

Spatial Data Infrastructure for Prosperous Nepal

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Key words: Metadata, Clearinghouse, Sustainable development, Good governance,

SUMMARY

This paper examines the current status of spatial data infrastructure development in Nepal and discuss about the components of SDI as well as expectations from SDI. Importance of metadata base and concept of electronic clearinghouse are also briefly explained. The expectations from the implementations of NSDI are identify as, it leads to envisage its rationale for development towards the prosperous Nepal, create an environment for sustainable development from local to national level and ultimately support for good governance in Nepal. Furthermore, provide a list of action plans to be taken immediately to operate NSDI efficiently and effectively.

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1. INTRODUCTION

People living in this Earth expect shelter, food and an adequate quality of life. Development of sustainable mechanism ensures the proper maintenance of those requirements. Reliable and more valuable information, specifically, spatial information science is one of the important tools for contributing to the determination of sustainability.

In recognition to these facts, Survey Department, Nepal initiates to undertake the National Geographic Information Infrastructure Programme (NGIIP). The programme will be the development process of National Spatial Data Infrastructure (NSDI). The NSDI will encompass the fundamental data sets, framework data sets, electronic clearinghouse, communication networks and on demand application. NSDI concept has been developed as it could play an important role in the development process to support good governance and to establish or prosperous Nepal.

2. SDI IN NEPALESE CONTEXT

Spatial Data Infrastructure (SDI) is being developed as a tool for national spatial data collection, storage, processing and dissemination. SDI is a basis of national information resources. Because the users can collect, revise and manage data from its own end in real time ensuring the information remains accurate and valuable. This broadens the importance of use of geo-spatial data beyond traditional users and brings them into mainstream of new technology. So, sharing of data between and within the organizations will be possible after SDI system is in operation and interoperability system will be focused in the development of NSDI. The operation System of NSDI is given in figure 1.

Poverty reduction, good governance, social justice, environmental protection, sustainable development and gender equity are some of the major national issues addressed in the current tenth five year plan (2002-2007 AD) of His Majesty's Government (HMG) Nepal. A good and reliable spatial and non-spatial data related with NSDI are the prerequisite for their effective and efficient decision making. Therefore, HMG/Nepal has commenced the NGII programme for building NSDI. It is evident that active participation and commitments from the major stakeholders could play a decisive role in building NSDI. The proposed model of operation system of NSDI seems to be one of the suitable models to support the issues mentioned above.

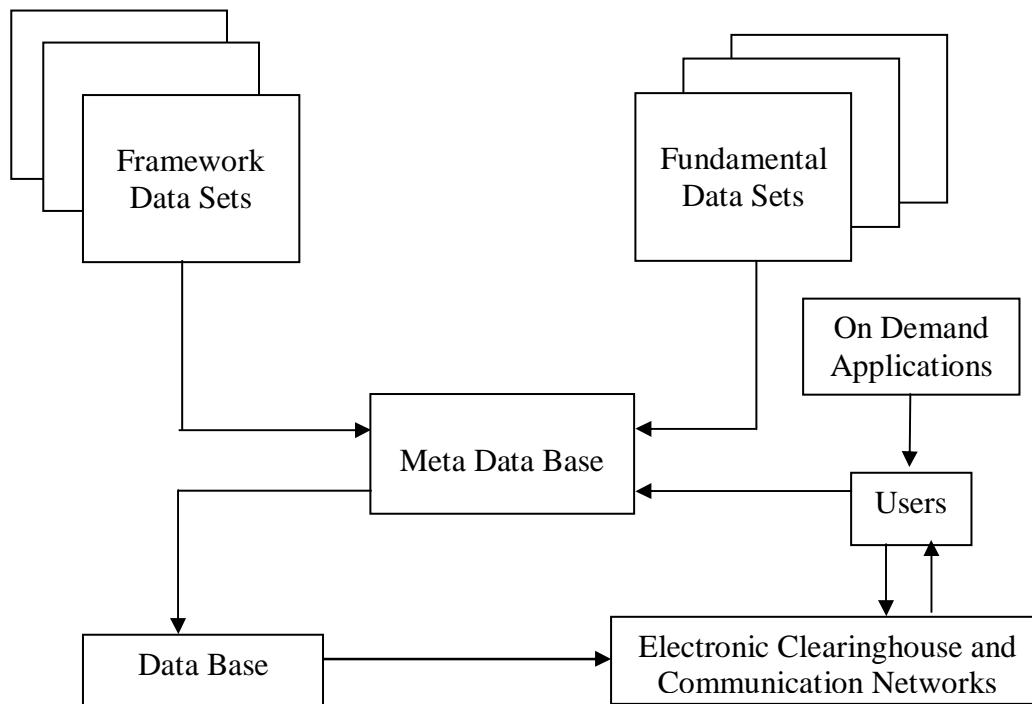


Fig 1: Operation System of NSDI

3. FUNDAMENTAL DATA SETS

The fundamental data sets of Nepal is the National Topographic Data Base (NTDB) containing the different layers such as geodetic data, administrative boundaries, transportation networks, buildings, Hydrography, Topography, utilities, Land cover, Toponymy and designated areas and is organized at sheet level. The basis for NTDB is the digitization of topographic base maps of scale 1:25 000 for the Terai (Plain Areas) and the middle mountains and of scale 1:50 000 for high mountains and Himalayas of Nepal. These maps were prepared and published by Survey Department of Nepal between 1989 and 2001 AD. Base data is generalized for the reduced scales and separate data layers are archived in the database. Furthermore, a large scale 1:5 000 to 1: 10 000 ortho-photo database is provided for densely populated urban and semi-urban areas.

4. FRAMEWORK DATA SETS

The framework data sets are the database obtained from different sources of the related disciplines such as National Data base of Population Census, Agricultural, Soil, Geological, etc. The aggregation and integration of fundamental data sets and framework data sets will solve the purpose of NSDI. This will make the works of users community more simple, efficient and effective in terms of time and resources because for most of the applications data will be available from NGII and very few data will need to be collected from primary sources.

5. METADATA

Metadata is the main key to open the door of SDI. So, the NGII project is in a state of creating metadata base. The main format of metadata presentation will be represented as thematic blocks aggregation. Each block consists of the information of some data attributes such as Information policy, data standard and norms, copyright policy, specifications, pricing policy, security and protection, etc. The users could easily access to metadata base to enable to find total information about their requirements, to evaluate the existing dataset, to understand the procedure for acquiring the dataset, etc. It also helps to maximize the data sharing and to minimize the data duplication. In our context, the users are always having problem of finding the information sources and the procedure to acquire them. So, the metadata services facility could facilitate the users to find the appropriate information.

6. ELECTRONIC CLEARINGHOUSE AND NETWORKING

In the development process of SDI, one of the services to be provided to the users is Electronic Clearinghouse service. This service will help the users to find out and access the data of its interest. One of the objectives of NGII is to support GIS users one way or other for their every study and project. So based on user's selection, data will be retrieved from the respective database and the data will be sent to the user. The user then can view, make query or download the data.

The communication network translates the concept of electronic clearinghouse to implementation level. One of the simplest ways for the connection from the users is through Internet. Data supplier will install Remote Access Server where the participating agencies can dial for their connectivity. The supplier gets connected to the Internet through dedicated Radio Link. Leased line is preferable as standby option, which will minimize the downtime.

7. ON DEMAND APPLICATION

The creation of Spatial Data base has a certain standards and norms, format, etc. These characteristics may not suitable to some end users and some may not be able to modify as per their requirements. Such end users may apply to the supplier and submit them the data as per their interest. Therefore a provision on demand application need to be establish within the clearinghouse. The details of this application are yet to be developed.

8. THE COMPONENTS OF SDI

The major components of SDI comprises of the following:

- Data producer
- Other Partners
- Data Users
- Legislative Body
- Telecommunication Service Suppliers

The function of data producer is to create fundamental database and to aggregate and integrate the other framework database that are made available through other partners. For example, the population census database will be made available through concerned organizations, such as Central Bureau of Statistics in Nepalese context. Furthermore, data producer must create metadata base and to form relevant legislation and with the help of a legislative body in order to disseminate data easily to the users without disturbing the integrity of the country. The sharing of data and communication with the users is nowadays mostly carried out through Internet and e-mail. So, a better telecommunication services should be made available with the help of concerned authorities. Finally, the users should be facilitated through its electronic clearinghouse and communication network to provide efficient services to them.

9. EXPECTATIONS FROM NSDI

At the present context of building of NSDI, establishment of NTDB has been completed and able to aggregate the population census database of Central Bureau of Statistics. The concept of NGII is develop to make participation of different stakeholders in phase basis. Accordingly, in the very first phase, Central Bureau of Statistics will join the system with their population census database. After completion of this phase, the system intends to incorporate other participating agencies such as Ministry of population and Environment, Ministry of Local Development, Ministry of Health and Ministry of Agriculture and Co-operatives. During the implementation of second phase other relevant agencies will also be encouraged to participant in the system to grow towards the development of a complete NGII.

After building of NSDI, the expectations are as follows:-

- Duplication of work goes down to a minimum level.
- Resources could be mobilize for more development activities
- Cooperation and coordination among the different disciplines will be more effective
- Implementation of development activities will be efficient
- More people will benefit with good results from the development activities.

As most of the developing programmes are related to grass root level of the population and each development programmes need spatial and attribute data for their respective activities. These data are easily accessible through NSDI applications due to which socio-economic parameters and socio-economic planning could be addressed more effectively. Therefore, NSDI will help in appropriate decision making purpose for betterment of the society; this will lead to envisage its rationale for development towards the prosperous Nepal, also it creates an environment for sustainable development from local levels to national level. Finally, it will then support for good governance in Nepal.

10. IMMEDIATE PLAN OF ACTIONS

The efforts should be concentrated for the following plan of actions to implement the SDI effectively and efficiently:

- Launch an awareness programme to educate the related persons and organizations
- Develop an appropriate working policy framework
- Establish an effective electronic clearinghouse and communication networks
- Continue development of human resources through relevant training programme and academic courses.
- Initiate capacity building to establish standard data sets and to integrate the data from several sources.

11. BENEFICIARIES OF NSDI

The direct beneficiaries of NSDI are the Government organizations, public and private agencies and academic institutions. The Government organizations could use NSDI for evaluation of their plans, programmes and policies, preparation of development activities, etc. public and private agencies could use for their business promotion activities. Finally, the academic institutions can make use of NSDI as teaching aids as well as for research works in this sector.

12. CHALLENGES

During the building process of NSDI, The following challenges have to be faced:

- Satisfy user demands:- User expectation is relatively high and changes in due course.
- Sustainability:- Require continued support from participating organizations for a sustainable system.
- Source of Fund:- Functioning and development of such system need a reasonable source of fund.
- Technology:- Related Technology changes very fast and is difficult to keep pace with such development.
- Human Resources:- Proper human resources development is a must which can be achieved through academic courses and local training programme.

13. CONCLUSIONS

The building of NSDI is an ambitious programme where maximum numbers of partners are expected, so the handling and management of such a massive volume of data is not an easy task or it is a very challenging work. Therefore, for the smooth operation of the NSDI, the staff involved in this work must be dedicated, honest and cooperative in nature.

At present, the development of the system is in a beginning state where the establishment of national topographic database and database of population census had been incorporated in the system. Furthermore, creation of metadata base of the existing database is in process and yet to develop the electronic clearinghouse and network communication and a system for on demand application is in a state of conceptualization. However, it is clearly visualized that quite a number of other partners will be accommodated in the system. So after the NSDI is in operation it will support in national building which will be a self sustain system and

ultimately it will support for the good governance in the country and will be able to establish a prosperous Nepal.

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BIOGRAPHICAL NOTES

Rabin K. Sharma, Chief Survey Officer

Qualification: M.Sc. (Photogrammetry), B.E. (Surveying), B.Sc.

Experience:

From 1975-1998 Worked in Topographical Survey Branch of Survey Department for supervising Surveying and Map Compilation works.

From 1998 – 2002 worked in Planning and Monitoring Section of the Department.

From 2002 – 2003 worked in Cadastral Survey Branch as Deputy Director General a.i.

From 2003 to date working in Foreign Unit of the Department to deal with the foreign organizations related with Geoinformatics field.

Publications:

About 30 papers published in several national and international proceedings of the Conferences and Magazines.

Membership:

Founder Member of Sigma-Mu Society, Associated Member of Institution of Surveyors (AMIS), Life Membership of Nepal Surveyor Society, Member of Nepal Engineer's Association

Babu Ram Acharya, Director General

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Experience:

From 1977-1997 Worked in different Branches of Survey Department for supervising Surveying and Mapping Projects of the Department.

From 1997 – 1998 worked in UN Volunteer as Census Cartographer in Cambodia.

From 1998 – 1999 Worked in Cadastral Survey Branch as Deputy Director General

From 1999 to date working as Director General of the Department.

Publication:

About 20 papers published in several national and international proceedings of the Conferences and Magazines.

Membership:

Founder Member of Institution of Governance (IoG) and Centre for Rural Development and Environment Conservation, Nepal (CRUDEC), Member of Nepal GIS Society and Nepal Remote Sensing and Photogrammetry Society.

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