"/> </div> <p style="text-align: center;">Advanced Search</p> <p>Popular Maps</p> <hr/> <p>Rwanda Base Map The Rwanda Base Map is the basic map shown in the Portal Map Viewer.</p> <div style="text-align: center; margin: 10px 0;">  </div> <p>Supported by:</p> <div style="text-align: center;">  </div>	<p>Data Categories</p> <p>Agriculture and Farming</p> <p>Applications Areas</p> <p>Current Events</p> <p>Information from CGIS</p>
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5. Integrating SDI into NICI Plans

According to Nkusi (2006) the Government of Rwanda is implementing the Information Infrastructure in four 5 years periods:

- called NICI Plans (National Information and Communications Infrastructure)
- over the 20 year time span of the Vision 2020 socio-economic development programme from 2000.

The SDI has been integrated into the NICI Plan in order to speed up the emergence of the Rwandan Information Society.

5. Integrating SDI into NICI Plans

The individual time span and goals of the each of the NICIs are:

- The 1st NICI Plan (2001 to 2005)

Goal: To Support the development of an economic base and environment for accelerated growth and development towards transforming Rwanda into an information-rich knowledge-based society and economy.

- The 2nd NICI Plan (2006 to 2010)

Goal: To support the strengthening of the economic base and improving the economic environment to accelerate development and growth towards achieving an information-rich knowledge-based society and economy.

5. Integrating SDI into NICI Plans

- The 3rd NICI Plan (2011 to 2015)

Goal: To facilitate the process of sustaining economic development and growth towards improving national prosperity and global competitiveness

- The 4th NICI Plan (2016 to 2020)

Goal: To consolidate the process towards achieving a middle-income status and an information-rich knowledge-based society and economy. (Nkusi, 2006)

Conclusion and recommendation

This study has contributed to the followings questions:

- What data are available?

The table of framework data sets (e.g. forest, National Parks, administrative boundaries, hydrology etc...)

- Where to find the data?

The framework data sets that shows which department is responsible of what data set in Rwanda.

- How to access the data?

The design of a proposed workflow of data sharing for Rwanda

Conclusion and recommendation

The author of this study recommends the creation of a national Institution in Rwanda which will coordinate:

- the development of the infrastructure needed to support the utilization of spatial information
- to create a single central geographic database
- to make it possible to link different databases maintained by public and private sectors.


Conclusion and recommendation

Model institutions in different countries:

- In the USA:
FGDC (Federal Geographic Data Committee)
- In South Africa:
- NSIF (National Spatial Information Framework)

Rwanda needs to create such an institution in order to develop the mechanisms of:

- avoiding duplication in data collection and management
- encouraging partnerships among spatial data producers



Thank you for your attention !