

COUNTRY REPORT

ON

GEOSPATIAL INFORMATION MANAGEMENT

IN NEPAL

Government of Nepal

Ministry of Land Reform and Management

SURVEY DEPARTMENT

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1. THE COUNTRY CONTEXT

Federal Democratic Republic of Nepal is a Himalayan country situated in South Asia. It is a land locked country surrounded by China in North and India in South, East and West. Globally it lies between $80^{\circ}04'$ – $88^{\circ}12'$ East and $26^{\circ}22'$ – $30^{\circ}27'$ North. The country extends about 885 km in the east-west direction and the width in the north-south direction varies between 145 km to 245 km. The area of the country is 147 181 sq. km. According to the census results of 2011, the total population of the country is about 26.62 million. It is a multi-religious, multilingual and multiethnic country with diverse culture. The country is famous for Lumbini, the birth place of Lord Buddha, and Mt. Everest, the highest peak in the world.

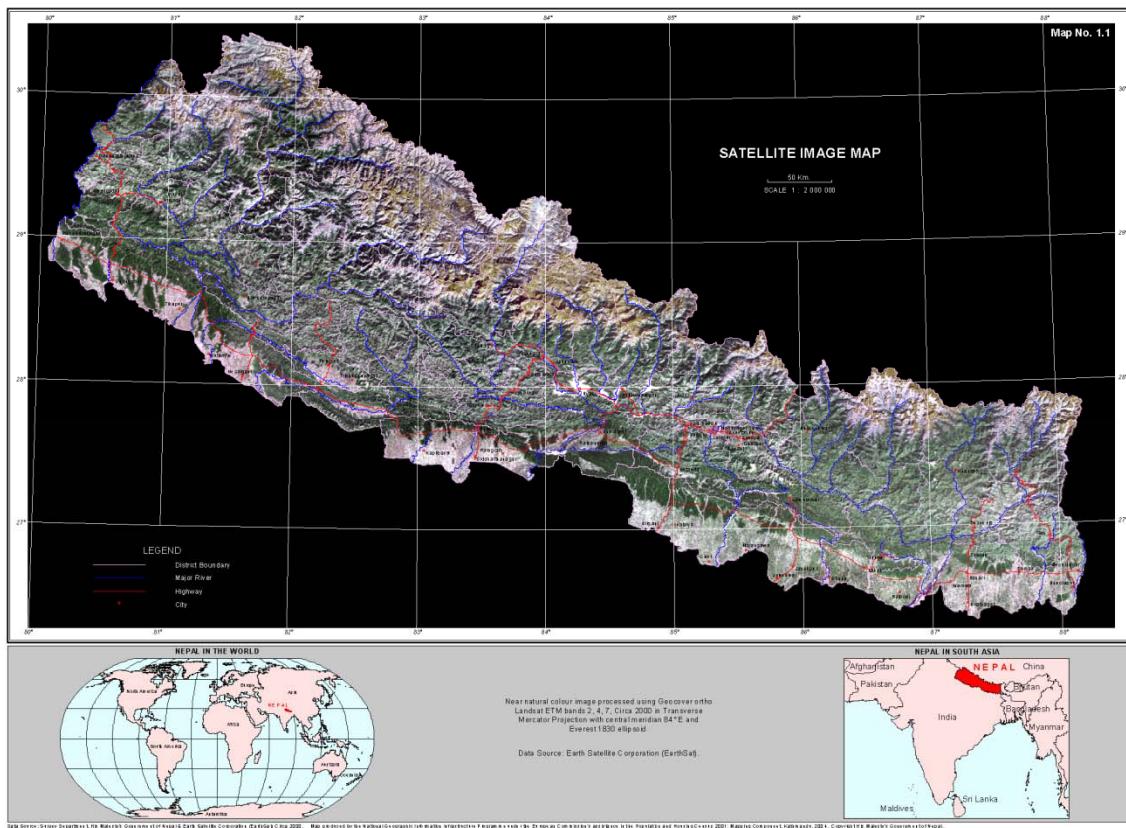


Fig 1: Satellite image map of 000 Nepal

Geographically, the country has diverse landscape. The elevation ranges almost from 60 m up to the top of the Mt. Everest, 8848 m. Out of world's 14 highest mountain peaks (above 8,000 m), eight mountain peaks are located in it, including the Mt. Everest and the third highest peak Mt. Kanchanjungha (8586 m). The country also has incredible touristic destinations.

2. NATIONAL MAPPING ORGANIZATION IN GEOSPATIAL INFORMATION SECTOR

2.1 Introduction

Survey Department, under the Ministry of Land Reform and Management, is the National Mapping Organization (NMO) of Nepal. The Department was established in 1957. It is the core organization working in the production, dissemination, and regulation of geospatial information in the country.

The Department comprises of mainly three divisions namely Cadastral Survey Branch, Geodetic Survey Branch and Topographical Survey Branch, and 83 Survey Offices. National Geographic Information Infrastructure Project (NGIIP) and Survey Office Strengthening Program are the other two wings of the Department working on project basis. The organizational structure is as shown in Figure 1.

Topographical Survey Branch is responsible for producing and disseminating various kinds of geospatial products including national topographic map series and administrative maps. Geodetic Survey Branch is responsible for carrying out geodetic and astronomical surveys, such as establishment of the national network of horizontal control points, leveling survey, gravity survey, magnetic surveys, among others. Cadastral Survey Branch is responsible for supervising the activities related to cadastral surveys and the first registration of real estate properties in the country. National Geographic Information Infrastructure Project was established as an initiative for National Spatial Data Infrastructure (NSDI) in the country. Survey Office Strengthening Program is responsible

for arranging required physical infrastructure for the Survey Offices at the district level. Survey Offices, expanded around the whole country, mainly at district level, is responsible for carrying out the activities of the Cadastral Surveys and the first registration of the real estate properties. Furthermore, Survey Offices also support the activities land administration and management technically at the district level. Nagarkot Observatory, under the Geodetic Survey Branch, was established to carryout astronomical observations. Currently, it is also operating a 'Continuous Operating Reference Station (CORS) and preserves the fundamental base point of National Geodetic Network.

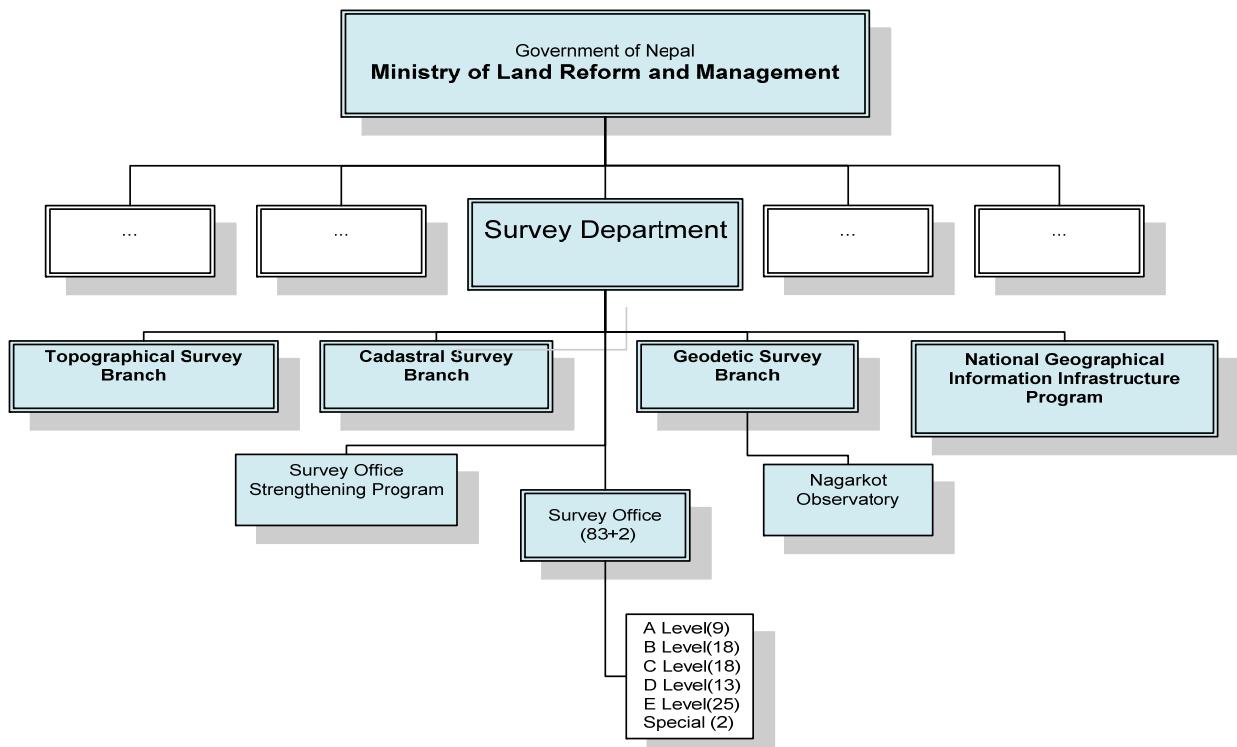


Figure 1: Organizational Structure of Survey Department

2.2 Role of Survey Department, as the National Mapping Organization

a) As a producer of Geospatial Information

The Department was mainly involved in cadastral surveying at the initial stages of its establishment. The scope of the Department has been widened in greater scale over the years. Currently, it has been involving in many segments of surveying and mapping such as topographic mapping, geodetic surveys, ortho-photo map production, cadastral surveys, land resources mapping etc. It applies modern technologies including remote sensing, Photogrammetry, Global Navigation Satellite System, Digital Cadastre, among others, for surveying and mapping activities of its mandate.

A new series of topographic base-maps were produced during 1992-2001. Based on the new series of topographic maps at two basic scales; 1:25,000 for the plains and the middle mountain region, and 1:50,000 for the high mountain and Himalayas. The topographic maps series has been converted to the National Topographic Database (NTDB). Currently, the department is working on the updating the topographic map series. The department produced various kinds of land resource maps including land use maps, land system maps, land capability maps and geological maps, during late 1970s and early 1980s.

Various activities of geodetic surveys were carried out over the past 30 years. A geodetic control network has been established throughout the country. Gravity observation, geodetic leveling and measurements of previously established geodetic control points with the Global Positioning System are its present activities. Recently, airborne gravity survey have been conducted to determine the national geoid of the country.

The Department is successful to attain the nationwide coverage of cadastral survey in 1995. Leaving some densely populated settlement areas called as Village Blocks, each of the parcels legally occupied has been brought under the cadastral system of the country. Currently, cadastral surveys of several districts have been undertaken to re-survey the districts that were surveyed in the past without using geodetic control.

b) As a disseminator of Geospatial Information

As mentioned above, Survey Department has produced various kinds of geospatial information products. Currently, the department is in a position to provide such geospatial products, including control points, aerial photographs, topographical maps, land resource maps, and cadastral data to government and private organizations useful for any kind of development, and research and planning activities. The dissemination of the geospatial products is done in analogue as well as in digital format. The Department charges nominal fees for the data. Availability of the geospatial data has not been restricted in the country except for few topographic maps.

c) As a nodal authority for National Spatial Data Infrastructure

Survey Department has undertaken an initiative for establishing national spatial data infrastructure in the country since 2001. National Geographic Information Infrastructure Project (NGIIP) is responsible for such activities. The project is making its best effort to bring all the stakeholders including governmental, non-governmental and private sector organizations working in the field of geospatial information in its network. The Department has still to work hard for achieving expected progress in this sector, though.

d) As a regulatory body of Geospatial Industry

In recent years, the Department is gradually changing its role of providing surveying and mapping services in the country to assuming a lead role in regulating the national surveying and mapping activities. The Land (Surveying and Mapping) Act, 1963 and corresponding Regulations 2001, have mandated the Department to issue surveying and mapping license to the professionals, individuals as well as organization, endorse technical specifications for any kind of surveying and mapping activities carried out through public fund, and control the unauthorized production of geospatial data.

Furthermore, the Department is the secretariat of the National Mapping Committee, that has been formed for regulating all the surveying and mapping activities in the country. All the geospatial products produced in the country, by any government or private organization should get endorsed by the committee. The Director General of the Department holds the position of the Member secretary of the committee and Coordinator of the Technical Sub-committee.

3. OTHER ORGANIZATIONS INVOLVING IN GEOSPATIAL INFORMATION SECTOR

A number of organizations like the Department of Forest Research and Survey, the Department of Hydrology and Meteorology, the Department of Water Induced Disaster Prevention, the National Planning Commission, Nepal Electricity Authority, the International Centre for Integrated Mountain Development (ICIMOD), the International Union for Conservation of Nature (IUCN) etc. are the major users of geospatial information. Therefore, these organizations are somehow being involved in the production of geospatial information by themselves in a condition that the products follow the specification approved by the Department and connected to the national geodetic network.

4. HUMAN RESOURCE DEVELOPMENT

The aspect of human resource development in the sector of geospatial information is not very much optimistic in Nepal. The opportunity of university education in the country, in this sector, began since a couple of year back only. Kathmandu University and Purbanchal University are the two universities offering such opportunities whereas Tribhuwan University is going to offer such opportunity from the coming session. Previously, Land Management Training Center (then Survey Training Center) under the Ministry of Land Reform and Management, was the only organization that used to

produce human resources in this sector through various level of trainings, and the center is continually doing so in present days too. Until now, no any opportunity of post graduate studies is available in the country.

5. CHALLENGES OF THE GEOSPATIAL INFORMATION SECTOR IN NEPAL

Various challenges exist in Nepal in the sector of Geospatial information. Major challenges in the sector can be listed out as follows:

- National Mapping Organization of the country is lacking sufficient resources that would be required to meet the national need in the sector of geospatial information.
- The opportunities for pursuing research studies and human resource development in the sector are very rare in the country.
- There is lack of sufficient and adequately trained human resource to work with modern technology; and
- The information sharing mechanism is not sufficiently adequate and the willingness of the stakeholders in participating in the NSDI initiatives is not optimistic.

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