From Cadastral Survey Plan To Geographic Information Infrastructure: Fifty Years Of Evolution Of Geo-spatial Data Policy In Nepal

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Abstract

The golden jubilee celebrations of Survey Department correspond with the golden jubilee of periodic planning in Nepal. The First Plan in Nepal was initiated in 1956 and the year 2007 coincides with the completion of the Tenth Plan. In this paper an overview of the ten periodic plan documents have been made to look into the evolution of the surveying/ mapping and geo-spatial data policy and a growth of Survey Department as a cadastral survey office to a NMA to the hub of NGII in Nepal.

1. Introduction

Despite many exercises conducted and the preparation of draft policy at several occasions, no comprehensive policy document- a national surveying/ mapping policy or the national geo-spatial data policy, as such, has been approved by the Government of Nepal so far. Therefore the content of the draft policy is not the theme of this paper. The periodic Plan documents prepared by the National Planning Commission and approved by the then successive governments of Nepal clearly enunciate the sectoral policy in different areas to be undertaken during the plan periods. The establishment of Survey Department and the initiation of periodic planning process correspond together (around 1956-1957). These documents clearly define the surveying and mapping policy during the said plan periods. A look into the sectoral policy on surveying and mapping outlined in the ten periodic plan documents clearly show the transformation of Survey Department as the custodian of cadastral survey plan to the focal point of geographic information infrastructure in Nepal. The enunciation of surveying and mapping and related policies in the different plan documents have been analyzed to look into this transformation. This paper documents the growth of Survey Department as a cadastral survey office to a national mapping agency (NMA) to the hub of national geographic information infrastructure (NGII) in Nepal.

2. Evolution of Surveying & Mapping and Geo-spatial Sectoral Data Policy

2.1. First Plan (1956-1961)

The First Plan (1956-1961) document consists of 22 chapters. Chapter 22 deals with Surveys, Research, Statistics and Publicity. The document clearly emphasizes on the lack of basic information on the resources, current conditions and potentialities of growth of the Nepalese economy, as well as special types of data needed for the detailed planning and execution of the various development programmes. Survey work of specialized character are planned to be conducted entirely by the departments concerned. The Plan envisages that detailed surveys specifically related with development activities planned in the field of agriculture, forestry, irrigation, power, road building, ropeway construction, communication, industry, mining and resettlement will be taken up and aims most of them to be completed within a year or two. It expects that some surveys like the cadastral survey will take years to complete.

A separate chapter is dedicated to Cadastral Survey in the document. It states that cadastral surveys are important in clearing up confusions as to title of boundaries, in developing dependable agricultural statistics, and in

providing a basis for equitable taxation. It mentions that trained technicians, equipment and funds have prevented the initiation of cadastral surveys. In the planned five years it was expected that a little less than half the country will be surveyed and maps and tabulation completed. It was also planned that the ultimate cost of the activity will be divided as between Government and landowners. It aims that this will not only pay its way but also increase Governments' revenue from the land.

2.2. Second Plan (1962-1965)

The Second Plan (1962-1965) has a total of 27 chapters and one chapter is fully dedicated to Survey and another chapter to Cadastral Survey. The Plan gives high priority to acquiring knowledge on present economic condition and the natural and human resource of the country. For this reason two types of surveys are foreseen in the Plan:

- General surveys of the natural resources of the country like forests survey, mines survey, soils survey, industrial raw materials, water resources (irrigation, power) survey, botanical survey, industrial survey etc.
- Pre-investment survey of specific projects like large waterpower, irrigation, mineral-extraction, international airports, roads, town-planning etc.

The Second Plan puts a very strong emphasis on cadastral survey. It analyses the shortcomings of the First Plan and draws up a more realistic plan to complete the cadastral survey of terai areas and the valleys (dun) areas in the mountains. This document also emphasizes on the cadastral survey management system, land registration system, resolution of conflicts, and promulgation of a Survey Act.

2.3. Third Plan (1965-1970)

This Plan is divided into 33 chapters within 3 parts: General, Development Programmes and Implementation. No separate chapters on Survey (general) or Cadastral Survey are made. But different survey plans and programmes are given in different chapters related to sectoral development programmes like agriculture development, land reform and land administration, forestry and botany, irrigation, mineral industry, power, transport, drinking water and sewage, statistics, hydrological survey etc. As an example, it explains that in order to develop irrigation, drinking water and hydroelectric power, hydrological data are very essential. To collect hydrological data for different rivers and streams, the role of Hydrological Survey Department has been outlined, for example.

The Plan once again puts lots of emphasis on accurate cadastral survey to determine the boundaries of the land and to classify the land property. The Plan analyses that the progress of cadastral survey in the past two plan periods has been slower than anticipated and that the methods were technically unsatisfactory. Making an impressive target for cadastral survey, it states that the existing capacity was relatively low and importance of developing adequate human resource was emphasized.

2.4. Fourth Plan (1970-1975)

The Plan is divided into 28 chapters. This again describes different sectoral plans like agriculture, survey, land reform and land administration, forest and medicinal plants, transport, civil aviations, geological survey and mining, power, hydrology and meteorology, drinking water and sanitation, housing and physical planning etc. As in the previous plans, related survey work has been assigned to related custodian departments. For example, some of the geological surveys assigned are: western terai petroleum investigation, gas investment in Kathmandu valley, regional geological mapping, integrated geological-mineral surveys, feasibility study of mineral based industries etc. Similarly surveying in hydrology and meteorology consist of surface water investigation, meteorological investigation, ground water investigation etc.

For the first time, additional to cadastral survey and maintenance of cadastral maps and records, the Fourth Plan discusses about trigonometrical survey and the topographic survey. The trigonometrical survey, however, is dedicated to cadastral survey alone, only a bid to provide more accurate control points to the cadastral surveying in order to improve their accuracy.

The paragraph on Topographical Survey states as

following:

Government of Nepal will endeavor to obtain United Nations Special Fund to set up a topographical survey unit and entrust with the following tasks:

- To complete the topographical survey works of the areas, other than those undertaken by Survey of India and the publication of one inch maps sheets,
- To reproduce one inch maps sheets of Nepal in the required quantity now being published by the Survey of India and to keep the sheets up-to-date,
- To draw and publish up-to-date small scale maps of Nepal, e.g. 1:250,000 scale,
- To survey and produce plans of sites for development projects,
- To print, and possibly draw, maps of surveys by other department.

In the same time, the Plan also emphasizes on the availability of sufficient trained manpower on Surveying and the importance of Survey Training Centre as a dedicated institute of learning on surveying and mapping.

2.5. Fifth Plan (1975-1980)

The Fifth Plan consist of 36 chapters, separate chapters being dedicated to policies like regional development policy, population policy, employment policy, landuse policy, water-resource development policy. This also describes different sectoral programmes like agriculture, irrigation and water resources, land reform, land administration and survey, roads and other transportation, geological survey and mining, drinking water and sewerage, housing and physical planning etc.

This Plan identifies three levels of survey technical manpower: Surveyors (high-level) with a requirement of 59, Assistant Surveyors (middle-level) with a requirement of 372 and Amin (basic level) with a requirement of 1222 during the plan period. This amounts to nearly 6.8% of the requirement of all technical manpower in the country. This Plan recognizes, therefore, for the first time surveying as a profession in the country with three-tiers of its own.

During the Fifth Plan period, emphasis is again laid on the cadastral survey. A total of 18 districts are planned for completion and 6 new districts initiated for cadastral survey during the period. Importance of trigonometrical survey for cadastral survey control is also given. Progress on the topographical survey unit as planned in the Fourth Plan was made and therefore the updating/ reprinting of 1" to 1 mile topographical surveying, 1:250,000 mapping and large-scale mapping will be made as planned. A new development during the Fifth Plan is the commitment for acquiring necessary assistance in carrying out land-utilization and land-resources mapping.

2.6. Sixth Plan (1980-1985)

The Sixth Plan consist of 10 chapters, with the collection of different sectoral programmes in 4 chapters e.g. Agriculture, Irrigation, Land Reforms, Forest and Medicinal Herb (Chapter 7), Industry, Commerce, Mining and Power (Chapter 8), Transport and Communication (Chapter 9), and Social Services (Chapter 10). In the survey sectoral plan, it is stated that cadastral surveys will be conducted in those districts left out so far to identify tenants and landowners, and it is also stated that authoritative maps will be prepared on different scales. A significant policy statement is "Stress will be put on geodetic and topographic surveys" with the word "geodetic" being pronounced for the first time. Outlined in the Plan are geodetic programmes like astronomic surveys and gravity surveys.

In other sectoral programmes, similar emphasis is given on respective surveys as well.

2.7. Seventh Plan (1985-1990)

The Seventh Plan consist of 51 chapters with 15 dedicated to separate sectoral policies like Population and Employment Policy, Water Resource and Fuel Policy, Ecology and Land-Use Policy, Export Policy, Development Administration Policy, Science and Technology Policy, Urbanization and Habitation Policy, Decentralization Policy, Public Enterprise Policy, Policy on Private Sector, Regional Development Policy, Computer Policy, Price Policy, Tax Policy, and Monetary & Credit Policy. Among them the inclusion of computer policy and the science and technology policy in the national planning framework is a breakthrough, which has an effect on the surveying and mapping policy and spatial data policy development in the future. The Computer Policy states that the government, semi-government or private sector should adopt a policy for the development of computer technology in the country to make available reliable statistics and information in a short time frame. It also emphasizes on the development and expansion

of suitable computer network facility for national and international use on a gradual basis. The Science and Technology policy emphasizes, among others, on the consolidation of prerequisites of science and technology, preparation of necessary groundwork for transfer of technology and increase the opportunities for upgrading the scientific capacity and exchange of information and know-how.

Going to specific policy on surveying and mapping, it states to carryout various activities such as measuring the land in a scientific manner, finding out the exact area of land, supporting the determination of survey policy and its implementation, preparing maps in different scales within the country for different purposes and producing necessary manpower for survey programmes effectively. Also it recognizes the importance of different types of mapping on different scales for administration, social and economic development of the country. It describes different geodetic survey and topographic survey activities to be undertaken to support this programme.

By spelling the importance of "survey policy" the Seventh Plan clearly recognizes the importance of Survey Department as a National Mapping Agency (NMA) rather than a departmental survey organization (basically cadastral).

2.8. Eighth Plan (1992-1997)

The Eighth Plan consists of 40 chapters with different sectoral issues discussed. One of the sectoral policy on land reform and management states, "By assembling all information received from land survey, an integrated land information system will be developed to support decision-making." This is a big break-through as a jump from the traditional surveying and mapping to the development and use of spatial information system. An ambitious plan of computerization of all land ownership records in all districts within two years has also been made. Another breakthrough in this plan is the commitment for encouraging involvement of private sector in surveying and mapping.

2.9. Ninth Plan (1997-2002)

The Ninth Plan consists of 15 chapters. The long-term concept of mapping sector spelled in the Plan document is to continue development of land-ownership, mapping and land-resources information for integrated development, and land management based on geographical information system. Specific objective in the Ninth Plan is to computerize and make available data related to land-ownership, land-resources and other topographic mapping. Specific projects and programmes outlined in the Plan are the implementation of Land Information System, land resources mapping, map digitalization, different geodetic surveys, topographic mapping etc.

2.10. Tenth Plan (2002-2007)

The Tenth Plan is another landmark in the field of surveying and mapping and Geo-spatial data policy in Nepal. The Approach Paper of the Tenth Plan states that National Geographic Information System will be gradually developed to disseminate and make easy access to spatial data in the country.

This is yet another breakthrough in the development process, from the concept of national mapping agency (NMA) to a national geographic information infrastructure (NGII).

The main document of Tenth Plan is spread into 34 chapters and 3 annexes. The survey sector lists out cadastral survey, map digitalization, topographic mapping, and various geodetic surveys, developing geographical information system as some of the projects to be undertaken. Establishment of land information system, computerization of land records, digitalization/ scanning of cadastral maps and records are other programmes outlined.

3. Assessment of the Evolution of Surveying and Mapping and Geo-spatial Data Policy

In the backdrop of the above policy developments during the fifty years of planned development in Nepal, it can be stated that the surveying and mapping and geo-spatial data policy have slowly emerged from a project based surveying/ mapping to development of a national spatial data infrastructure. The surveying/ mapping and geo-spatial data policies, programmes and projects have been guided by the user-requirements in the first place and equally important by the corresponding developments in other sectoral areas. The developments in the field of science and technology in general and in the field of ICT in particular have made a tremendous impact in the field of surveying and mapping. GeoICT is now a recognized field of learning and this technology is applied for benefiting a larger part

of the society and the nation as a whole.

Surveying and mapping as a technology involved in cadastral survey in 1956 in Nepal, and Survey Department as an organization barely involved in the production of cadastral survey plans that year, the technology and corresponding policies have undergone tremendous development during the fifty years. In the same way, during this period Survey Department has undergone a complete metamorphosis from a bare cadastral survey office to a national mapping agency NMA (outlined in the Seventh Plan) to the hub of national geographic information infrastructure NGII (outlined in the Tenth Plan). Survey Department has grown from a technician department to a scientific department in these fifty years. Surveying has grown and recognized as a profession in itself. The Surveyors take pride in their profession and are satisfied that they are helping in the overall development of the country by providing necessary maps and geo-spatial information for planning and execution of different development projects. The Plan documents over the years clearly outline these policy changes. The changes have been gradual and the developments have been evolutionary. This type of evolution has created an environment in Survey Department as an organization and its Survey professionals to take ownership to the developments. This is perhaps the key to a sustainable development of Survey Department and the Surveying profession.

4. Conclusion

The periodic Plan documents spell out gradual evolution in surveying and mapping and geo-spatial data policy in Nepal. However as outlined in the Seventh Plan a comprehensive national policy document on Surveying and Mapping and Geo-spatial Data is still awaited. There have been several exercises in the Survey Department to formulate these policies and draft documents have been prepared. But they have yet to be formally indorsed by Government of Nepal and therefore the contents have not been discussed in this paper. However, with the advent of NGII it is no more a sectoral policy of Survey Department to be monitored by a singular organization. It is high time that a national geo-spatial data policy is endorsed. Before such endorsement is made, it is naturally anticipated that some consensus is built between the concerned stakeholders e.g. the producers and users of geo-spatial data. Such a policy document should include, among others, policy statement on spatial data management e.g. fundamental and framework data sets data acquisition and data management plan, technical standards and protocols on metadata clearinghouse implementation and usage, organizational and administrative arrangements including guidelines for custodianship of spatial data, guiding principles for spatial data access and pricing policy. Also important in this regard is the guidelines for financing of NGII.

It is seen that all periodic plans are guided by the policy concepts evolved in the concerned organizations and the technological and scientific developments in the related professions. With respect to surveying & mapping and geo-spatial data, formalizing such concepts through the enunciation of a National Geo-spatial Data Policy will be a formal document to give directives and guidelines in the sector for the future periodic plans.

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