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An inventory of Existing Poverty Assessment  
Methods

Working paper for GIS Unit-CIAT

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# **An Inventory of Existing Poverty Assessment Methods**

**Working Paper for GIS Unit, CIAT.**

**By**

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*“ the trouble is, we think that we know about poverty, and that all that remains is to think up ways to do...what? Eradicate it? Reduce it? Alleviate it? Cope with it? Manage it? There are urban and rural poor, and for a few, poverty may be a chosen way of life. Others, though they might live poorly by some standards, don't think of themselves as poor. Still others are poor temporarily, while many who are born into poverty do not expect ever to escape their condition and have come to accept it as in some sense a natural condition. Nor is poverty viewed everywhere, as it is in western countries, as a radical evil that prevents the poor from human flourishing”.*

*Friedmann, J. Empowerment. The Politics of Alternative Development. Cambridge; Blackwell 1992 p55.*

## Introduction

This paper attempts to provide a basis for the development and formulation of a poverty conceptual framework for the poverty mapping project (see appendix 2) in CIAT. An inventory of the existing poverty assessment methods is a necessary step but not sufficient enough in building such a conceptual framework. Nonetheless, it helps in identifying appropriate poverty assessment methods to apply and develop poverty indicators for the mapping process which is a useful starting point for policy design. However, before presenting some of the current methods used in poverty assessment and measurement, it is important to state at the outset that the conceptual understanding of poverty and the context of its application condition the methods used. Despite such prevalent connotations, poverty assessment and measurement methods can be grouped broadly into two. First, the top-down methods which are based on the absolute or relative understanding of poverty. Second, the bottom-up methods which are based on people's perception of poverty, well being and livelihood systems. Through a participatory research approach, the people/ community are able to identify key indicators describing their socio-economic, physical, political and environmental conditions.

In order to present these current poverty assessment and measurement methods, this paper will be divided into three sections. The first section will present some of the current top-down methods in use. And also provide examples of its application and the context. The next section will attempt to articulate some of the bottom-up methods in a similar way. In addition, the two sections will tackle some of the limitations of the methods and provide a critique. Finally, the last section of this paper draws a conclusion and also highlights some of the implications for whatever methods to be implemented to measure and map poverty.

## Current Top-Down Poverty Assessment Methods

The most commonly used conventional top-down methods are drawn from the economics domain. Economists have developed a range of options to measure poverty mainly in monetary terms. They are based on two approaches: an **absolute** or **relative** understanding of poverty.

## **1. The absolute Approach:**

This approach measures poverty in terms of a person or a family having a particular amount of goods and services to meet their basic living requirements. The interpretation of this approach is based on the fact that if a person does not possess such requirements then the person is described as impoverished. Such requirements (goods and services) could be defined to include food, water, shelter and daily calorie intake, however, the determination of what is basic is done by whoever is setting the poverty line.

The main critique with this approach lies in its failure to appreciate the differences and variations in needs over space and time. We live in different geographic environments, with different needs and pressures and different pricing systems that make it difficult to build a universally acceptable poverty line. In addition, the geographic divide between rural and urban areas, the age groups, gender and the physical differences that make the approach error prone. In order to use this approach, reliable data must be collected, an area specific weighting system must be created and the definition of what constitute the basic requirements of a person or family must be done. This will help to reduce the anticipated errors so that the final results are acceptable.

## **2. The Relative Approach:**

The relative approach focuses mainly on one's poverty by his or her income. Let us use a scenario to illustrate a relative approach: supposing the average monthly income of Cali city dwellers is 200,000 pesos, then any person in Cali city with an income below the average is described as being poor. The interpretation of this approach depends on how an average/ or standard income is determined in a given context. Therefore, the main critique with this approach lies in its failure to define what a standard income is. This is because determining what is standard for an area or person is very relative, take for instance, what may be standard in one locality may not apply to another and above all what is standard today may not be standard tomorrow. Let us use the above scenario of Cali city, assuming that 20% population of Cali city falls below the defined average monthly income of 200,000 pesos. Does that mean by topping up the differences of the income among the 20% population described as being poor solve the problem of poverty in Cali city?

The two approaches simply fail to account for other aspects of life like social exclusion, civil strife, marginalisation, powerlessness, voiceless, rootless, isolation and vulnerability that may not be possible

to compute and yet are significant features of poverty. Putting it simply, there are socio-cultural aspects of life that may not be translatable [quantifiable] in terms of goods and services. How do these two approaches account for these factors? The approaches simply dwell on one dimension of poverty, income yet poverty is a multi-dimensional phenomenon.

That notwithstanding, the two approaches have a contribution towards the understanding and measuring of poverty and hence help in planning on how to tackle it. By determining the household income/consumption of individuals they provide necessary indicators that help in monitoring and targeting the problem of poverty. In some studies<sup>1</sup>, adjustments have been done to redress/ accommodate anomalies of incomes and expenditures so as to minimise an over/underestimation of poverty by taking the household expenditures and determining the food and non food expenses. Other studies<sup>2</sup> have used the consumption approach to determine market purchased goods and home purchased goods with education and health considered separately or collapsed together within the market purchased goods. Using the above techniques it is possible to derive household income threshold for areas and to locate which households and socio-economic groups are poverty prone. A general measure of welfare<sup>3</sup>, for example is derived by using the following variables:

- Total Household Income
- Total Household Expenditure
- Per Capita Household Income
- Per Capita Household Expenditure
- Total Household Income per Adult Equivalent
- Per Capita Food Consumption
- Proportion of Household Budget Spend on Food.

However, due to variations in requirements among the age brackets different weights are recommended such as:

|                   |       |
|-------------------|-------|
| Above 17 years    | = 1.0 |
| Age 13 - 17 years | = 0.5 |
| Age 7 - 17 years  | = 0.3 |

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<sup>1</sup> See LSMS Studies done by the World Bank such as the Nicaragua Poverty Assessment in 1995.

<sup>2</sup> See Demery (1993) Understanding the Social Effects of Policy Reform. Pp54 - 57.

<sup>3</sup> Ibid.

Age less 7 years = 0.2

### Some Examples of Applications

- 1□ The Head Count Index (HDI). It is based on the proportion of the population with income or consumption below the accepted and defined level required to meet per capita minimum nutrition/ or requirements.
- 2□ International Fund for Agriculture Development (IFAD) approach<sup>4</sup> of poverty measure at national level, based on food security index, relative welfare index, integrated poverty index and basic needs index. The last two are derived from income and consumption data.
- 3□ Social Dimensions of Adjustment (SDA)<sup>5</sup>/ World Bank based on Household expenditure measurements which are aggregated from consumption's expenditure on food, consumption of home production of non food items, non food expenditures, remittances paid out and imputed value of wage income in kind.
- 4□ Living Standard Measurement Survey (LSMS)<sup>6</sup>/ World Bank based on total per capita monthly expenditures derived from food/ non food expenses. In Nicaragua, for instance, due to biological variations in caloric requirements of different age groups and genders, the following weights were adopted, for more than 18 years, between 10 to 17 years and less than 10 years weights of 1.0, 0.91 and 0.61 were given respectively. With a minimum caloric intake set at 2226 per adult.

Given the criticisms within the absolute and relative approach, **other methods** have been developed to complement . Some of these multi-dimensional measures include:

- 1□ The Human Development Index (HDI)<sup>7</sup> developed by UNDP is meant to determine a composite measure of human progress. It calculates the average level of human capabilities by taking the national income with two social indicators; adult literacy and life expectancy. The index is derived from set minimum and maximum values of life expectancy (25 and 85 years), adult literacy (0% and 100%), combined (primary, secondary and tertiary) enrolment ratio (0% and 100%) and real GDP per capita (PPP\$100 and PPP\$40,000) with a threshold level for the average world income set at PPP\$5711. An educational attainment index is derived from the adult literacy and the combined enrolment ratio. Through a series of calculations, an index is derived for each of the three variables

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<sup>4</sup> See also appendix 1.

<sup>5</sup> See more details in the reference cited in this paper from World Bank Reports.

<sup>6</sup> See the Guidelines to LSMS studies as provided by the World Bank.

<sup>7</sup> See also appendix 1.

and the summation of them gives the HDI. This method is currently being used to map poverty in the West African region. In a GIS environment the index is linked to biophysical data (agroclimatic zones and land degradation) and socio-economic data (population density and accessibility) to produce a series of maps for each indicator and an aggregated poverty map of the region.

- 2□ The Capability Poverty Measure (CPM) also developed by UNDP, is based on a person's material standard of living which is assumed to determine his well-being. The major difference between the HDI and CPM is that the former measures human capabilities and the latter dwells on the lack of capabilities and does not include income in its calculations. The CPM considers three variables by taking the percentage of children under five who are under weight, the percentage of births unattended by untrained health and the percentage of women aged 15 years and above who are illiterate, the percentage of population with less capability are sought. These are given the same weighting and the average of the three variables is the value of CPM.
- 3□ The E delbecq-delphi method based on those who possess a wealth of experience on the study area. These persons are drawn to help to define and develop the poverty profile. For Vulnerability mapping in Bangladesh, four panels were drawn from technical experts, aid distributors, senior retired government officials and village elders to rank and provide weight for defined indicators. In another example, in Zimbabwe Poverty Assessment, a team of 28 community based researchers were drawn from 16 districts to build a poverty profile at district level for the socio-economic groups, accessibility and constraints to achieve sustainable livelihoods.

The next section of this paper focuses on other approaches that measure poverty using people centred vision. It should be noted that this last method [the E delbecq-delphi] presented lies in the grey area between the bottom-up and top-down methods of poverty assessment and measurement..

## **Current Bottom-up Poverty Assessment Methods**

The driving force behind bottom-up poverty assessment methods is to be found within the on-going people-centred sustainable development paradigm. This paradigm advocates for a people-centred development: the people must be the main stakeholders of development; people must be able to identify, communicate and solve their developmental problems. Putting it another way, nobody moves people out of their helplessness situation, it is them who know the situation and therefore it is them to solve that situation. Having given the above background, it is imperative to dwell on the approach itself.



This approaches can help to provide micro-level information about poverty so that the right development programs could be sought and implemented. The major bottom-up poverty assessment approaches can be grouped into three. These include:

- 1□ Participation in poverty assessment (PPA)
- 2□ Participatory rural appraisal (PRA)
- 3□ Beneficiary assessment (BA)

The last two methods share many core techniques as it will be illustrated in this paper. PRA and BA use conversational and semi-structured interviews, focus group interviews and participation observation. The former also focuses at community level rather household level using other techniques like thematic mapping, wealth and preference ranking and a range of other options depending on the participators' objectives. We must also try to distinguish between PPA and PRA before presenting the discussions below. The major difference is that PPA selects participators so suffers the danger of being exclusive whereas the PRA includes all the members of the community under study. In order to systematically tackle the proposed methods, the next sub-sections will summarise these approaches separately, emphasising their strengths and weaknesses.

### **1. Participation in Poverty Assessment (PPA)**

PPA is based on a multi/broad stakeholders input to assess poverty with an aim of building a strong in-country capacity response to the problems of the poor. It is envisaged that with the participation of government and other institutional stakeholders in all aspects of work, sensitivity will be enhanced when dealing with poverty issues, there will be an improved level of analytical thinking among the key actors and a willingness towards fighting poverty. PPA approach involves the identification of key actors like senior government official, NGOs, local researchers selected from academic institutions, opinion leaders, civic leaders and other participators deemed appropriate. It should be noted that the E delbecq- delphi method (discussed in the previous section) has some kind of similarity with this PPA method. Possibly what separates the two methods could be the use of different concepts and the manner in which it is conducted. Putting that aside, the PPA method has number of advantages- first, it offers the capacity to build a poverty profile on the basis of local skills and knowledge and second, it also spreads the ownership base especially knowing that poverty is a very sensitive social issue. I think, the major weakness with this approaches lies in it having so many actors probably with different interests

and orientations which hamper the process due to crossing cutting issues, so a clear research focus is a must to help minimise this problem.

This method has been applied in several countries. In Cameroon, it involved the National Statistical Office in preparing poverty profiles and the Centre for Nutrition Research in addressing food insecurity issues with a number of other Donor agencies, local NGOs, advocacy groups and research institutes participating. A poverty alleviation policy formulation in Peru and the potential of women groups in Kenya were approached using this method.

## **2.2 Participatory Rural Appraisal (PRA)**

PRA has a range of techniques that are not only used in poverty assessment but used in community resource assessment, development of community action plans and research purposes. The method suffers from the danger of raising people's expectations and people may not be willing to participate if there are no tangible incentives. Making it vulnerable to community power structures the participatory researchers may never be able to hear the voices of hard core poor who experience extreme social exclusion. Despite such limitations PRA methods have been very successful in getting communities together and engineering people centre sustainable development. It is also able to explore how the people perceive poverty.

In order to overcome the above weaknesses, the inception stage is very important in winning community trust and co-operation- so it may be important for the PRA researchers to spend some time with the community clarifying their purpose and using facilitators drawn from within. This method has been applied in so many countries, we will draw on specific examples that relate to poverty studies. In Vietnam, ActionAID (a British NGO) used a wealth-ranking exercise to produce a village ranking list that highlighted significant socio-economic differences between villages. The World Bank initiatives in Zambia and Burkina Faso used wealth-ranking techniques and simple "point and shoot" cameras in poverty studies respectively. In Zambia, villagers were asked to sort a stack of cards each labelled with name of a head of household, into piles according to relative wealth of households using any criteria they wished. This method is currently being implemented for CIAT poverty project in 90 households selected from rural Honduras.

### **3.3.3 Beneficiary Assessment (BA)**

This method provides qualitative input because it focuses on human conditions that have a bearing on poverty, motivation factors, delivery systems and institutional factors, and their significance in relation to limiting available options and opportunities. Also the importance of the informal and formal safety nets are examined while considering these factors. Through a systematic link with project beneficiaries and key stakeholders, this method facilitates participation and offers a feedback so as to incorporate any outstanding feedback when formulating the project and its implementation. Actually, it is a vehicle for reaching the 'hard to reach' beneficiaries and provides a voice for the poor to be heard. We describe this method as a process-oriented approach, because the first stage results are an input into the second stage and likewise.

The main critique with this method, is that it may be too demanding in terms of getting to the bottom of the problem and then prepare mechanisms to respond- it simply requires a lot of time. This will depend mostly on the in-built communication networks between the Task Managers and the Project beneficiaries on the one hand, and the Task Manager and other stakeholders on the other hand. The actors must possess good communication skills to deliver and to interpret the incoming and outgoing messages during the communication process. So good communication skills are a pre-condition for the method to function appropriately.

This method has been used in Mali in an education project aimed at understanding why parents in rural areas did not send their children to school, and why the attendance of girls was extremely low. The study discovered revealed that transportation and feeding costs compared with the opportunity costs of losing the children's labour at home outweighed the benefits of a poor quality education with few prospects for finding a job. The results led to policy reformulation in order to reduce beneficiaries costs by building schools in closer proximity, increase girl school attendance and attainment by including and emphasising a girl's component, and enhancing teacher training capacity.

## **Conclusion**

The first step in developing a poverty map whether using a manual technique or GIS is the identification of the right poverty assessment and measurement methods. Given the above methods, the

biggest challenge is how to integrate the top-down and bottom-up approaches within the poverty assessment framework while appreciating the limitations of each. The methods should be seen as complementing each other: by using both quantitative and qualitative poverty assessment techniques you help fill gaps and hence narrow the errors to get a good result.

A careful poverty definition will enhance a proper selection and establishment of the right poverty measure and therefore an appropriate poverty map can be developed. Mapping should be seen as a tool for policy design, as a tool for the spatial understanding of poverty, as tool for locating and identify who the poverty people are and therefore be able to demarcate the most severe poverty areas, severe poverty areas and less severe poverty areas and focus differently given their different poverty depth. We will also argue that if a wrong poverty assessment method is sought then the mapping process is bound to be error prone since mapping only brings in the spatial component of poverty so that the physical-physical, physical-human and human-human poverty factors can be analysed, understood and also their relationships exposed. Given the flexibility of GIS as a data visualisation tool and its capabilities, it provides this most needed environment required to manipulate several poverty data types and build an aggregated poverty map. A series of other poverty indicators according to different viewpoints can be produced so that the decision makers have a range of choices to aid decisions and policy formulation. Being able to up-date the databases in order to address the temporal dimensions of data is yet another of the advantages the GIS adds to efforts aimed at reducing poverty.

So the ability to put the right poverty facts and figures on the map lies in the choice of techniques selected to assess and measure poverty. And in order to arrive at this point, an integrated choice of poverty techniques in the context of the study area is an important step in developing a practical working model for poverty mapping.

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# Appendix 1

## 1. Human Development Index

In order to calculate the HDI, first individual indices are computed according to a general formula:

$$\text{Index} = \frac{\text{Actual } X_{(i)} \text{ Value} - \text{Minimum } X_{(i)} \text{ Value}}{\text{Maximum } X_{(i)} \text{ Value} - \text{Minimum } X_{(i)} \text{ Value}}$$

However, the construction of the income index is based on Atkinson's Formula where ( $y^*$ ) is the average World threshold income level.

$$\begin{aligned} W(y) &= Y^* \text{ for } 0 < Y < Y^* \\ &= Y^* + 2[(Y - Y^*)^{1/2}] \text{ for } Y^* \leq Y \leq 2Y^* \\ &= Y^* + 2(Y^{*1/2}) + 3[(Y - 2Y^*)^{1/3}] \text{ for } 2Y^* \leq Y \end{aligned}$$

In order to calculate the discounted value of the maximum income of PPP\$40,000, another Atkinson's formula is used.

$$W(Y) = Y^* + 2(Y^{*1/2}) + 3(Y^{*1/3}) + 4(Y^{*1/4}) + 5(Y^{*1/5}) + 6(Y^{*1/6}) + 7(Y^{*1/7}) + 8[(40,000 - 7Y)^{1/8}]$$

The Discount value of the maximum income of PPP\$40,000 is \$6040

An example is computed to illustrate the above method, three countries are drawn from Latin America.

| Country   | Life Expectancy (years) | Adult Literacy % | Combined Enrolment Ratio % | Real GDP per capita (ppp\$) |
|-----------|-------------------------|------------------|----------------------------|-----------------------------|
| Colombia  | 69.4                    | 90.6             | 68                         | 5790                        |
| Honduras  | 67.9                    | 71.4             | 61                         | 2100                        |
| Nicaragua | 67.1                    | 65.0             | 61                         | 2280                        |

### Life Expectancy Index

$$\text{Colombia} = (69.4 - 25) / (85 - 25) = 44.4 / 60 = 0.74$$

$$\text{Honduras} = (67.9 - 25) / (85 - 25) = 42.9 / 60 = 0.715$$

$$\text{Nicaragua} = (67.1 - 25) / (85 - 25) = 42.1 / 60 = 0.702$$

### Adult Literacy Index

$$\text{Colombia} = (90.6 - 0) / (100 - 0) = 0.906$$

$$\text{Honduras} = (71.4 - 0) / (100 - 0) = 0.714$$

$$\text{Nicaragua} = (65.0 - 0) / (100 - 0) = 0.65$$

### Combined Primary, Secondary and Tertiary Enrolment Index

$$\text{Colombia} = [2(0.906) + 1(0.68)] / 3 = 0.831$$

$$\text{Honduras} = [2(0.714) + 1(0.61)] / 3 = 0.679$$

$$\text{Nicaragua} = [2(0.65) + 1(0.61)] / 3 = 0.637$$

Adjusted real GDP per capita (PPP\$) index, since the GDP of Colombia is higher than the pre-determined world threshold income then adjustments will be made to the figure.

$$A\_GDP = [5,711 + 2(R\_GDP - 5711)^{1/2}]$$

$$\text{Colombia} = [5,711 + 2(5790 - 5711)^{1/2}]$$

$$= 5,711 + 17.7$$

$$= 5,729$$

$$\text{Colombia} = (5729 - 100) / (6040 - 100) = 5629 / 5940 = 0.948$$

$$\text{Honduras} = (2100 - 100) / (6040 - 100) = 2000 / 5940 = 0.338$$

$$\text{Nicaragua} = (2280 - 100) / (6040 - 100) = 2180 / 5940 = 0.367$$

Human Development Index got by dividing the sum of the three indices by 3.

| Country   | Life Expectancy Index | Educational Index | Adjusted real GDP per capita Index | $\Sigma$ | HDI   |
|-----------|-----------------------|-------------------|------------------------------------|----------|-------|
| Colombia  | 0.74                  | 0.831             | 0.948                              | 2.519    | 0.839 |
| Honduras  | 0.715                 | 0.679             | 0.338                              | 1.732    | 0.577 |
| Nicaragua | 0.702                 | 0.637             | 0.367                              | 1.706    | 0.568 |

## 2. IFAD Approach

This approach is largely suitable for large scale poverty mapping.

The food security index (FSI) is computed using this formula:

$$FSI = 0.77 \left\{ \frac{x1}{(1 + x6)} \right\} (1 + x2)^{20} + 0.23 (0.23 x4 \left\{ \frac{x3}{(1 + 5)} \right\})$$

x1 represents per capita daily calorie supply as a percentage of requirements

x2 the annual growth rate of per capita daily energy supply

x3 the food production index

x4 the self sufficient ratio

x5 the production variability

x6 the consumption variability

All variables are normalised by dividing by 100. The FSI attempts to provide the composite food security situation of a country.

The Integrated Poverty Index is derived as follows:

$$IPI = [x5\{x2+(1-x2) x7\}] / x4$$

Where:

- x1 represents per capita Gross National Product (GNP)
- x2 the income-gap ratio =  $(\max x1 - x1) / \max x1$ , with  $\max x1$
- x3 the per capita GNP annual growth rate
- x4 the per capita GNP growth factor =  $1 + x3$
- x5 the percentage of the rural population below the poverty line
- x6 life expectancy at birth
- x7 life expectancy at birth factor
- x3 and x5 are normalised by dividing by 100

#### Basic Services Index

##### Educational Status Index (ESI)

$$ESI = \frac{1}{2} (x1 + x3)$$

- x1 is the adult literacy rate
- x2 the primary school enrolment rate as a % of age group
- x3 the adjusted primary enrolment rate
- x1 & x3 normalised by dividing by 100

##### The Health Status Index

$$HIS = 1/5 [(1 - x5) + (1 - x7) + x8 + x9 + x10]$$

- x4 is population per physician
- x5 is physician per head of population factor
- x6 is the infant mortality rate per 1,000 live births
- x7 is infant mortality factor
- x8 percentage of rural population with access to health services
- x9 percentage of rural population with access to safe water
- x10 percentage of rural population with access to sanitation
- x8, x9 and x10 are normalised by 100

Then Basic Service Index (BSI) =  $\frac{1}{2} (ESI + HSI)$

To derive the Relative Welfare Index =  $\text{adjusted FSI} + (1 - IPI) + BNI / 3$ .

## Appendix 2

### Poverty Mapping Project

I propose that the scale of operation for mapping poverty in Honduras be made in medium scale to depict the poverty conditions. There are three levels that can be used to implement poverty mapping: the watershed, the village and household. We can also work to map poverty from the administrative structures existing in Honduras but limit it to municipio level. There are 291 municipios within the 18 departments representing a total of 3792 villages (according to 1988 population census), so working with municipios will allow us to compare the variations (magnitude) of poverty in Honduras.

The census data can be used to derive village data, demographic data, some education data, some employment data, some health and sanitation data but we need more detailed shelter data, nutrition data, education data, health data and income data.



It should be noted that studies conducted in Honduras reveal that single female households, self employed or landless people and small farmers having small land are more vulnerable and prone to poverty. Therefore, maps representing such characteristics are important because they will assist to locate these socio-economic groups. Other maps showing households with highest number of dependants, an education map, health map, income level map, gender map will also be relevant for poverty mapping. We can also produce the rate of educational attainment index map, basic needs index map, health status index map, shelter status map, mobility map and a radar chart showing geographic regions and 8 major indicators drawn from the socio-economic and environmental dimensions (4 major indicators drawn from the two sets of indicators). The most important thing is to provide some level of intelligence to these maps so that the end users have multiple functions for them and can use the maps flexibly.

## Description of the Indicators

Types of indicators:

### Socio-economic and Environmental indicators.

1. Income and Consumption (volume of goods and services at municipio/ village level).
2. Education indicators like enrolment rates, number of schools, access to school, literacy rates, student teacher ratio and wastage rates.
3. Health indicators like number of health facilities, accessibility, infant mortality rates, safe water, sanitation, number of doctors and primary health care facilities.
4. Shelter quality using the types of materials used for construction must be locally defined and derived.
5. Nutrition data can be extracted from LSMS.
6. Bio-physical data: land cover, slope, climatic data, soil, protected areas, rivers.
7. Common diseases
8. Other relevant data types: road information, electricity, telephones etc.

Justification of the identified set of indicators and their limitations. Placed in the context of either the community or the technical knowledge of the person in charge of evaluation. An overlay of these various indicators in Geographical Information System will allow a spatial evaluation and correlation of poverty.

### Should be able to answer the following questions?

What kinds of poverty and social exclusion exist in the area? Where they are, who is affected, what are the causes and what action is needed?

What is it like to live on a low income? What do these people need? What are their needs? What are their priorities?

What are the common property resources? Who are involved? What needs to change?

## A Proposed Human Needs Index (HNI)

Given the difficulty of getting the volume of goods and services at village or household level and in order to work with the current data, I suggest a slight modification of the indices. I have coined the index - the Human Needs Index (HNI). It measures the rate of attainment in education, the health status and shelter quality of the village. These are considered important variables because they measure the level of human progress. These variables cross cut most aspects of human life and quality. So it is an aggregated composite measure that will help in conceptualise poverty. In order to complement the poverty mapping exercise, LSMS and FHSS results will also be included.

To derive the HNI, the following indicators are used enrolment rates, literacy rates, shelter type and access to services, for example, latrines, safe water. These steps are followed:

1. Calculation of Combined Enrolment Ratio(CER). The minimum and maximum values have been set like for the Human Development Index (HDI) at 0% and 100% respectively. For primary enrolment rates will mean number of children attending school, secondary enrolment rates those who are attending second level education and tertiary enrolment rates represented by x, y and z variables respectively. So that average of the total of the variables is used to get CERI

$$\Sigma \text{CER} = \frac{\% x + \% y + \% z}{3}$$

So that  $(\Sigma \text{CER} - 0) / (100 - 0) = \text{CERI (Combined Enrolment Ratio Index)}$

2. Adult Literacy Rates (the same assumption is held) so  $\text{ALI} = (\text{ALR} - 0) / (100 - 0)$ .

To derive the educational attainment index (EAI) =  $[2(\text{ALI}) + 1 (\text{CERI}) / 3$

3. Calculation of Shelter Quality Index (SQI), housing status is classified as follows: Permanent dwelling features used to identify include: Construction Materials used for roofing and building the wall, such dwellings score a weight of 1.0, then semi-permanent dwellings are given a score of 0.6 and the temporary dwelling (squatters settlement and the make shift structures) are scored by 0.2.

The shelter quality index is derived by the summation of the three variables divided by three.

4. The Health Status Index (<sup>HSI</sup>~~HNI~~) using available data on IMR, latrines and access safe it is simply calculated by the dividing the number of variables used and all weighted on the same scale.

Therefore in order to derive the HNI, summation of all the indices is calculated using this formula:

$$\text{HNI} = \frac{\text{EAI} + \text{SQI} + \text{HSI}}{3}$$