



RURAL POVERTY ANALYSIS AND MAPPING IN NEPAL

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## PREFACE

Measuring the level of rural poverty and identifying poverty-stricken areas are the common problems in developing countries of Asia due to nonavailability of right kind of data and information. It is also further limited because of inappropriate and cumbersome techniques. This is very much true in Nepal, where GOs and NGOs face similar difficulties in addressing rural poverty issues. Through this research study, an attempt is made to offer some answers in support of simplified techniques and demonstration of application using socioeconomic data of Kaski district, presented by Village Development Committee, the smallest administrative unit of Nepal.

In the research an attempt is made to assess the poverty situation based on selected indicators supported by the available database in Nepal. It uses a simplified technique for standardizing the indicators and computing composite indices to explain the poverty levels at the VDC level. The results obtained through analysis are used for generating various maps to illustrate spatial distribution and to correlate with poverty at the micro level. The study has given the answers for prioritizing poverty-stricken areas for undertaking appropriate development strategies. Finally, few strategies are recommended for combating poverty in Nepal.

The book contains seven chapters and appendices. The introduction chapter covers conceptual framework, research questions and objectives. Chapter two presents a review of poverty measuring methods and techniques as practiced by the developing countries. This chapter gives the idea how poverty-stricken areas (backward areas) are identified and the types of indicators used for poverty analysis in few selected developing countries. Chapter three presents the methodology applied in this research to carry out poverty analysis and mapping in Nepal. Chapter four and five present data and information system, and rural development planning process with a focus on one district in Nepal. Chapter six presents the analysis and the results by maps. Chapter seven provides the conclusion and recommendations. Finally, the appendices present a group of indicators, directly or indirectly reflecting poverty, in few selected countries, and computation of

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## ABBREVIATIONS

ADS	Aggregated Development Sector
AIT	Asian Institute of Technology
APROSC	Agriculture Project Services Center
BMN	Basic Minimum Needs
BSI	Basic Services Indicators
CBS	Central Bureau of Statistics
CDO	Chief District Officer
DDC	District Development Committee
Dev.	Development
DFID	Department for International Development
GIS	Geographic Information System
GO	Government Organization
GSO	General Statistical Office
HDI	Human Development Index
HH	Household
HRD	Human Resource Development
ICIMOD	International Center for Mountain Development
IFAD	International Fund for Agriculture Development
IIS	Infrastructure and Institution Sector
INGO	International nongovernmental Organization
IRDP	Integrated Rural Development Program
JICA	Japan International Cooperation Agency
JMA	John Mellor Associates, Inc.
Km	Kilometer
Km <sup>2</sup>	Square Kilometer
LDO	Local Development Officer
LGP	Local Governance Project
LRMP	Land Resource Mapping Project
LSMS	Living Standard Measurement Survey
m	Meter
NA	Not Available
NPC	National Planning Commission
NR	Nepali Rupees
NRD-2C	National Rural Development Database
NRDP	National Rural Development Program

## GLOSSARY

**Deprivation:** Deprived households are those, which are poor, physically weak, isolated, vulnerable and powerless. All these factors are inter-related. They enforce each other in producing and maintaining deprivation. This situation is called deprivation trap (Chamber, 1993).

**District:** For administrative purpose, Nepal is divided into five development regions and 75 districts. Average size of the district is 1962.41 km<sup>2</sup>.

**Headcount Index or Poverty Incidence:** This measure represents the percentage of population, which has an annual per capita consumption level below the poverty line. It interprets how many people are poor in the country, but it is indifferent as to whether poor have consumption level just below the poverty line or whether they lie far below the poverty line (World Bank, 1999)

**Poverty:** People are considered poor, when they cannot secure a minimum standard of well-being and when their choices and opportunities for a tolerable life are denied or severely restricted (UNDP, 1997).

**Poverty Gap:** It reflects the distance between the consumption level of the poor and the poverty line; the greater the distance the higher will be the Poverty Gap (World Bank, 1999)

**Poverty Line:** It is an indicator for reflecting the order of magnitude, its spatial distribution and trends to serve as a rough and ready reckoner for allocation of resources (Hiton, 1990). Within the poverty line there are varying degree and depths of degradation. For example destitute, the very poor, the very poor and the poor in terms of their annual incomes (IRDP-India, 1990). There are two poverty lines: Absolute Poverty Line and Relative Poverty Line.

**Poverty Map:** Poverty maps provide information about spatial distribution of inequality and poverty within a district/country.

## Chapter One

### INTRODUCTION

#### BACKGROUND

Poverty eradication is the major goal of both developed and developing countries of the world. At present 1.2 billion people are living on less than \$1 a day, and 2.8 billion on less than \$2 a day. Similarly, 968 million people are without access to improved water resources, 2.4 billion people without access to basic sanitation (World Bank, 1998). 854 million adults are illiterate. The women development situation is still worrisome where their number exceeds half of the given population. 325 million children are out of school at the primary and secondary level. Malnourishment and mortality incidence of children below five are also discouraging (World Bank, 2000).

The intensity of South Asian poverty is more worrisome. Forty percent of world population lives on less than \$1 a day and 83 percent population lives on less than \$2 a day. The Human Development Index (HDI) value computed in 1999 by the UNDP is 0.564 for South Asia, in comparison to 0.716 of the world HDI value.

In case of Nepal, the poverty severity is alarming. The HDI developed by the UNDP in 2001 is 0.480 and places the country in the 129<sup>th</sup> position in the descending order of development. Based on analysis of the Nepal Living Standard Survey (NLSS) 1996, the Ninth National Plan (1997-2002) mentions that the size of population living below poverty line is 42 percent, where the population of poor is 24.9 percent and population of ultra poor is 17.1 percent. The percentage of poor population is highest in the mountain, which is 56 percent in comparison to 41 percent in the hills and 42 percent in the Terai. The situation in the rural area is more severe, where the poverty incidence is 44 percent in comparison to 23 percent in the urban areas. Similarly the Ninth National Plan mentions that social indicators such as access to health, education, and safe drinking water, etc. are significantly lower in rural areas.

For poverty eradication in the global level, the world's leaders were gathered at the United Nation General Assembly in the beginning



identified and documented. Data analysis process for poverty alleviation program is neither fast nor clear at the local level.

With this background, an attempt is made here to study and assess the available database for poverty analysis and to apply some simple technique to categorize VDCs for rural development planning. The following issues were attempted to explore at the district level.

1. Is the DDC database adequate to assess and compare the poverty and development situation at the VDC level?
2. What are the indicators used to categorize VDCs for poverty alleviation program?
3. Do these indicators capture the heterogeneity in terms of biophysical and socio-economic factors responsible for poverty?
4. What is the relation between the level of poverty and selected development indicators?
5. How effective is the poverty-mapping concept to exhibit poverty heterogeneity at the VDC level?

#### OBJECTIVES OF THE STUDY

The objectives of the study are set on the basis of the questions raised above. Therefore, the broad objective of the study is to develop a database and information system to support rural poverty analysis and planning in Nepal.

##### Specific Objectives:

1. To review the sources of data and information, types of data and their availability at the VDC level within the district,
2. To gain views and feedback from the local planners about the adequacy and quality of the database, and identify the problems, needs and constraints associated with the existing database,
3. To establish a spatial database by VDC and identify gaps, if any, to streamline for rural development planning,

1. Economic factors,
2. Social factors,
3. Institutional and infrastructure factors,
4. Deprivation,
5. Women empowerment, and
6. Natural resources endowment.

These factors are demonstrated schematically in Figure 1. They are interrelated to each other. Similar to this relation, Chamber (1990) has called the poverty trap. When one sector in the circle is affected, the other sector is also influenced.

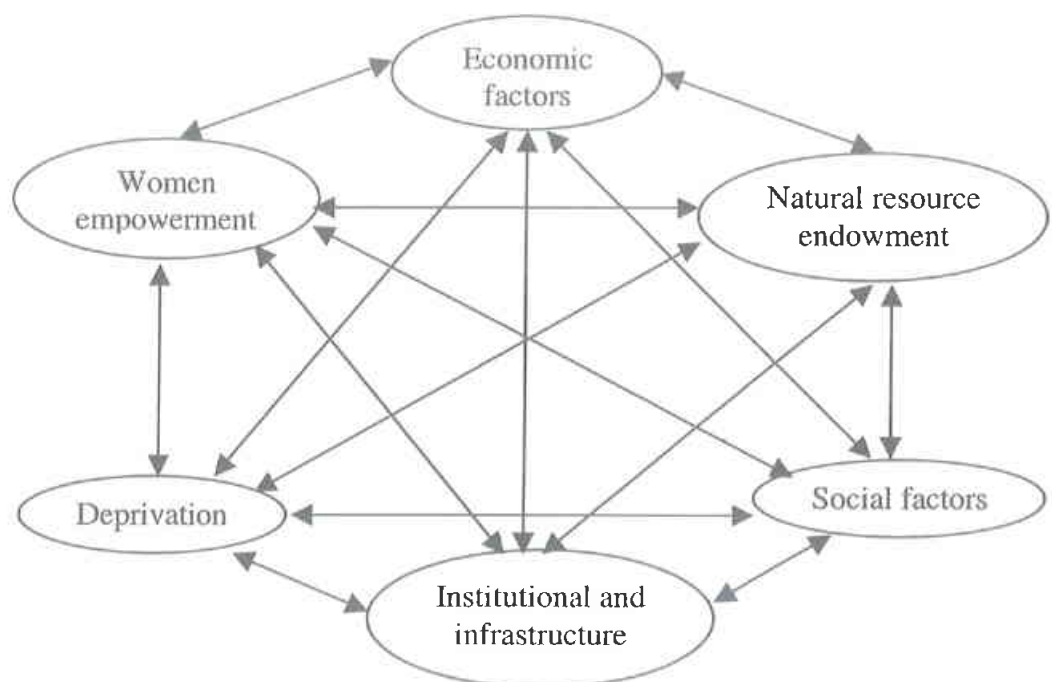
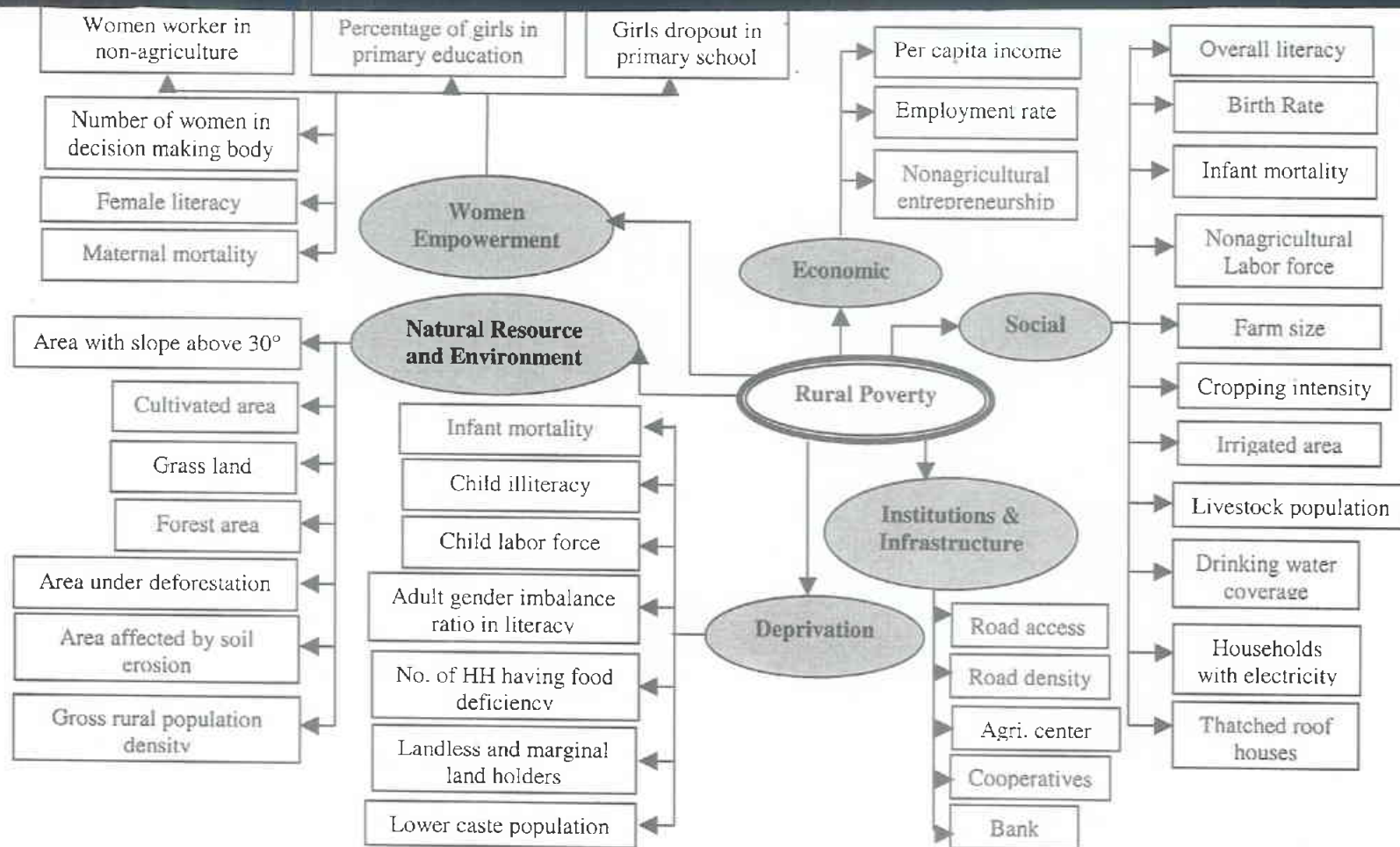


Figure 1. Aggregate indicators of rural poverty

Note: Modified on the basis of the works of Chamber (1990) and Dixon (1990).

These broad factors are regrouped into causes of poverty existing in



Formulated on the basis of database of Cambodia, Lao PDR, Thailand, and works of the World Bank (2000), the UNDP (2000) on development indicators and works of ICIMOD (1997) and Routrav (1997) on development indicators of Nepal

Figure 3. Indicators of rural poverty.

## Chapter Two

### **POVERTY ASSESSMENT METHODS AND TECHNIQUES**

Poverty assessment methods and techniques applied in developing countries - Cambodia, Laos, Thailand, Vietnam, Ecuador and Nepal are described in this chapter. The review of the poverty assessment methods and techniques in these countries reveals that the poverty measurement at present is commonly done in two ways.

- 1) It is measured in economic terms such as Poverty Incidence, Poverty Depth (Poverty Gap) and Poverty Severity (Squared Poverty Gap) based on income or level of consumption, and
- 2) Spatial units are assessed on the basis of a set of development indicators directly or indirectly related to poverty. According to the performances of the indicators the spatial units are categorized as poor and non-poor.

In practice, it is observed that first type of analysis is applied to identify and compare poverty level at the national level, whereas the second type is applied in identifying poorer areas to design poverty alleviation program especially for the rural areas.

The first type of measurement is supported by the financial organizations such as the World Bank, whereas the second type of analysis is supported by the UNDP. Examples for the second type are the Seila Program of Cambodia, Focal Site Strategy in Lao PDR and Participatory District Development Program (PDDP) in Nepal. In these programs, supports are provided at the district level to establish database system for development planning.

### **DEVELOPING COUNTRY EXPERIENCES**

#### **Cambodia**

Royal Government of Cambodia (RGC) has implemented Seila Program in 1996. The Seila program is an initiative to strengthen local

Before making final decision for resource allocation, Provincial Rural Development Committee (PRDC) considers other factors also such as the funding that commune is getting, the local contributions that commune is raising and the special attention, if any, that a commune is needing.

The database has covered most of the aspects of development of a commune. It also comprises the indicators directly or indirectly related to poverty. From these indicators rural poverty can be exhibited at the commune level. In the analysis, sectoral composite index can be computed which further can be mapped at commune level for visual communication. The map facilitates for rural development planning at the grassroots level. The indicators such as 1) funding that commune is getting, 2) the local contributions that commune is raising, and 3) the special attention, if any, that a commune deserves, are taken into account separately which can mislead the process to make it transparent. These indicators should be incorporated along with other indicators in the database.

#### Ecuador

Ecuador is a poorer country, where thirty five percent of the total population (three and a half million people) lived in poverty in 1994. Additional one and a half million population were vulnerable to poverty. Sixty percent of the total poor resided in rural areas. There is great heterogeneity across region and sectors in relationship between poverty and social indicators (World Bank, 1999). The World Bank has mentioned two methods of poverty measurement in the Ecuador Poverty Report.

#### *Consumption Based Poverty Analysis*

The report claims that consumption based Poverty Assessment over income, is more reliable for a number of reasons. First, consumption of a household tends to fluctuate much less during the course of a month or even a year than income. The income of the poor is often quite volatile in the urban centers, as the poor frequently depend on daily wage jobs from the informal sectors. In the rural sector, income from agriculture fluctuates with prices and harvest

Poverty line was obtained by determining the average proportion of total consumption, which was spent on nonfood items by those members of the population, who were in principle just able to meet their calorie needs, if they were to devote their total expenditure to the purchase of food items. The poverty line was then calculated by scaling up the national level food poverty line by that empirically estimated proportion.

Three most frequently used poverty indicators have been used: first, the incidence or headcount ratio, second, the depth of poverty (or poverty gap), and third, the severity of poverty. After determining the poverty line the poverty incidence, the poverty depth and the poverty severity were found out.

This technique is being used in developing countries through the World Bank support. It covers few representative households and therefore these data are not available for the development planning at the grassroots level. Also, in the developing countries collection, storing and updating of such data and information for all the households are difficult.

#### *Basic Service Indicators and Poverty*

The Statistical Institute of Ecuador (INEC) generated a number of maps for Basic Services Indicators (BSI) applying the census data of 1990. These maps have been used as general poverty maps to identify geographical pockets of poverty. Separate maps were prepared for urban and rural areas.

The INEC involved seven service-related indicators; each was assigned a certain number of points according to its availability and type of supply. The followings are the indicators with subjective weight.

1. Water supply: Public net (250), Water truck (50), Well (25), Others (0).
2. Sewerage: Public net (150), Septic tank (50), Other tanks (25), None (0).
3. Electricity: Available (100), Not available (0).
4. Tel. Service: Yes (200), No (0).
5. Garbage disposal: Collected (75), Others (0).

3. Promotion of settled agriculture to replace slash and burn cultivation in villages,
4. Participation, and
5. Security.

NRDP of the Lao PDR mentions that Provincial Rural Development Committees (PRDC) have used these criteria to select the focal sites in their provinces. In the list of indicators few are not measurable in quantitative term and few separate indicators are mixed in single indicator. Therefore the mathematical calculation of the indicators for composite indices or sectoral indices is complicated.

#### Thailand

Thailand's National Rural Development Program uses two databases for rural development (NRD-2C and Basic Minimum Needs BMN presented in Annex 3) to identify the areas, which are in need of special attention in order to overcome problem of rural poverty. NRD-2C aims to guide the planner at different levels of planning while BMN aims to get the population involved in examining their own living condition (NRD-2C database and Srisang, 1986). NRD-2C database has 31 indicators, which are covered in six problem groups, namely

1. Infrastructure (4 indicators),
2. Promotion, income and employment (9 indicators),
3. Public health (6 indicators),
4. Water resources (3 indicators),
5. Knowledge, education and culture (6 indicators), and
6. Natural resources and environment (3 indicators).

Level of development is distinguished into three categories, namely poor, fair, and good assigned with 1, 2 and 3 scores respectively for analysis. Villages are categorized from the following criteria

1. (Backward): If more than ten among thirtyone indicators are marked by 1, the village condition is backward. It means the problems are concentrated in that particular area to a degree

technique can further be enhanced by composite index computation for sectoral indicators and mapping.

#### Vietnam

Minot Nicholas (2000) conducted a study in Vietnam aiming to develop a method to generate a geographically disaggregated estimates of poverty by combining Vietnam Living Standard Survey (VLSS) and Agriculture Census data. The VLSS has used a stratified random sample of 4,800 household including 3,840 rural households and 960 urban households, and collected information on household members, housing, fertility, assets, employment, agriculture production, income and expenditure. Minot used these data to estimate the relationship between poverty and twentyfive indicators (including household characteristics and regional dummy variables shown in Annex 4) with regression analysis using probit regression model.

General Statistical Office (GSO) conducted an Agriculture Census in 1994 covering 11.5 million rural households (including non-agriculture households) and collected data and information on household members, housing, land use, animal ownership and assets. The indicator values were computed for the districts and substituted in the same regression analysis model whose unknown parameters were determined from the VLSS data. Poverty indices were generated for each district. The results were presented in the form of poverty maps at the district level using geographic information system.

From his study, Minot concluded that highly disaggregated maps of the incidence of poverty could be generated by combining household survey data and census data. The approach requires two databases with an overlapping set of household variables. Second, household characteristics are individually, fairly weak predictors of rural poverty. Third, household characteristics are much more accurate in predicting rural poverty when combined using probit Regression Analysis. Fourth, the district level poverty maps suggest that rural poverty in Vietnam is strongly associated with distance from cities and coast. Fifth, to maximize the usefulness of census data for poverty analysis, a census should include a wide range of questions on household characteristics that are correlated with income and it should



*Consumption Based Poverty Analysis*

Central Bureau of Statistics has accomplished the Nepal Living Standard Measurement Survey (NLSMS) during 1995 and 1996. Based on this survey, poverty assessment was conducted for Nepal. First poverty assessment was done in 1991 from Multipurpose Household Budget Survey of 1984-85.

For computation of caloric consumption per household, the population was grouped into men, women, infants, children and adolescents. The group was further categorized based on the workload into sedentary, moderate and heavy, as the caloric requirements vary for different groups. The caloric requirement per capita from this method came out to be 2124 kcal per day. This is taken as nutrition poverty line.

Thirtyseven food items generally consumed by Nepalese households were identified. The NLSMS took information on these food items and on other various nonspecific food items and their consumption in different groups through sample survey. These consumption figures were converted to caloric consumption using caloric consumption table. From this computation it is found out that average food caloric consumption per person per day is 1736 kcal. This figure is somewhat lower than the recommended intake of 2137 kcal per person per day. After finalization of the food basket in quantity terms, it was multiplied by average price prevailing in the Rural Eastern and the Central Terai and found out the cost of the food basket. The calculated amount came out to be NR 2637 per person per annum.

Food expenditure is a sub-set of total expenditure. So even if some persons could afford to buy the food basket, they should still be considered a poor if they were unable to purchase essential non-food items. To take this point into account, expenditure on non-food items and expenditure on house was added for total poverty line. The final poverty line was calculated to be NR 4404 per person per annum in real price. Further, the Poverty Incidence, Poverty Gap and Poverty Severity were computed using Foster-Greer-Thorbeck class of poverty measures.

### Similarities and Differences of Indicators

From the review of database of Lao PDR, Cambodia, Thailand, Vietnam, Ecuador, and also of the World Bank and other literatures, it is found out that there are similarities in indicators of different development sectors such as agriculture, infrastructure, institution, health and education. But there are few country specific indicators also. For example Lao PDR has focussed in slash and burn (shifting) cultivation, which is being practiced in the rural areas. Likewise security is another factor that has been emphasized in Lao PDR's focal site criteria. Cambodia's Seila program has focused on seasonal migration, and performances of and number of community-based organizations. Thailand's National Rural Development (NRD-2C) database has included land ownership and land certificate problem. Development indicators of ICIMOD are in line with the theme of the Ninth National Plan of Nepal.

### Poverty and Indicators

Based on the conceptual framework presented in the previous chapter, the broad groups with specific indicators are explained below to understand the interrelationships and linkages with poverty.

#### *Economic Factors*

Three indicators have been taken in this category: 1) average annual per capita income, 2) employment percentage, and 3) percentage of people involved in nonfarm activities. Income consists of agriculture income and nonagricultural income of a household. Nepal Human Development Report (NHDR) prepared in 1998 mentions that income is directly related to the low level of literacy, malnutrition, and ill health. Low-income households have low level of consumption. Employment and entrepreneur lead to the use of the existing stock of capability and to the enhancement of capabilities.

#### *Socio-economic Factors*

Those indicators, which are causes and consequences of poverty

population, 5) landless and marginal landholders, and 6) number of households having food sufficiency less than nine months.

Analysis of 1991 census data shows that eleven Terai origin groups namely Chamar, Dhanuk, Dhusadh, Kewat, Kurmi, Kushwha, Mallah, Mushar, Muslim, Tharu and Yadav are disadvantaged groups. Similarly, Pahadi origin (people of the mountain) groups are Damai, Kami, Sarki and Tamang are educationally disadvantaged. These groups have shown high level of fertility and low level of participation in the white-collar activities (Chettri, 1996). These groups are distributed all over the country. So the higher the number of these groups in VDCs the higher is the poverty.

#### *Women Empowerment*

In general, women are discriminated in Nepal. This situation is the worst in households where food, clothes and money are scarce. This is true and reflected in case of the female children also. They are malnourished and have limited access to education and health care. Women have to work more hours per day than that of their male counterparts. NHDR (1998) mentions that the overall capability attainments in human development in Nepal will be reduced by one-sixth if disparity in men and women capability attainment is taken into account.

Therefore, to assess the status of women and female children, six indicators related to education, health care, occupation and their involvement in administrative decision making body, are included in this group. It includes two indicators related to female children: 1) percentage to girls in primary education, and 2) percentage of girls drop out in primary school. There are other four indicators also related to women: 3) maternal mortality, 4) percentage of females in nonagricultural activities, 5) percentage of female illiterates, and 6) percentage of female in decision making body.

#### *Natural Resources and Environment*

Land distribution, quality of land and supporting arrangement e.g. forestland for fodder and fuel wood and litter, grassland for grazing for livestock, constitute elements of agrarian structure.

the people, but their presence increases the economic activities. In the other hand, these institutions are established where the population threshold permits. Therefore, presence of the higher number of service centers symbolizes prosperous areas.

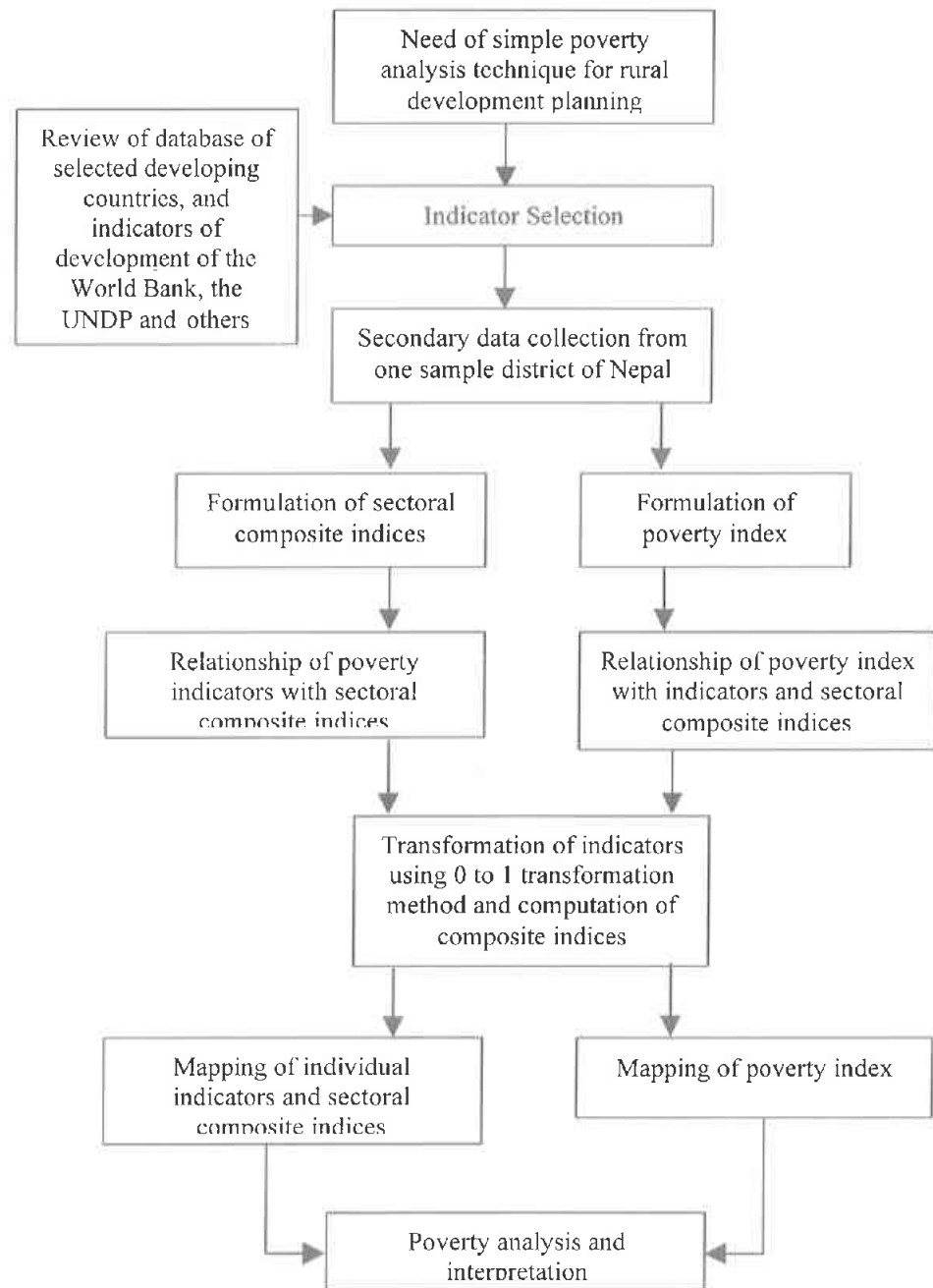


Figure 4. Operational steps followed for the poverty mapping.