

# APPLICATION OF GEOINFORMATICS TO LOCAL GOVERNANCE A CASE OF THE KASKI DISTRICT, NEPAL

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## ABSTRACT

The district is the statutory geographical unit of 'Local Governance' defined by the constitution of the Kingdom of Nepal. In the process of development several organizations and line agencies are working on. The ultimate goal of those line agencies and development institutions is to enhance the physical, moral and cultural condition of the people residing in the defined territorial units. The crucial problems generally faced by the development planners and decision-makers are the repetition of the activities of different line agencies, development organizations, and sometimes there are persisting the development gaps in the defined territory. Local Governance Act 1999 of the His Majesty's Government of Nepal identified and emphasizes the importance of the local level information about resource and development activities. The Act persuades the importance of the information for the objective local governance. As envisaged by the Act, an exercise on the application of geoinformatics has been carried out in the context of Kaski District, Nepal. Preparation of the detail data layers (both spatial and non-spatial), analysis of the most common problems i.e. development status of the Village Development Committees (VDCs) and the poverty level of the people within the VDCs in the district have been carried out with the help of GIS. The exercise has given a good result upon the problem identification, and searching of the development potentialities at local level. The case of Kaski District in Nepal would give the basic model on application of geoinformatics in the similar context of local governance, and also provides clear methodological guidelines.

## INTRODUCTION

Local Self-Governance Act 1999 of HMG/Nepal clearly emphasizes the importance of the information in the context of local level planning. According to the Act, Village Development committees, Municipalities, Sub-Metropolitan and Metropolitan Cities, and District Development Committees are the statutory local governance units. The Section 44 and 199 of the Act mentioned the importance of the database about the resources and other spatial information in the context of local level planning.

Geographical location of Kaski district is in the middle part of the country between 28°06' - 28°36' north latitude and 83°40' - 84°12' east longitude; covers 2110.53 square kilometers. The district has three constituencies, thirteen Ilakas (planning sub-region in the district according to the by-laws), one sub-metropolitan city, one municipality, and 43 Village Development Committees (VDCs). The upper part of the district is extending up to the summit of Great Himalayas (Annapurna Himalayan Range of Central Nepal) at above 8000-meter elevation from the average sea level (asl). The lower part is confined in valley and spurs even below 500-meter contour line. Thus, the district has different geo-ecological diversities. Because of these diversities simple descriptive interpretation could give little information and helps for limited planning options. Therefore, a comprehensive analysis based on Geographic Information Systems (GIS) assisted data integration capability is needed and also will be highly desirable and even essential for the detail planning and will provide in-depth knowledge and understanding of the district. In the present study geoinformatics have been applied in carrying the following analytical assessment.

- i. Identification of status of development of VDC
- ii. Measurement of human poverty at VDC level

VDCs are the statutory bodies of the hierarchical structure of the government mechanism. Those are the smallest spatial units to deliver the development activities for the civilian. Similarly the human poverty is the most prioritized sector of the HMG/Nepal. Development options are controlled by the poverty of the people, thus the development plan envisaged the poverty alleviation strategy on its priority.

#### **SOURCE OF THE DATABASE**

The digital database available at the District Information Center (DIC) Kaski were verified and made the accuracy test according to the discussion with the related representatives of VDC and District Development Committee (DDC), specifically, the boundary of VDC and DDC, infrastructure distribution, district resources and settlement location were corrected through the repeated exercise. The socioeconomic database collected in 1998/1999 and coded by the DDC personnel were processed and linked with spatial database.

#### **DEVELOPMENT STATUS OF VILLAGE DEVELOPMENT COMMITTEES (VDCs)**

The proportion of the distribution of infrastructure in VDCs in terms of population residing on, presents the overall scenario of the development at the village level. The distributions of infrastructure in different VDCs were identified from the database of different line agencies and sectoral offices. The locations of the infrastructure were verified by marking each facility in the 1:25,000 original topographic maps. The correction of the actual positional accuracy was made from the direct quarries and personal discussion with local authorities. The infrastructure establishments in the district are listed in Table 1.

Table 1: Distribution of Infrastructure

Types of Infrastructure	Number of facility
<b>EDUCATION*</b>	
Primary school	309
Lower secondary school	45
Secondary school	63
Higher secondary school	12
University campuses	10
University	1
<b>HEALTH FACILITIES*</b>	
Sub-health post	34
Health post	12
Primary health care center	2
Ayurvedic center	5
Hospital	5
<b>COMMUNICATION SERVICES*</b>	
Ordinary post office	39
Area post office	11
District post office	1
Telephone	
VHF & MARTS	21
Ordinary Lines	5
Urban Service	2**
<b>SERVICE CENTERS*</b>	
Veterinary service sub-centers	8
Veterinary service centers	7
Veterinary Hospital	1
Agriculture service sub-centers	7
Agricultural service center	6
<b>FINANCIAL INSTITUTIONS</b>	
Agriculture Development bank	6
Rastrya Banijya Bank	8
Nepal Bank Limited	4
Finance Companies	8
Standard Chartered Bank (Grinlay's)	2
Gramin Bank	2
Machhapuchhre Bank	1
NABIL	1
Nepal Rastra Bank (Regional)	1

\* Only the government establishments are included.

\*\* Pokhara Sub Metropolitan and Lekhnath Municipality

Source: DDC database, 2000

For the measurement of the development status of each VDC in the district a list of the facilities available in the VDCs have been considered. Primary school, agriculture services, primary health facilities (settlements within 2kilometers areal distance from the spatial location from the sub-health post and health post), drinking water (tape water), veterinary services, post office (settlements within 2 kilometers areal distance from the spatial location from the ordinary post office), cooperatives, hydro electricity and motor road accessibility (within 2 kilometer buffer from the road alignments) are the major infrastructure services taken as a measurement parameters of the development. Some of these facilities are measured based on the proportion to the total number of population and some others are based on the yes/no condition. Therefore, finally all the facilities are normalized by Z-score computed in the statistical package. The composite score has been computed from the facilities confined in each VDCs and given a relative scale of development status from very low to very high categories. Based on these procedures the relative scale of each infrastructure services

confined in the VDCs as well as the over all composite status of the development of the VDCs in the district is given (Fig. 1).

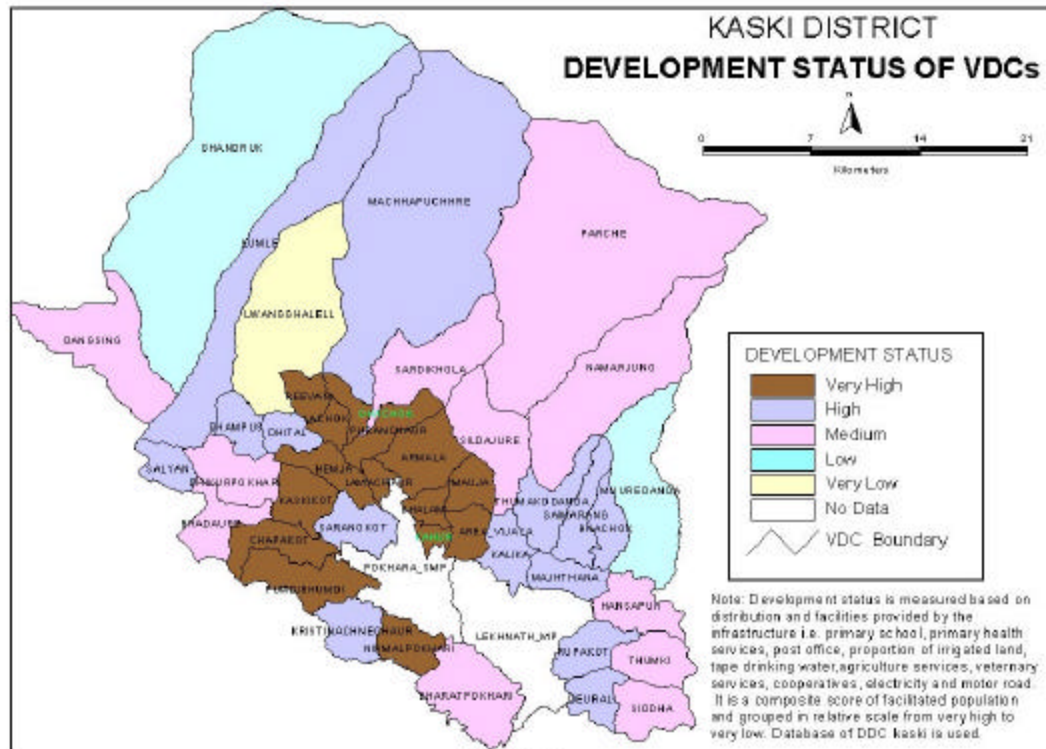


FIGURE 1

#### MEASUREMENT OF POVERTY AT VDC LEVEL

The United Nations Development Programmes, UNDP (1997) defines the poverty from the human development perspective as a state in which opportunities and choices most basic to human development are denied. The Nepal Human Development Report (1998) quotes HDR (UNDP, 1997) the human development frame maintains that poverty should not be narrowly linked with the denial of economic sources alone but with the denial to live a valuable and worthwhile human life. The Human Development Report (2000) typifies HPI for developing countries and for industrial countries. In the context of developing countries The Report mentions deprivations in three dimensions of human life, as longevity, knowledge and a decent standard of living. The deprivation in longevity relates to survival – vulnerability to death at a relatively early age. The deprivation in knowledge relates to being excluded from the world of reading and communication and the deprivation in decent standard of living relates to in terms of overall economic provisioning. The Human Development Report (2001) also follows the HPI similar to the HDR (2000). The Report clarifies the HPI reflects the distribution of progress and measures the backlog of deprivations that still exists. The HPI measures deprivation in the same dimensions of basic Human Development Index. Following basic guidelines developed by UNDP the poverty situation of Kaski district at VDC level is measured. The Human Poverty Index (HPI) is assigned from the household information collected by the DDC personnel. Thus, for the calculation of HPI, the indices are grouped under:

- i. Deprivation in knowledge (P1), typified by the percentage of adult illiteracy of the population,
- ii. Deprivation in longevity (P2), typified by the percentage of people die because of unnatural death (as mentioned in the questionnaire),
- iii. Deprivation in a decent standard of living (P3), jointly by;
  - unweighted composite value of the percentage of people without access to safe water (P31),

- percentage of people without access to health service (P32),
- percentage of malnourished population (P33),
- percentage of households having debt for the survival (P34),
- Percentage of the households in food deficiency (P35),
- Percentage of households having minimum range of income (not more than Rs. 25000 annual income from the all activities reported) (P36),
- iv. Deprivation in social equity of women (P4), typified by;
  - the composite value of percentage of households having land ownership not in women's name (P41),
  - percentage of female illiteracy among the total female population (P42), and
- v. Deprivation in infrastructure facilities (P5) given from the composite Z-score of the status of infrastructure at VDCs.

Thus, HPI is calculated:

$$HPI = [P1+P2 + ((P31+P32+P33+P34+P35+P36)/6) + ((P41+P42)/2) + P5]/5$$

The score presents the higher the value larger the level of poverty.

From the computation of the composite value, a relative scale of poverty level is grouped from maximum to minimum range of the score. Five categories of poverty level from very low to very high are made (Fig. 2).

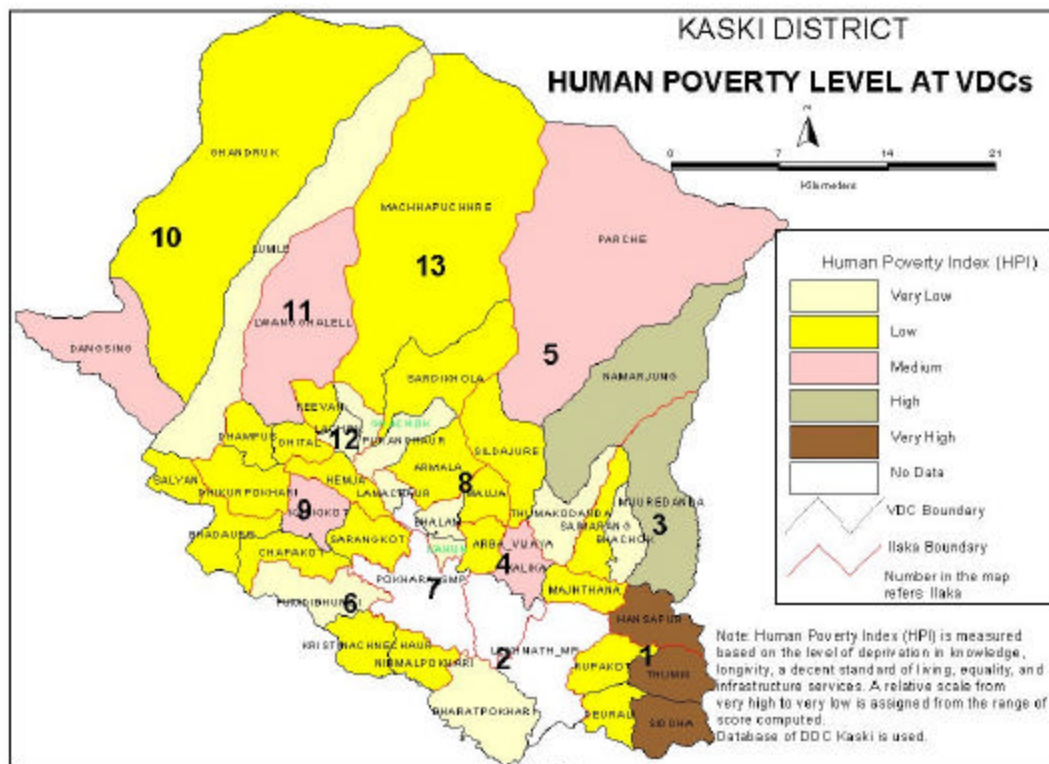


FIGURE 2

From the computation of HPI, three VDCs, such as Hanshapur, Thumki and Siddha have the very high HPI score. Out of 43 VDCs the very low category has eleven VDCs and the least score (21.40) is in Lamachaur VDC. The Puranchaur and Ghachok also have the similar scores. The computation of HPI shows the VDCs located closer to the Pokhara has the least scores and the VDCs located far corner of the district have the highest scores.

## CONCLUSION

People at grass-root always expect good decision from their leaders. The rational planning procedures too, need the betterment of the people. The detail information of the spatial units and their proper handling could give the better suggestions to the planners. Geoinformatics help them on integration the information of various sources and measurements at varied scale. In the Kaski district the development gaps at VDC scale have been identified to suggest the planner on the basis of people and the institutional establishment of the infrastructure. Measurement of the development status of VDCs provides two types of information. First it gives the distributional pattern of infrastructure over the VDCs and the second, gives the location allocation gaps with respect to the settlement and people. The concentration of infrastructure is high along the urban units; however, the study does not include the Pokhara Sub-Metropolitan City and Lekhnath Municipality. Similarly, the measurement of human poverty is confined along the villages located at far corner of the district. How does the human poverty occur high with the distance increasing from the urban centers? There is a common answer that the infrastructure and institutions usually concentrated close to the urban centers. The concept of '**friction of space**' seems prevailed even in establishments of infrastructure in the remote areas. People, resources and physical limitations are three major components of a spatial territory and the planners have to minutely scrutinize these components at micro level in the process of local governance. These three components have varied nature of elements and measurement; thus, geoinformatics bring them into a single whole and made it possible for alternative planning solutions.

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