

Technology Transfer For Use of Spatial Data for Development Planning

M V BHAT

Survey of India, Hyderabad

ABSTRACT

Spatial data is generated by many agencies in Govt, Public and Academia. The National Spatial Data Infrastructure, established by Govt of India, is expected to create an environment for knowledge on data availability among different data producing agencies, for making the data available to common man for development.

There has to be a mechanism where education and awareness on the data availability and method to efficiently integrate and use the data, is imparted to the users. This paper deals with the aspect of need of human resource development in the National Spatial Data Infrastructure Environment, so that the awareness to use the spatial data can be effectively created.

INTRODUCTION

Government organizations, Industries and many Private sector agencies generate Spatial Data in their day to day activities connected with their role and objectives. All these agencies have invested millions of rupees in development of geospatial information. Such Spatial Data is very important for development purposes. However, the common man at grass root level is not having access to such data. Products of Computerisation and automation, have, by and large, remained in such offices of data generating agencies, without any access for the public. The National Informatics Policy -1999 of government of India envisages bringing the Information Technology to grass root level. Spatial data forms very important and inevitable input for any developmental activity at any level. With the intention of bringing the spatial data generated by different agencies within the reach of common man for development, the Department of Science & Technology(DST) and Department of Space(DOS) have initiated the process to create a National Spatial Data Infrastructure(NSDI).

Agencies generating spatial data, often duplicate efforts, without knowing what is generated by whom, thereby, wasting National resources. Customers are also not aware of sources for different types of data. NSDI is expected to be a single window agency to provide information on spatial data availability and standards of different data generating agencies. The customers can access data through a query mechanism and get to know about types and sources of different spatial data for his day to day use.

In this context it becomes necessary to educate the data producers and data users continuously, on the structure and mechanism of working of NSDI. Educational programmes are the need of the hour, in all facets of technological advances. Few government and private Indian Institutions and

entrepreneurs have taken initiatives to take a lead role in formulating, designing and imparting training to decision makers, middle level managers and professionals.

PURPOSE

The importance of spatial data, is realized by all, but many data generating agencies and data users are not aware of the method of interpretation of spatial data and hence are not able to exploit the wealth of information. Again, when NSDI is established and the data providers and data users are not conversant with the structure of the data and method of depiction and interpretation of data, the data becomes redundant and of no use. The aim of NSDI will be defeated. The vision of NSDI is to serve as a mechanism under which many organizations can work together and craft tactical plans to advance the use of spatial data. The NSDI can become reality only through cooperation among local, regional, state and central government agencies, private sector and academic community. Each of these agencies have different interest and different ways of representing data and looking at solutions for problems. The goal of NSDI is to build relations among these organizations to support each other, for the continuing development of NSDI and to achieve a vibrant network of organizations working together.

STAKE HOLDERS IN NSDI

The stake holders in NSDI are the data generating agencies in government and private sector, NGOs, academicians, researchers, data providers and users. The vision of NSDI is to make all such data available to the grass root level for overall economic development of the nation and raise the standard of living of the common man in the society. All these stake holders will participate in NSDI with different outlook, as follows:

- Government has to play a major role in making NSDI exist and remain vibrant, resonating to the pulse of the expectations of other stake holders. National interests will be of highest priority, in the voice of government organizations.
- The Private sector will play a major role in design, software development and implementation of programmes. It will speak for the commercial sector, but has to rise to the challenge of pooling resources to make NSDI, a reality.
- Academia and Researchers will provide the research and technology development support. They will voice the aspirations of the educationists and geographic information science.
- Individuals in the society will be the major stake holders, who will demand for sufficiently accurate and reliable spatial information for better services in their day to day activities - what is expected by E-Governance.
- Policy makers, decision makers and administrators will be able to assess the political, social, economical and environmental implications of geospatial technology.
- Scientists and engineers will be capable of developing and adopting the technology by designing integrated systems, by understanding the intricacies of the complex nature of the spatial data.
- Educators and trainees will be capable to transfer the knowledge at various levels in different application areas.

IMPORTANCE OF EDUCATION AND TRAINING IN THE CONTEXT OF NSDI

With several organizations and agencies across the globe carrying out activities connected with spatial data generation and analysis, the requirement of skilled persons familiar with such operations has increased. However, the training to various levels of personnel is needed because:

- Senior managers in many organizations are confused about the type of skills they should aim to obtain (in new staff or retraining existing staff) in order to make optimum use of these new tools.
- Employees interested in both job security and future employment prospects are concerned about what skills they should obtain through further education or on-the-job training.
- Professional associates are concerned about the impacts of technology in reducing, or, at least, changing, the roles, responsibilities, and authority of their members in the work place and in the community.
- Awareness is created among data users for effective use of available spatial data.

ASSESSMENT OF REQUIREMENT OF TRAINING:

In the above emerging scenario of NSDI becoming a reality, there is a changing trend in user organizations from data collection to data base maintenance and management. This aspect has major implication for demands on Capacity Building at all levels. Converging interests and skills of specialists from a number of disciplines, like, survey engineering, geodesy, cartography, GIS, photogrammetry, remote sensing etc., need to blend their roles and responsibilities, with those educated in computer science,

Hence in Capacity Building for NSDI, all these stake holders are to be provided education and training in working together and making use of the NSDI Gateway, to achieve its objective.

ROLE OF EDUCATION AND TRAINING

Anticipation of emerging changes in technology and developing skills to adopt such changes when it comes is the basic requirement of human resource development in any organization. Research institutions and academia are evolving new training programs to cater needs of such skill development in the field of geospatial infrastructure in order to improve effectiveness of the system. For a sustainable economic and social upliftment of the country, it is necessary that this geospatial information is used to its maximum potential. This requires Human Resource Development (HRD), in terms of large number of trained personnel, in information technology for judicious use of the variety of data, now available with various organizations. The concept of HRD involves:-

- Investment in human resources to enhance productive capabilities.
- Utilisation of those human resources to produce increased/enhanced quality output.
- Consumption of those human resources of the benefits arising out of such increased quality outputs, thereby leading to better quality of life.

An effective system of education in the field of NSDI will provide opportunity to develop specific skills to address the following issues:

business management, policy understanding and organizational understanding , to develop skills required for market leadership.

There will be growing requirement for specialists familiar with Geographical Information system, with thorough knowledge on spatial data and related complexity. Geo- spatially literate programmers capable of developing and maintaining customized applications within the organizations will be required. There are three significant types of skills required in organizational and process management:

- Experience in establishing and refining the organizational and regulatory structures policies and process.
- Familiarity with quality management, business process redesign, workflow management practices and insights necessary to meet the new demands for database maintenance and transaction based updating.
- Experience of the design and management of service facilities and ensuring the integrity of related transaction management, contract management and error management processes.

Hence, Capacity Building Process involves:

- Blending the knowledge of capable specialists from a number of disciplines, like, survey engineering, geodesy, cartography, GIS, photogrammetry, remote sensing etc., with those educated in computer science, business management, policy understanding and organizational understanding , to develop skills required for market leadership, to cope with the needs of NSDI, to achieve the desired goal.
- Develop a mix of economic and management expertise within the organizations to accommodate the evolving technologies, expanding market demands and heightened expectations.

The projected immediate requirement of Capacity Building in the contest of NSDI is as follows:-

□ Senior level managers among stake holders to give an overview and goals of NSDI, with a course of about one week duration:-

- Central Government departments	-	1,000 persons
- State Government Departments	-	900 persons
- District level administration	-	5,000 persons
- Local Bodies	-	25,000 persons
- Private sector	-	1,000 persons
- NGOs	-	1,000 persons
- Academia	-	2,000 persons

Total.....	35,900	say 36,000

□ Middle level managers to give an idea of generating and handling information through NSDI Gateway, with a course of 2-3 weeks duration. A rough estimate of 1:5 ratio of the Senior level managers, will give us the figure of around 1,80,000 persons to be trained in a short period.

□ Technologist level persons are required to be developed to handle information in both data generation, access and retrieve output through NSDI gate way. A course of about 8-10 weeks will be required. The number of persons to be trained in this category would be around 3,60,000 persons even if we take 1:2 ratio of the middle level persons to be trained in a short period.

□ Awareness programmes for users: The individuals, who are the main stake holders will have to be trained through awareness programmes, by conducting workshops, seminars, video show through media, distance education programs etc. in a big way.

INSTITUTIONS AND ORGANISATIONS IMPARTING TRAINING

There are several institutions imparting training in this area. Some of them are:

- Survey Training Institute , Survey of India, Hyderabad.
- Indian Institute of Remote Sensing (NRSA), Dehradun.
- Institute of Remote Sensing, Anna University, Chennai.

- Geological Survey of India Training Institute, Hyderabad.
- Andhra University, Waltair, AP.
- IITs at Mumbai, Kharagpur and Delhi.
- Indian School of Mines, Dhanbad.
- Jawaharlal Nehru Technological University, Hyderabad.

The basic framework for spatial data is the topographical data generated by Survey of India. Most of the data generating agencies use the framework data of Survey of India for depicting their information for analysis and retrieval. Hence it becomes necessary on the part of Survey Training Institute of Survey of India to provide a platform to educate the data providers and users on handling of spatial data in the context of NSDI.

Indian institute of Remote sensing (NRSA), Dehradun imparts training in application oriented programmes using Remote Sensing inputs. Its role is to impart training in capture and analysis of spatial data from such inputs, using the basic framework spatial data generated by Survey of India, by exploiting the strength of Remote Sensing inputs, for developmental purposes. IIRS provide training in:

- Remote Sensing and GIS Applications.
- Geoinformatics Technology and applications.
- Environment assessment and disaster management.
- Theme specific orientation courses using Remote Sensing applications.
- Course for Decision Makers.
- International Programmes.
- NNRMS-ISRO sponsored courses.

SOME MORE INSTITUTIONS IMPARTING TRAINING ARE

- CSDMS, DELHI
- ESRI, NEW DELHI
- ROLTA INDIA LTD, MUMBAI
- PENTASOFT, CHENNAI

SURVEY TRAINING INSTITUTE (STI)

Besides the courses of short, medium and long term durations, in generating, collection, depiction and analysis of basic framework spatial data, STI has designed special courses for HRD in NSDI. They are:

- (a) **OVER-VIEW ON NSDI:-** STI proposes to organize short duration course of 3- 5 days duration for decision makers for interaction with

different data generating agencies. This course will deal with and familiarize the participants in:-

- (i) Structure and domain of NSDI
- (ii) Method of query through NSDI Gateway.
- (iii) Different Nodal data generating agencies and use of their data.
- (iv) Knowledge about the meta data standards of different data generating agencies.
- (v) Pricing and payment mechanism.

(b) SHORT COURSES OF 1-2 WEEKS

DURATION:- Middle level supervisory officers of different user organizations can undertake the courses for getting knowledge on processing and use of spatial data and data integration for any application of spatial data produced by different users.

(c) COURSES OF 2-3 MONTHS DURATION:-

To impart training on generation of data as per desired format. Set out standards and formats for retrieved data and analyse the data for applications.

COURSE FEES

The fees for courses conducted at STI are usually subsidized and affordable. It is intended to organize some educative programmes by conducting workshops at various places initially to create awareness on NSDI and use of Spatial Data. These programmes will be without any fees. However, for the courses being organized at STI, there will be a course fee for which some fellowships could be available at DST or DOS.

STI PROVIDES THE BEST ENVIRONMENT FOR SUCH TRAINING

As already stated, the purpose of STI is to impart knowledge on all aspects of Geo- Science related with Spatial data generation, depiction, analysis and interpretation for organized planning for development. Hence STI would provide a conducive environment for such training.

CONCLUSION

The existing facilities listed above cannot meet the entire projected needs of capacity building in the context of NSDI, in a short time. There is need for private- public partnership in this Capacity Building exercise, to achieve the vision and goals of NSDI.

REFERENCE

Human Resource Development for NSDI by Dr. P.S.Roy and Col M V Bhat.