



Collaboration, Innovation and Resilience: Championing a Digital Generation

Brisbane, Australia 6-10 April

# *A Review of Nepal's Spatial Data Infrastructure: Status and Future Prospects*

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## Presentation Outline

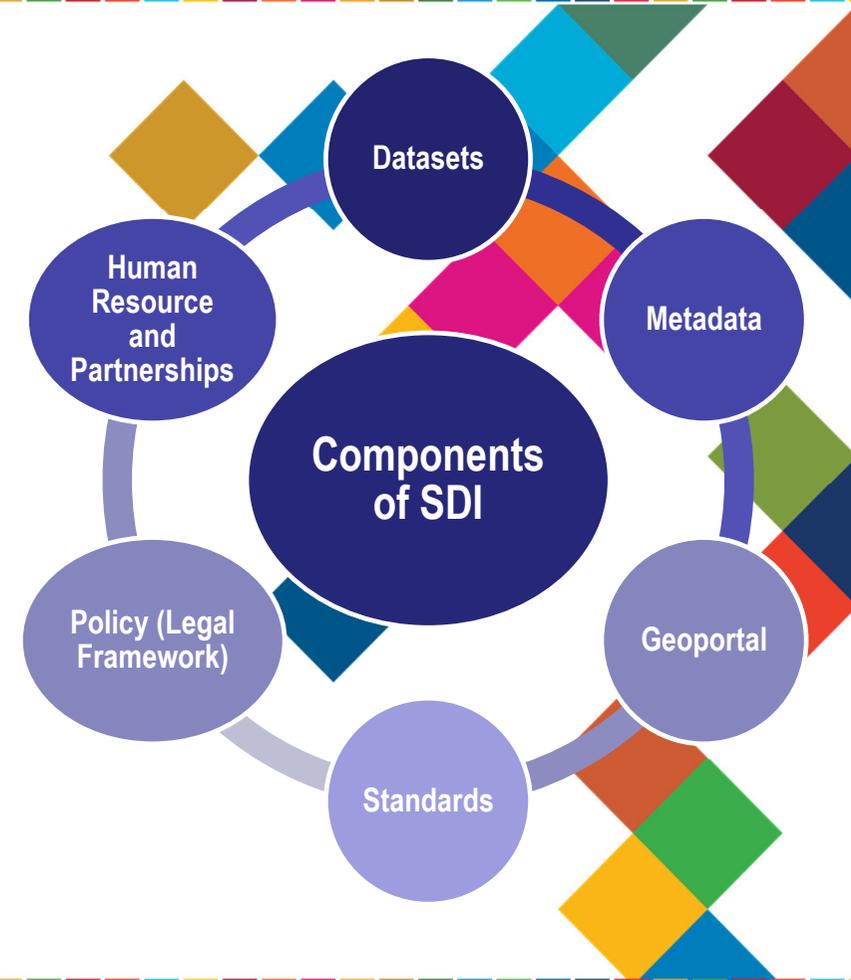
1. Understanding Spatial Data Infrastructure (SDI) 
2. Introducing Nepal
3. Status of NSDI in Nepal : from past to present
4. Challenges
5. Future Prospects



# 1. Understanding Spatial Data Infrastructure

## Spatial Data Infrastructure (SDI) :

- Collection of technologies, policies and institutional arrangement that facilitate the creation, availability, access, exchange and use of spatial data. (*GSDI, SDI Cookbook v2*)
- Involves multiple stakeholders sharing / using data
- A way to :
  - **Support** : Data sharing, use and discovery of data
  - **Reduce**: Data duplication
  - **Assist**: Informed Decision Making and planning



## 2. Introducing Nepal



- Land Locked Country in **South Asia**
- **31 million** (approx.) : population
- **207 people / km<sup>2</sup>** : population density
- **Lower-middle-income** country (*World Bank*)
- **146<sup>th</sup>** OUT OF 193 : in HDI Rank

### National Goals:

- ‘**Prosperous Nepal, Happy Nepali**’ : transform country into high-income nation by 2043 , middle-income by 2030.

## Land of Wonderful Landscape, People and Culture





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### 3. National SDI (NSDI) in Nepal : from past to present

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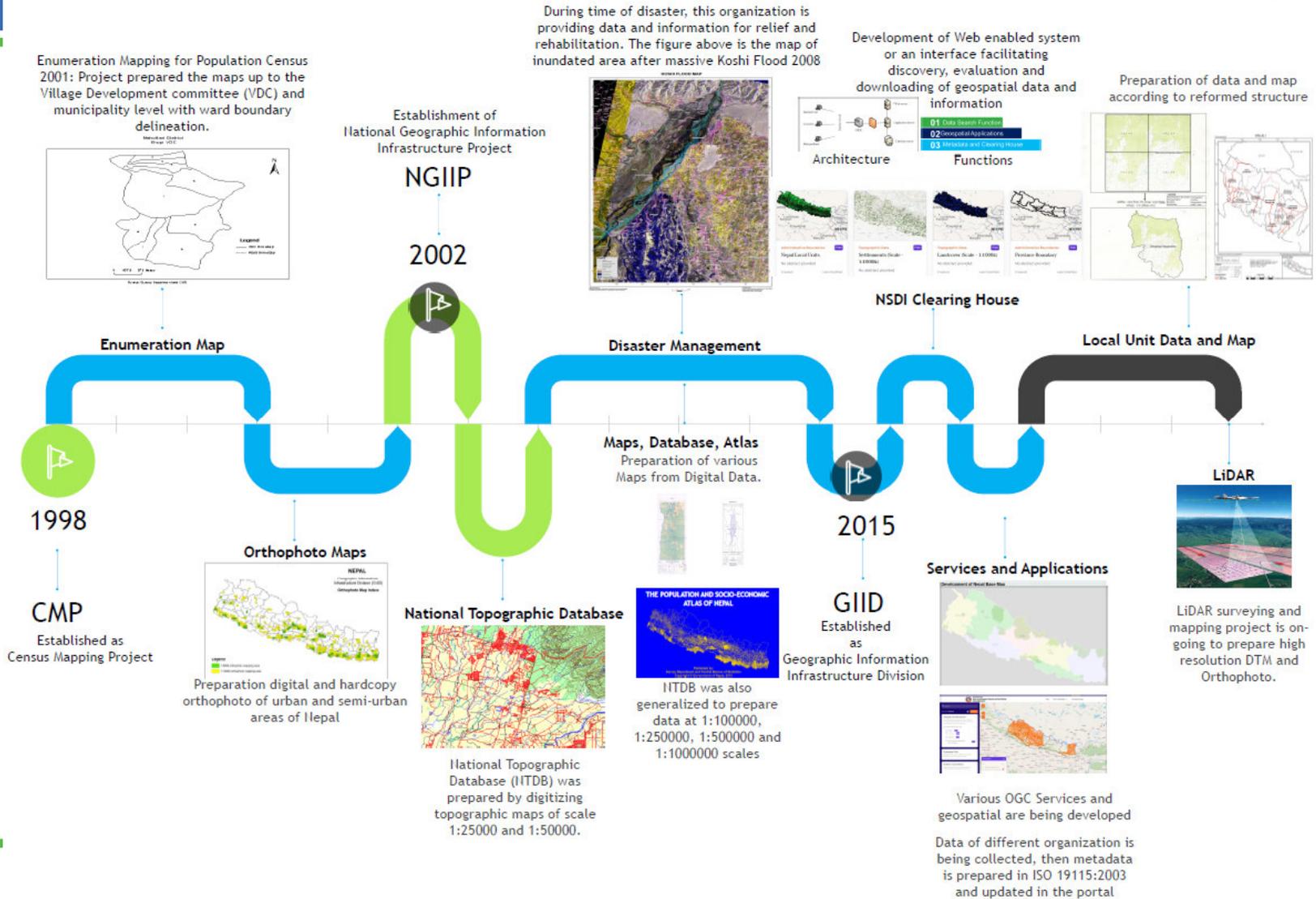


# Milestone of Geographic Information Infrastructure Division

## NSDI of Nepal: Timeline

25+ years of SDI development:

- 1998-2002
- 2002-2015
- 2015- Present



## NSDI of Nepal: Timeline

- **1998-2002:**

- 1996- NTDB
- 1992-1997 8<sup>th</sup> Periodic Plan : GIS Activities Initiation
- 1999: Systematic map digitalization and digital mapping project
- IT Policy 2000
- Ninth Plan (1997-2002)
- Tenth Plan (2002-2007)

- **2002-2015:**

- 2002 NGII
- 2005 Geoportal ([www.ngiip.gov.np](http://www.ngiip.gov.np))
- 2004 Nrs 3.6 M worth data sold
- 2005 EC Handed over mapping component to government

- **2015- Present:**

- Geoportal (<https://nationalgeoportal.gov.np/>)
- 2015 LRIMS
- 2021 NeIS
- 2021 Digital Mapping and Service Delivery Directives 2021



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## Recognizing the Need for SDI in Nepal

- Multiple organization generating data
- Questions on quality, compatibility,
- Difficulty in discovery , lengthy process
- Need of data in development and research activities



## Reviewing NSDI of Nepal:

### Technical Aspect :

- Data
- Metadata
- Geoportal

### Organizational Aspect

- Institutional Arrangement
- Human Resources

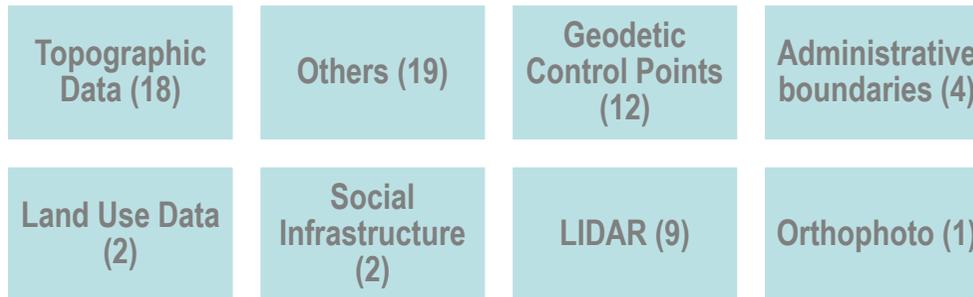
### Legal Aspect

- Policy
- Standards

## NSDI of Nepal : Technical Aspect

### Data and Metadata:

- 67 dataset layers (Framework + other Geodata)
- 8 categories



## NSDI of Nepal : Technical Aspect

### Geoportal:

- Interface of Nepal's National Geoportal



The screenshot shows a dark blue background with a faint map of Nepal and a globe. The main heading is "Welcome to National Spatial Data Center : Geoportal". Below it is a sub-heading: "A National Spatial Data Infrastructure (NSDI) Clearinghouse / Data Center to enhance the public reach and easy access to the authentic Geospatial Dataset provided by the Survey Department, Nepal." At the bottom, there is a search bar with the placeholder text "Search by Name and keyword..." and an orange "Search" button. Below the search bar is a link for "Advance Search".

# NSDI of Nepal : Technical Aspect

## Geoportal:

- User friendly interface with option to view map and download data

The screenshot shows a web-based geoportal interface. At the top, there is a search bar with the text "Search by Name and keyword..." and an "Advance Search" button. To the right of the search bar is a "Sort by" dropdown menu set to "Sort" and a hamburger menu icon. Below the search bar is a purple banner with the text "Go to **Advance Download** to download filtered data." and a large orange "Advance Download" button. On the left side, there is a dark blue sidebar with a white "Advance Download" button at the top. The sidebar contains two sections: "Available Datasets" with a list of checkboxes for "Administrative Boundaries", "Geodetic Control Points", "Hazard", "Land Use Data", "Others", "Orthophoto", "Cadastral Data", "Topographic Data", "Social Infrastructure", and "LIDAR"; and "Data Contributors" with checkboxes for "Others" and "Survey Department". The main content area displays a list of datasets. The first dataset is "Geodetic Control Points" with the title "First Order Horizontal Control Points". It includes a small map thumbnail showing red control points on a map of Nepal, a "Map View" button, and a "Download" button. Below the title, it states: "First order Control points were established at the start of trigonometrical survey of Nepal. These Control points are used to further densify the...". It also shows "Created" and "Last Modified" dates as "Dec 17, 2024". The second dataset is "Topographic Data" with the title "Airports Polygon (Scale - 1:25k & 1:50k)". It includes a map thumbnail showing a polygon over a map of Nepal, a "Map View" button, and a "Download" button. Below the title, it states: "No abstract provided". It also shows "Created" and "Last Modified" dates as "Dec 12, 2024". The third dataset is "Social Infrastructure" with the title "Health Facilities", including a map thumbnail and a "Map View" button.

## NSDI of Nepal : Technical Aspect

### Geoportal:

- Multiple features

### Major Features

The major features of National Spatial Data Clearinghouse - Geoportal



#### Find Desired Data

You can find desired data by using the search and advance search feature.



#### Download Desired Data

You can download desired data by logging in to the system.



#### Desired Data in Map

You can view the data in map to check how the data looks when plotted over map.



#### View Metadata

You can view the metadata of the desired data to know more about the data.



#### Add Data to Cart

You can add multiple dataset to cart and download it together in a packaged format.



#### View Geospatial Apps

You can view the useful geospatial apps and tools developed by different Government Bodies.

# NSDI of Nepal : Technical Aspect

## Geoportal:

- Geospatial Apps links for accessing: Land use and other data

## Geospatial Apps

Explore Geospatial Applications and Tools developed by different government bodies.

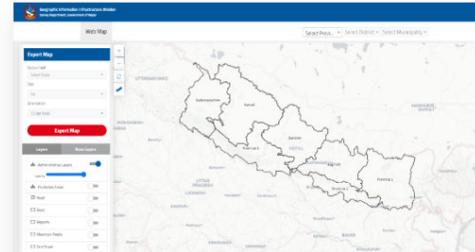


### Basemap Application

This app contains Basemap of Nepal.

Published  
May 13, 2019

[View App](#)



### Nepal Local Unit Maps

View and download local unit maps in pdf format. There are two options: 1. Hard Copy Map and 2....

Published  
May 13, 2019

[View App](#)



### Land Use Geoportal

This portal contains data and metadata information on Land Use data prepared by Survey Department.

Published  
Oct 19, 2022

[View App](#)

# NSDI of Nepal : Technical Aspect

## Land Use Geoportal

### Geoportal:

- Geospatial Apps links for accessing: Land use and other data

The screenshot displays the 'Land Use Geo-Portal' interface. At the top, it identifies the 'Government of Nepal, Ministry of Land Management, Cooperatives & Poverty Alleviation, Survey Department'. The main map area shows Nepal divided into districts, with a 'Present Land Use' layer overlaid. A legend on the right side of the map lists categories: Agriculture (yellow), Built up area (orange), Forest (green), Riverine and Lake area (blue), Shrubs and grassland (light green), Snow and glacier (white), Other (grey), and Unclassified (dark grey). The interface includes navigation tools (Home, Metadata, Reports, etc.), a 'Map Layers' panel on the left with 'Present Land Use' selected, and a 'Select Data' panel with dropdown menus for 'District' and 'GaPa/Na'.

## NSDI of Nepal : Technical Aspect

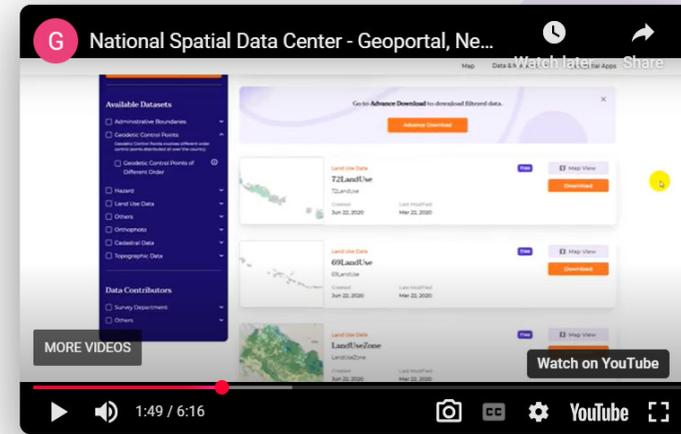
### Geoportal:

Other features for user's ease:

- Video Tutorial for using the portal
- FAQs

### What is National Spatial Data Center : Geoportal?

A Geoportal is a consolidated and centralized web-based digital platform that provides an online geo information management system and consists of spatial data sharing tools to access and view different data and maps. It is a type of web portal used to find and access geographic information (geospatial information) and associated geographic services (display, editing, analysis, etc.) via the internet. Geoportals provide geospatial service access to distributed data systems featuring maps, data downloads and management. Some Geoportals can also offer online analysis and processing of datasets and dynamic data visualization tools.



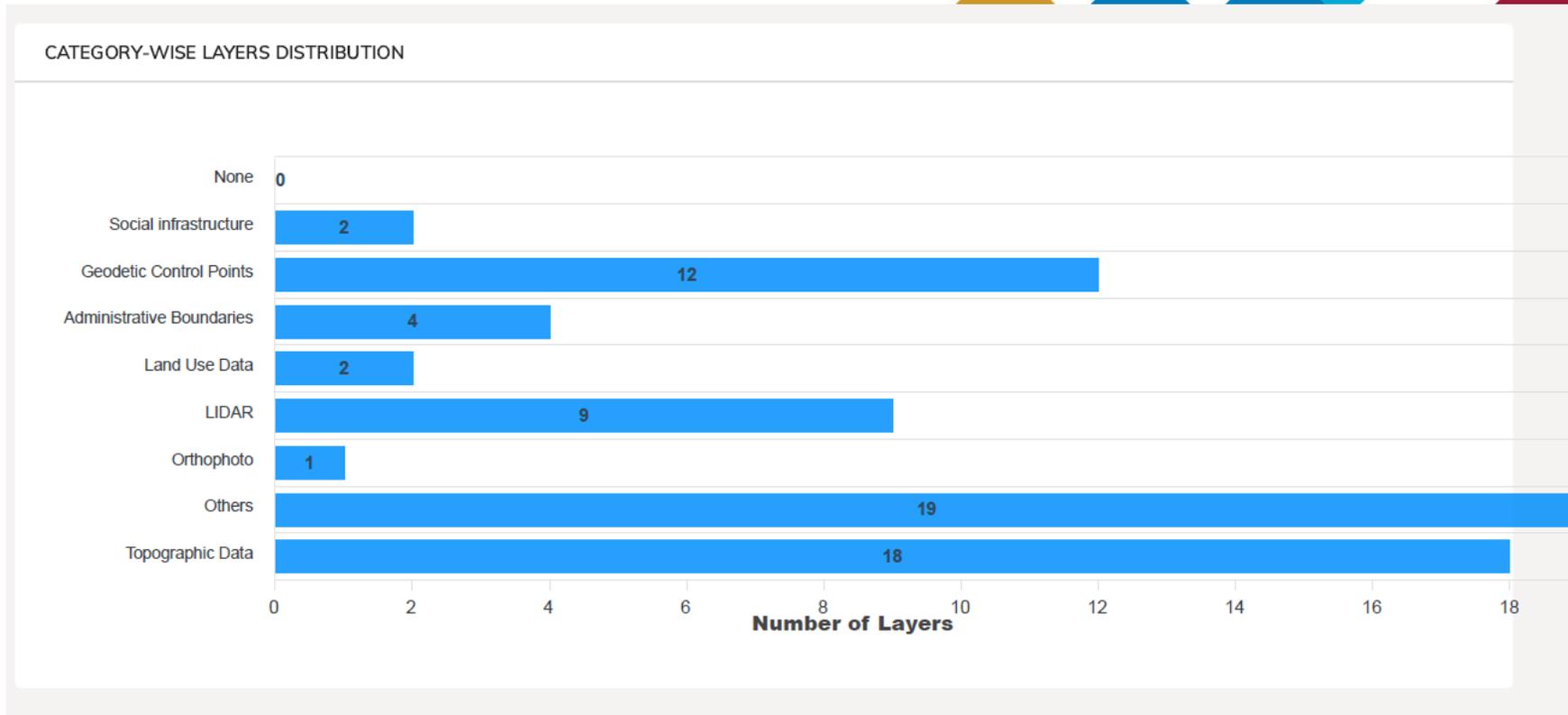
### Frequently Asked Questions

Please wait while FAQs are being displayed.

# NSDI of Nepal : *In terms of Data/ Metadata/ Geoportal Usage and Demand*

Available data in geoportal as per category

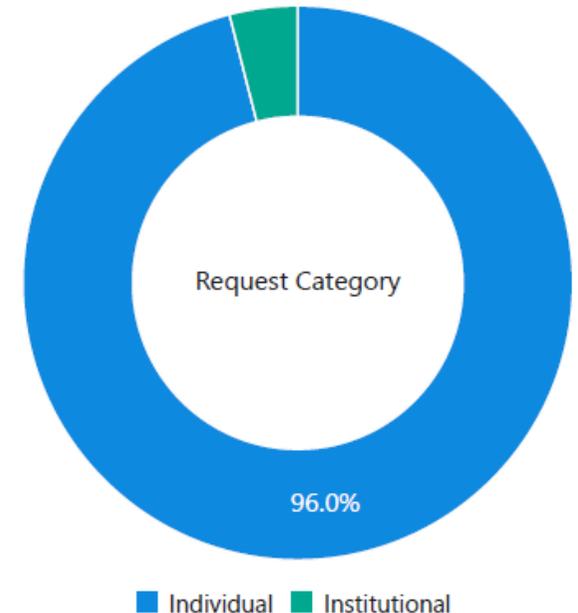
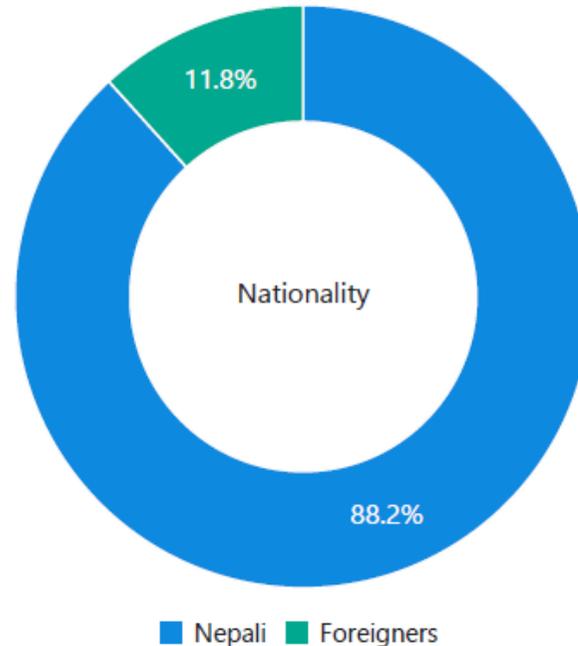
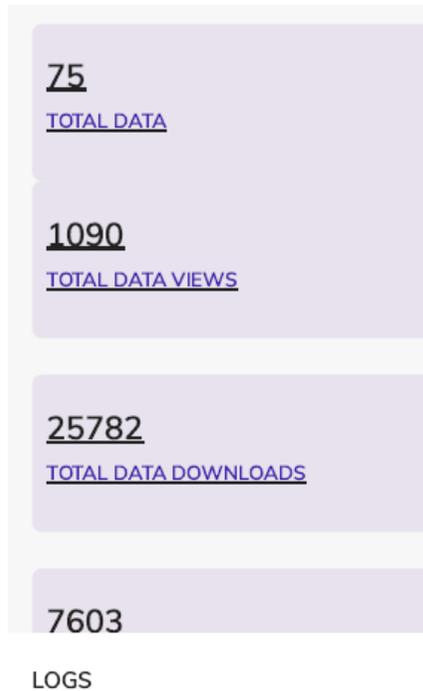
- Total layers (



# NSDI of Nepal : *In terms of Data/ Metadata/ Geoportal Usage and Demand*

Download request on basis of:

- Nationality
- User Category

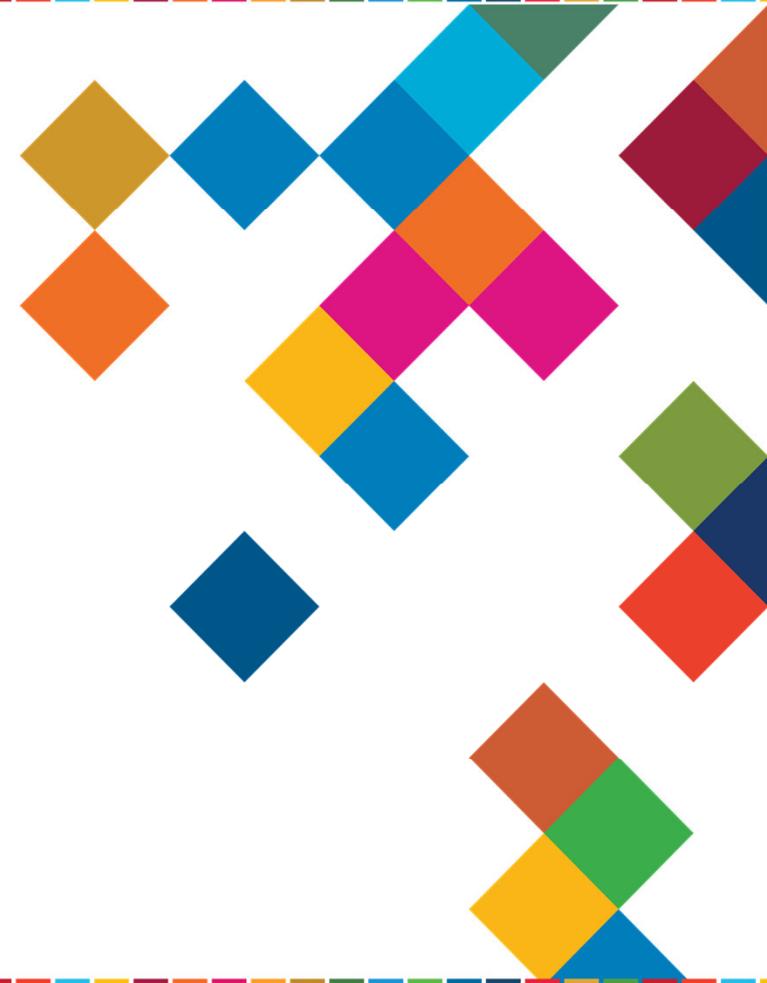


## NSDI of Nepal : Organizational Aspect

### In Initial Stage

Partnership was envisioned between 6 government agencies:

- Survey Department under Ministry of Land Management and Cooperatives (Lead Agency)
- Central Bureau of Statistics
- Ministry of Local Development
- Ministry of Population and Environment
- Ministry of Agriculture and Co-operatives
- Ministry of Health/ Department of Health Services

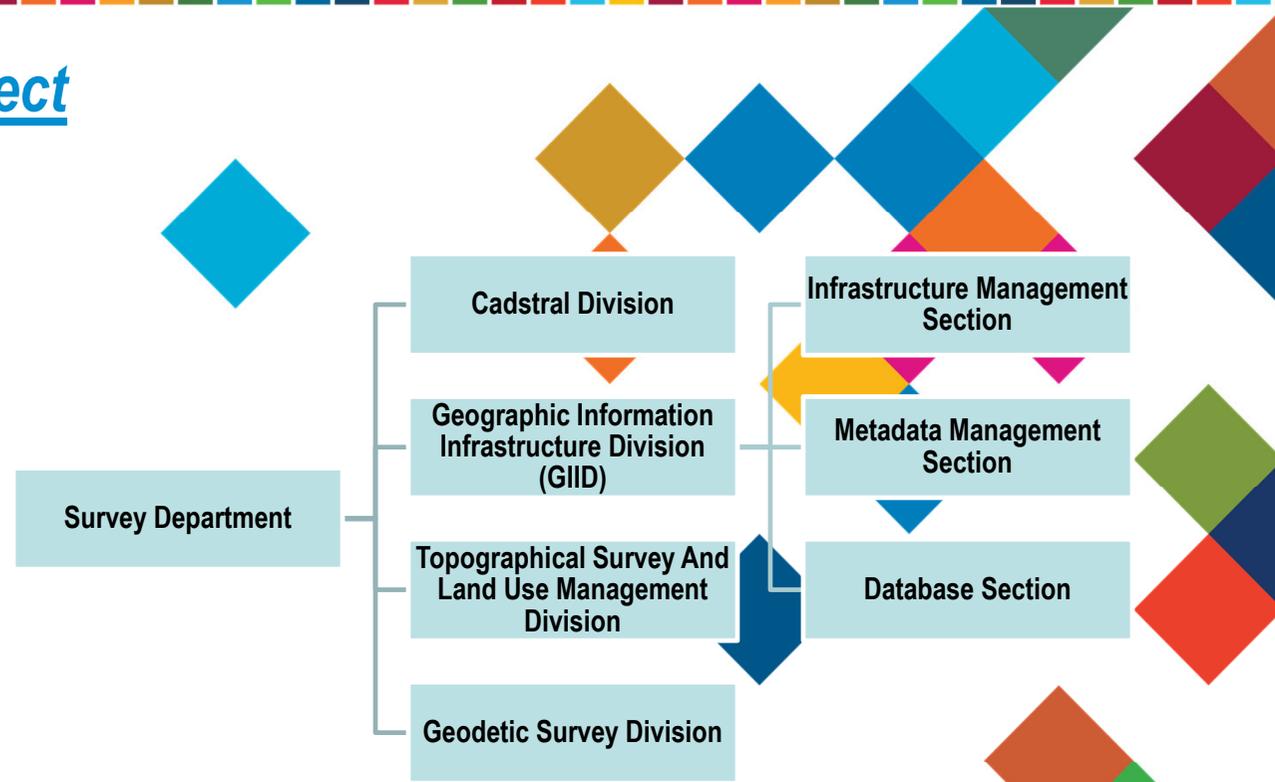


## NSDI of Nepal : Organizational Aspect

Now

Geographic Information Infrastructure Division (GIID) under Survey Department is core organization Involved.

Human resources include those with background in Geospatial Field (Geomatics engineers, Surveyor), IT, management, etc.



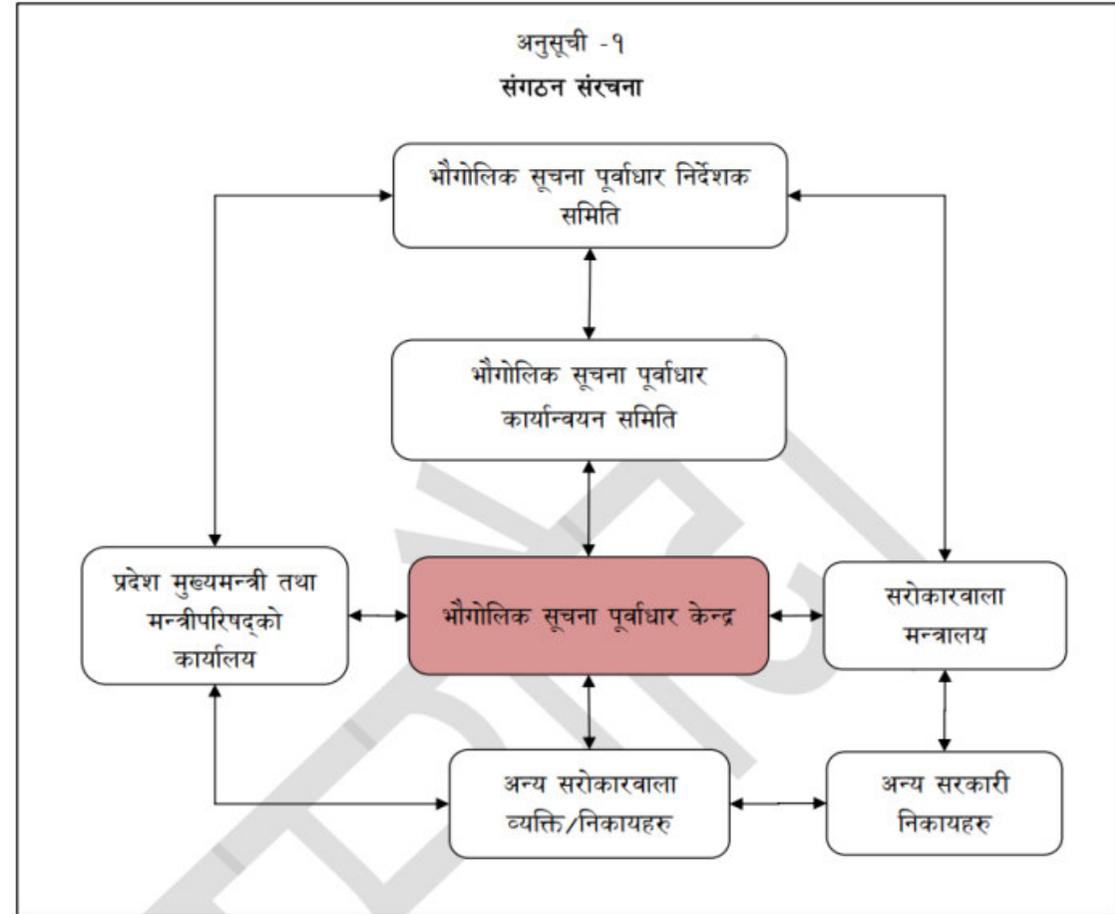
## NSDI of Nepal : Organizational Aspect

### Future

#### Organizational Structure as per draft NSDI (GII) Policy

The draft policy envisions establishment of a three major structures:

- Geographic Information Infrastructure Center
- Geographic Information Infrastructure Steering Committee
- Geographic Information Infrastructure Implementation Committee



## NSDI of Nepal : Legal Aspects (Policy/Standards)

### Presently approved Policies / Guideline on which division' activity is being directed:

- **Digital Data Distribution, Use and Regulation Directive, 2069** : provisions on data pricing, distribution structure, distribution prohibition, distribution policy, control of unauthorized use of data
- **Geographical Data Interoperability Report, 2078** : Elaborates on existing situation of Geographic data interoperability and makes suggestion on future course to maintain data interoperability

### Policies under Development

- **National Geospatial Information Infrastructure Policy, 2075** : Preliminary Draft Ready
- **Geospatial Information Infrastructure Policy, 2081 (2024)** : Draft Ready – Under Discussion

However, the Big Question is –  
Is this Enough for now or in a long run ??



## 4. NSDI of Nepal : User Needs / Limitation / Challenges

### User Needs (Demands)

- More diverse / updated data – e.g. of census, environment, forest, infrastructure related etc.
- More enriched/updated metadata.
- Online download availability of all data (Ease of service)
- User friendly and always running interface
- More enriched user guide on use and value of data

### Limitations

- Limited data only (less stakeholder coordination)
- Incomplete/Missing metadata.
- Not all data as OWS service / Online downloadable.
- System/Portal goes down sometimes (security threats too).
- Limited user manual/guides.

### Challenges

- Lack of integrated law (act) or policy on SDI.
- Institutional Coordination challenges
- Limited knowledge of SDI's importance to all stakeholders.
- Financial Constraints
- Human Resource constraints.

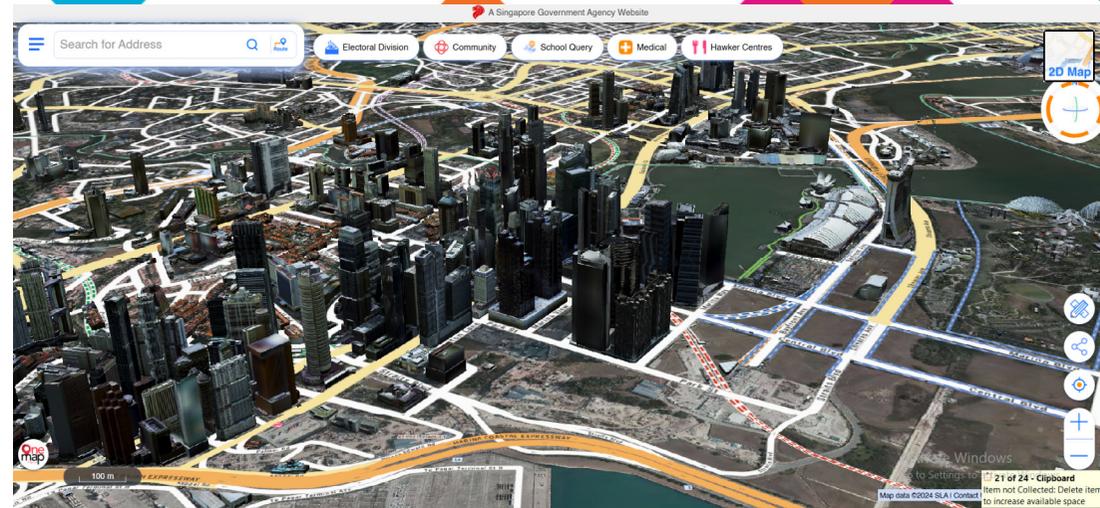
## 5. NSDI of Nepal : Future Prospects

Getting perspective from some successful SDI around the world:

### NSDI of Singapore

- Set up in 2008 ----- In 2018 as SG Space
- Now as Geospatial Singapore (Geospatial SG) :
  - Lead by Singapore Land Authority
  - Geospatial Master Plan – envisions GeoSmart Government ; GeoEmpowered People and a Thriving Geoindustry
  - Integrated Land Information Service (ILIS)
  - OneMap : free open-source online Geospatial portal

### One Map in 3D view (Geospatial SG)



<https://www.onemap.gov.sg/>

## 5. NSDI of Nepal : Future Prospects

Getting perspective from some successful SDI around the world:

### NSDI of Canada

- CGDI (Canadian Geospatial Data Infrastructure )
- Different geoportals ( for open data (almost 7000 records), earth observation data, ATLAS etc.)
- Web services available
- Information available in geospatial data (separately)
- Reports/Information on data and insights on different topics
- Funding and partnership opportunities for successful NSDI development
- Research and Lab information and many more...



### User Links in NSDI of Canada

#### Data portals, tools and services

Access open, shared, trusted geospatial data, services, and applications.

#### Geospatial collaboration and governance

Discover the collaboration and partnerships that make the Canadian Geospatial Data Infrastructure possible.



#### Standards and operational policies

Learn about the geospatial operational policies and standards that facilitate the development, sharing, and use of geospatial data.

#### Canadian Geospatial Data Infrastructure Resource Centre

Access a wide variety of publications, including primers, case studies, user needs assessments, operational policies, and studies on the use of geospatial data in the Canadian context.



#### Funding (GeoConnections)

Check out the GeoConnections Program Calls for Proposals, supporting the development of innovative adoption and further development of the CGDI by co-funding projects with eligible recipients.

#### Geospatial Web Services

Consult an evergreen list of geospatial web services that are growing the Canadian Geospatial Data Infrastructure, updated weekly



## 5. NSDI of Nepal : Future Prospects

- So, getting lessons/perspective from these successful NSDI implements and overviewing Nepal's need of SDI, limitations and user demands, Future efforts for NSDI development in Nepal needs to focus on:
  - Identifying user needs in a long run and planning on how those can be met technically
  - Stakeholder coordination
  - Long term policy --- develop and implement it as soon as possible.
  - Organizational Redesign / Stakeholders coordination

### Short Term Goals:

- Approve National Policy as soon as possible
- Identify user needs/demands scientifically and plan accordingly

### Long Term Goals:

- Organizational Restructuring / Stakeholder Coordination
- Development of Standards on data / metadata / etc.

## The most relevant SDGs related to the presentation and theme of this session

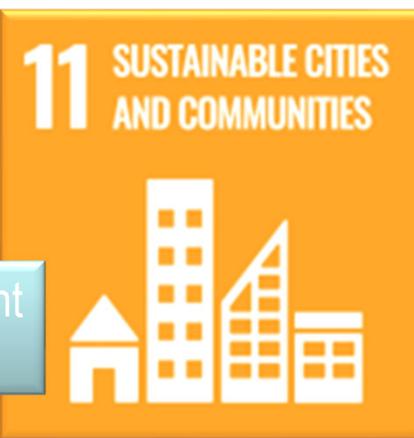
1st relevant SDG



**15** LIFE ON LAND

Icon depicting a tree, birds, and a road.

2nd relevant SDG



**11** SUSTAINABLE CITIES AND COMMUNITIES

Icon depicting buildings and a house.

3rd relevant SDG



**17** PARTNERSHIPS FOR THE GOALS

Icon depicting interlocking circles.

**SUSTAINABLE DEVELOPMENT GOALS**

International Federation of Surveyors supports the Sustainable Development Goals



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Thank You!  
Any Questions?

Source: Nepal Tourism Board



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