

# Application of Geographic Information Infrastructure: In the context of restructuring the country

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## KEYWORDS

Geographic Information System, Application, Restructure, Delineate

## ABSTRACT

*Nepal has a diverse geography. The declaration of Nepal as Federal Democratic Republic Nepal has occurred recently. Transformation in administrative boundaries has undertaken. For the formulation of changes in administrative divisions, changes in different phases were involved. Committees that are formed and methods that are adapted socially, technically and administratively to map the local government units is depicted through this paper. Finally, the outcomes of restructured Nepal with its individual local level are prepared with the help of Geographic Information System.*

## 1. BACKGROUND

The extent of Nepal ranges from 80° 04' E to 88° 12' E longitude and 26° 22' N to 30° 27' N latitude (Chhatkuli, 2004). It exhibits the geographical stretch from the highest top of the world, the high Himalayas, to hilly and plain Terai region. No other thing can fascinate more than the natural diversity of Nepal.

The administrative structure of Nepal follows a series of transformation. From the Panchayat regime to today's Federal Composition of Nepal, several changes has occurred in the number of VDCs and Municipalities. After the adoption of new federal structure with seven States (Schedule-4 (Relating to clause (3) of Article 56)), Nepal has 77 Districts, 6 Metropolis, 11 Sub-metropolis, 276 Municipality, and

460 Rural Municipality as local government units. It is illustrated in table 1. The exercise of delineating boundaries of new local government units was a cumbersome task. It was made possible through efficient use of geographic information facility.

| State no. | Districts | Metropolis | Sub-metropolis | Municipality | Rural Municipality | Total local units |
|-----------|-----------|------------|----------------|--------------|--------------------|-------------------|
| 1         | 14        | 1          | 2              | 46           | 88                 | 137               |
| 2         | 8         | 1          | 3              | 73           | 59                 | 136               |
| 3         | 13        | 3          | 1              | 41           | 74                 | 119               |
| 4         | 11        | 1          | 0              | 26           | 58                 | 85                |
| 5         | 12        | 0          | 4              | 32           | 73                 | 109               |
| 6         | 10        | 0          | 0              | 25           | 54                 | 79                |
| 7         | 9         | 0          | 1              | 33           | 54                 | 88                |
| Total     | 77        | 6          | 11             | 276          | 460                | 753               |

Figure 1: Local government units allocation.

## 2. INTRODUCTION

The application of geographical data in most of the field has made the importance of geographic information higher. In order to develop information from the data for any developmental and non-developmental activities, the spatial-temporal and socio economic data is a must. We as a surveyor know well to develop information of any kind relating to the spatial context. The technologies have made us even easier on analyzing such kind of data. This has direct influence on the frequency of using geographic information to develop ideas for the decision making process.

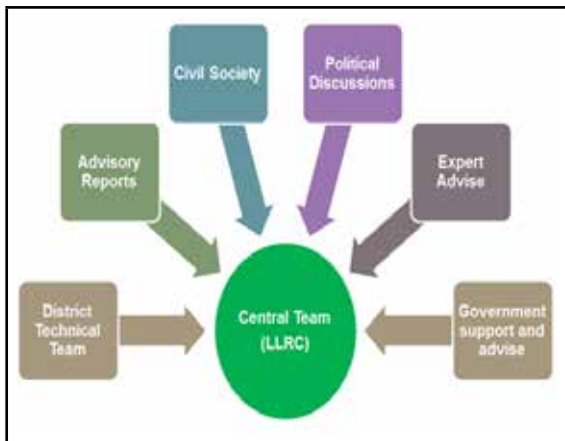
The Geographic Information System (GIS) assists in developing information from collected geographic data. It is thus, involved from very beginning of data collection to manage, analysis and manipulate the data, and to the dissemination of the information extracted from the data. The use of technology should be done to better answer their needs and queries regarding the geographic information systems. The geospatial system has the special place to help the society in the informed decision making processes. GIS is regarded as the system to shape the world and better depict the processes going on the earth's surface, below and above the earth surface.

For the implementation of the Constitution of Nepal, the restructuring of the federal Nepal to the Local Government unit was necessary. For this historical benchmark, as per Constitution of Nepal (Article 295(3)), formed a "Commission for the determination of the Number and Boundaries of Village bodies, Municipalities, and Special, Protected or Autonomous Regions". This commission was established on the Chaitra 1st, 2072 having time period of one year. The mandate of this commission was to form the units and demarcate the boundary at the local government unit for the formulation of the federal system of Nepal. The

commission followed the Terms of Reference (TOR) provided by the Government of Nepal and other jurisdiction is within the commission. The technical part of the task involved formulation of the major role in the formation of local government units of the country. With the dedication and day night hardship of the members and staffs of the commission, the scientific, delicate, collaborative, collective and highly appreciable thematic concepts and technical procedures of the commission was developed. The commission formed a technical committee to represent one district named Local Level Restructuring Technical Committee which consist of members as:

|  |                      |
|--|----------------------|
| Local Development Officer  | Coordinator          |
| Officer Representative,<br>District Administrative Office                                | Member               |
| Officer Representative,<br>District Technical Office                                     | Member               |
| Officer Representative,<br>District Revenue Office                                       | Member               |
| Officer Representative,<br>District Survey Office  | Member               |
| Planning, Monitoring and<br>administrative Officer,<br>District Development<br>Committee | Member-<br>Secretary |
| Guest Members:   |                      |
| Officer Representative,<br>District Forest Office  | Guest Member         |
| CBS Head   |                      |

Thus formed committee helped in the restructuring program of the local government units in their respective districts. As per the TOR provided to the technical committee, each district proposed numbers, names and centre for the local government units formed in their district.



**Figure 2: Stakeholders of the national responsibility of restructuring the country.**

As in Figure 2, the proposal included many consolidation programs, orientation programs, and different meetings with local people, local representatives and civil society groups. The suggestions and facts provided by the people were incorporated in detailed proposal and report of the district technical committee. The reports provided by the districts were collected, studied and analyzed whether they meet the terms and conditions provided by the commission. The individual units were formed and their thematic data were incorporated in the GIS database which was made ready for mapping purposes.

### 3. METHODOLOGY

The initiation of the management and implication of the restructured nation requires the self-sustainable Geographic Information System for better planning and decision-making processes. Spatial information for the decision making process is very crucial. The methodology adopted for this operation is explained below:

- **Data collection:** The source of the geospatial data was Survey Department. The spatial data was gathered for the whole Nepal. Likewise the population data was collected from the Central Bureau of Statistics (CBS). Other utilities and public services data like health services data from the then Ministry of Health and Population, education related

data from the then Ministry of Education and other respective data from respective authorities were collected.

- **Data management:** All the data collected from different sources were incorporated into the database of spatial data of whole Nepal. It was necessary for easy and quick information retrieval based on the geographic location of the place.
- **Data processing:** The primary data were processed to carry out the detailed information system. On the basis of purpose of the operation, the overall data from different fields were processed to gather the information regarding the spatial location, health service facility and education facility, access to the infrastructure, population density, population distribution, ecological belt, and previous election constituencies.
- **Initial outputs:** The initial outputs were the population map, land cover map, and electoral constituency's distribution map.
- **Preliminary outcomes:** The population map and land cover map were used for the decision making process which helped to figure out the preliminary delineation of the new local government unit boundaries in the district level. Different seminars and orientation program were carried out to provide the knowledge about the use of maps and how it can help in the informed decision making process. The optimum use of spatial data was done to delineate the administrative boundary of local level. The delineated boundary from the district level was forwarded to the central level commission technical team.
- **Inspection:** The delineated boundary report from the district technical committee was inspected by the commission and the technical part of the matching map details with ground details was observed and reported.

- Database matching: The data provided by the district technical committee was inspected by the technical team of the GIS Experts for the information matching.
- Verification: The verification of data and information matching was done and the field scenario was conveyed back to the district technical committee for further verification.
- Final output: After a long process of data collection to the verification the final output of the delineated boundary of the new local government units were mapped and the administrative division was demarcated. The final outcome of the system was the administrative map of the local government units with the ward boundaries.

### 3.1 Flow Chart

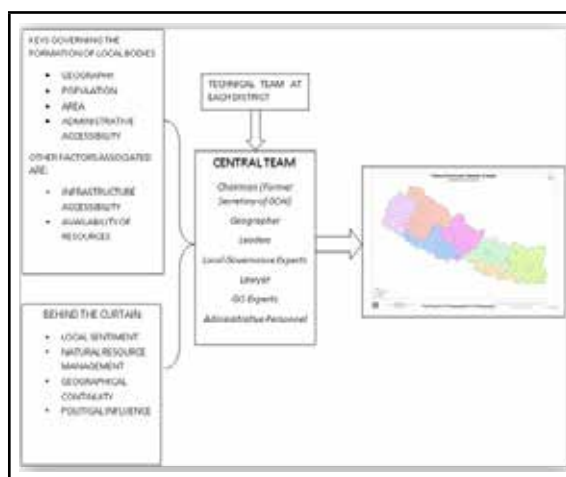


Figure 3: Flow chart of the general workflow.

From Figure 3, the general scenario shows that the major keys that governed the formation of local government are the geography and location of the place, its population and area and administrative accessibility. The other factors that helped were the infrastructure accessibility and resource availability of the respective place. The local sentiment attached with the place,

resource management and geographical continuity are also other factors behind the formation of the units. These above mentioned factors are studied in detail and the technical team at each district come up with the proposal. These proposal were administered by the central team and final report proposing the local bodies were prepared.

### 4. OUTCOMES

The role of Geographic Information System is to provide the information about the geographic location, land use patterns, topography, socio-economic data relating the location of the place, and provide support for the informed decision making process and finally delineate the boundary and prepare respective maps. The ultimate outcome was the number and boundaries of the local government units of The Federal Democratic Republic of Nepal. Two kinds of maps were the major outcomes of the system.

- The district administrative map with the Municipalities and Rural Municipalities.
- The Municipality and Rural Municipality map with the wards.

Some of the examples are as follows:



Figure 4: Districtwise administrative sample map.



**Figure 5: Administrative map showing palikas of the district Parbat.**



**Figure 6: Administrative map showing wards of Chattradev Gaunpalika of the district Arghakhanchi.**



**Figure 7: Nawalparasi and Rukum splitted to form 77 districts of Nepal.**

In figure 7, it shows that during the formation of state, the two districts; Nawalparasi has been divided in state number 4 and 5 and Rukum has been divided in state number 5 and 6, hence the number of districts becoming 77.

## 5. CONCLUSION

The administrative structure of Nepal follows a series of formation. The number of VDCs and Municipalities went through several changes in recent years. Earlier when the local units were dissolved or disjointed, there was no or very limited use of Geographical Information System. This has made it difficult to prepare and manage spatial database. Therefore a very tiresome efforts has been made in building the database that we are using today. After the adoption of new federal structure, Nepal has 77 Districts, 6 Metropolis, 11 Sub-metropolis, 276 Municipality, and 460 Rural Municipality as local level (local government units). According to The Constitution of Nepal, 2072 (Schedule-8 (Relating to clause (4) of Article 57, clause (2) of Article 214, clause (2) of Article 221 and clause (1) of Article 226)) has provided different power to the local level (local government units). For exercising the given power to the people the restructuring of the country plays a vital role to help people empower themselves. The historical framework of the three tier scenario of the administrative division of the country was made possible with the help of the application of geographical information infrastructure. This also shows the need of technology and informative way in the decision making process. Application of GIS for this delineation has made this operation scientific and systematic which will be helpful in better understanding the restructuring of the nation.

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