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## MULTIDIMENSIONAL POVERTY: A REVIEW AND ANALYSIS OF ITS THEORETICAL CONCEPTIONS AND MEASUREMENTS

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### Abstract

These days, poverty is being increasingly recognized as an inherently multidimensional phenomenon. In recent years, a consensus has emerged among those studying and making policies related to individuals' well being: poverty is best understood as a multidimensional phenomenon. The definitions of poverty range from income and consumption based to others that emphasise its multi-dimensional nature by highlighting its manifestations which cover—lack of productive resources to sustain livelihoods, limited or no access to basic services such as water, health and education, hunger and malnutrition, increased morbidity and mortality, living in an unsafe or insecure environment, poor or no housing, lack of participation in social, cultural and political life, social discrimination or exclusion etc. The measurement of multidimensional poverty involves three fundamental steps: selecting the space, deciding who is poor and aggregating the information of the poor. The fundamental step of deciding 'who is poor' is the identification which entails counting the number of dimensions in which people suffer deprivation. After a measurement methodology has been chosen, the design of poverty measures—whether unidimensional or multidimensional—require a series of normative choices. These choices relate to the space of the measure, its purpose, unit of identification and analysis, dimension, indicators, deprivations cut-offs, weights and poverty line. In recent years, poverty has been seen as an 'endemic disease' as its persistent afflictions in developing countries has become unbearable. Governments in developing countries as well as other development agencies have devoted much of their attention and budgets towards its reduction to no avail. Under this backdrop this study wants to review the concept of poverty and its measures in the literature. It establishes that poverty is multidimensional in nature and extent and therefore, has to be approached multidimensionally. A multidimensional approach moves away from the traditional unidimensional approach by arguing against the focus on a single dimension—in particular a monetary dimension—as a sufficient proxy of human well-being.

**Key words:** Poverty, Measurements, Dimensions, Well-being, Deprivations, Indicators, Absolute Poverty, Relative Poverty.

### 1. Introduction

Poverty and inequality are found in almost all contemporary societies, although they are more visible and manifest in some societies than in others. It is undesirable and intolerable state of affairs which is considered as a social, economic, political or psychological problem. In recent years, poverty and inequality is considered as an 'endemic disease' as its persistent afflictions in developing countries has become unbearable. The well-being of many populations has been jeopardised by poverty and inequality. These days, poverty is being increasingly recognized as an inherently multidimensional phenomenon. In recent years, a consensus has emerged among those studying and making policies related to individuals' well being: poverty is best understood as a multidimensional phenomenon. However, views differ among analysts regarding the relevant dimensions and their relative

importance. Welfarists stress the existence of market imperfections or incompleteness and the lack of perfect correlation between relevant dimensions of well being (Atkinson, 2003; Bourguignon and Chakravarty, 2003; Duclos and Araar, 2006) which makes the focus on a sole indicator such as income somewhat unsatisfactory. Non-welfarists point to the need to move away from the space of utilities to a different and usually wider space, where multiple dimensions are both instrumentally and intrinsically important. Among the Non-Welfarists, there are two main strands: the basic needs approach and the capability approach. (Duclos and Araar, 2006).

## 2. Conceptualizing Poverty

The word 'poverty' and its adjective 'poor' represent an ancient concept which expresses social differences between man and man. It was coined long before the social sciences came up with the notion of social stratification (Gupta, 1984). 'Poverty' is generally used as if its meaning is clear, but this is not the case. It is a value loaded term which differ in denotation in accordance with culture and economic development. Kosa (1969) distinguishes four possible attitudes towards poverty—

- i. Poverty is taken for granted and its existence is not perceived;
- ii. Poverty is taken for granted and its existence is perceived;
- iii. Poverty is not taken for granted and its existence is perceived;
- iv. Poverty is not taken for granted and its existence is not perceived”.

Thus, from above it is clear that, it is very much hard and complex to define 'poverty' and as such many different meanings and definitions are resorted to in the development field. Further, what one understands by 'poverty' varies considerably from one locality to another and from one period of time to another. The definitions of poverty range from income and consumption based to others that emphasise its multi-dimensional nature by highlighting its manifestations which cover –lack of productive resources to sustain livelihoods, limited or no access to basic services such as water, health and education, hunger and malnutrition, increased morbidity and mortality, living in an unsafe or insecure environment, poor or no housing, lack of participation in social, cultural and political life, social discrimination or exclusion etc. (Eldis, 2013).

Poverty has traditionally been defined in terms of income or consumption. Thus, it is “the inability to attain a minimum standard of living” (World Bank, 1990). The minimum standard of living defines the income poverty line and all persons whose income is less than this poverty line, fall in the category of poor. Most of the countries calculate poverty lines by calculating how much it costs to obtain enough food usually in terms of a calorie norm of around 2000 calories per day. Sometimes, this norm is set differently for people undertaking manual work and sometimes different calorie standards are defined for men and women. To calculate the poverty line, it is necessary to convert the minimum nutritional level of 2000 calories into expenditures i.e. the cost of calories is to be calculated. In other words, given all the foods in the market, as well as the calorie content and prices of each, what is the amount of money that is needed to buy a bundle containing 2000 calories? Once this expenditure level is obtained, the poverty line is defined at this particular level of expenditure.

According to Valentine (1968), the term 'poverty' refers to “the state or condition of having little or no money, goods or means of support or to a condition of being in want of something that is needed, desired or generally recognized as having value”. This implies that there are variable degrees of poverty depending upon different status or conditions of the

poor. It follows, however, that the essence of poverty is inequality or some degree of deprivation. Thus, poverty is historical in nature, its meaning changes in the spatio-temporal dimension. The state of being poor in the United States or the U.K. is different from the state of being poor in India. Thus, there is a long tradition of debate as to whether poverty is absolute or relative, whether it is subjective or objective. (Miller and Devey; Wedderburn, 1981).

Differently expressed, there are two basic approaches to the conceptualization of poverty: Absolute and Relative (Fuchs, 1965, Ridgers, 1974; Korpi, 1980)

### **2.1 Absolute Approach to the Definition of Poverty**

There are two versions of the absolute definition of poverty: Bourgeois and Marxist. The bourgeois theorists try to define poverty in relation to human physiology and in terms of subsistence levels of nutrition. The Marxists treat the subsistence minimum as being more than physiologically determined. They include both natural and necessary wants. Marx said-

“The workers’ natural wants, such as food, clothing, fuel and housing vary according to the climatic and other physical conditions of his country. On the other hand, the number and extent of his so-called necessary wants .....are themselves the product of historical development, and depend, therefore, to a great extent , on the degree of a civilization of a country”,(Baran and Sweezy,1966).

Following this line of argument, Baran and Sweezy (1966) defined poverty as “the condition in which those members of a society live whose incomes are insufficient to cover what is for that society and at that time the subsistence minimum”.

Some scholars argue that “poverty has to be identified with deficiency in the total level of living which includes not only energy requirements but also balanced diet needed for health, and the other basic needs essential for human existence at a tolerable level (Rao, 1977).

### **2.2 Relative Approach to the Definition of Poverty**

At the other extreme, it is argued that poverty is essentially a relative phenomenon. Several scholars have opted for a relative definition of poverty. The relative approach defines poverty as the position of the individual vis-à-vis his society, primarily in terms of the distance between the poor and the average or minimum standard of living in the society concerned, thereby making poverty one aspect of inequality (Gupta, 1984).The definition of the poverty line may be in absolute terms at a point of time, but what it measures is relative deprivation, and it, therefore, changes as the characteristics of the society concerned change.

The relative definition of poverty has been accepted by both American and European researchers in the post-war years (Galbraith, 1950, Miller and Roby, 1970, Rainwater, 1974). The adherents of this approach have rejected the definition of poverty based on a specific subsistence income level. Instead, they have defined in relation to society as whole. Relative deprivation occurs when there is a significant disjunction between the living conditions of many in most of the societies and the population that might be denoted as poor. Gabraith writes:

“...people are poverty-stricken when their income, even if adequate for survival, falls markedly behind that of the community. Then they cannot have what the larger community regards as the minimum necessary for decency and they cannot wholly escape, therefore, the judgement of the larger community that they are indecent. They are degraded;

for, in the literal sense, they live outside the grades or categories, which the community regards as acceptable..." (Galbraith, 1950).

Thus, a definition of poverty in relative terms, involves more factors than one based on income adequate for subsistence. The latter considers the critical issue to be the result of income distribution on a given society. A measure of relative deprivation brings more people under poverty than the official counts. The relative approach in the conceptualization of poverty transcends the economic biases of much poverty research which are limited only to gross measure of personal or household incomes.

The relative deprivation definition of poverty is, however, not free from shortcomings. First, it underplays the importance of the levels of the poverty line for characteristic of the poor. It is only the poverty-line which tells us how many people are below it, how far below it they are, and how many are near to the poverty conditions. Thus, the composition issue of poverty remains neglected, if one adheres merely to the relative approach (Gupta, 1984). Secondly, the relative deprivation approach is not a "scientific exercise". It is, in fact, a value issue, like most questions of statistics. There are some who attempt to combine the absolute and relative factors. Sen (1978), for instance, includes inequality among the poor in the index of poverty.

### **3. A Universal Minimum Standard**

In order to define poverty, there ought to be a minimum standard that should be applied to all societies below which individuals can be said to be in poverty (Klugman, 2002). The poverty line or minimum standard is based on subsistence and so, it was earlier believed that 'people are in poverty if they do not have the material resources to physically maintain human life (Haralambos, Holborn & Herald, 1991). These days, poverty is considered as living below the acceptable social standards or threshold. But relativists argue that a definition of poverty should be related to a particular standard of a particular society at a particular time. Thus, poverty line varies according to how affluent that society is. It is a complex issue to define poverty (Eldis, 2009; Lauer, 1998).

From another point of view, poverty can be considered as a state of multiple deprivation of individuals or group or communities of their well-being. Because of this deprivation, people lack or are deficient in their socio-economic and psychological capabilities which are manifested in the lack of income, lack of access to basic services, lack of access to assets, limited social networks or social capital. Poor are hungry, they lack shelter, clothing, schooling and also cannot access health care services. They are more prone or vulnerable to exogenous negative events (Greig, Hulme & Turner, 2007).

According to World Bank Report (2001), poverty is deprivation which encompasses not only material (i.e., income and basic needs or services) but also non-material aspects such as vulnerability, voiceless, powerlessness, mental or psychological indispositions. Thus, from the foregoing discussion, we can say that, one generally accepted conclusive definition and meaning cannot be found for poverty, due to its manifold manifestations and dimensions of deprivations. Still, it can generally be defined and conceptualized as:

"A condition of being deprived of well-being, being vulnerable to events outside one's control, being isolated and living below the acceptable socio-economic norms or prescriptions of society and psychologically and politically indisposed". (Narayan et al;2000).

Thus, the concept of poverty considered so far is to mean that people are "poor when they have both a low standard of living and a low income". It is a condition of absence of

well-being and a condition of ill-being. So, Ringen (1987) defines poverty precisely as having 'low standard of living', meaning deprivation in way of life because of insufficient resources to avoid such deprivation. In conceptualizing poverty, the World Bank (2001) is of the view that poverty is income based although it accepts poverty as encompassing not only material deprivation but also low achievement in education and health. The Bank prioritizes income as the key measure of poverty by distinguishing between 'the poor', who live below a US dollar 2 a day poverty line and the 'extreme poor', who live on less than US dollar 1.25 a day. These are absolute measures of poverty (i.e., the measures which quantify the numbers of people living below a certain threshold). Therefore, poverty is an income level below some minimum level or below threshold necessary to meet basic needs, which is called the 'poverty line' that varies across time and societies.

#### **4. Different Types of Poverty**

From the above analysis and discussions, poverty can be distinguished reflecting its various meanings. In our study, we can differentiate poverty as Income Poverty, Human Poverty, Food Poverty, Absolute Poverty, Relative Poverty, Case Poverty, Community Poverty, Chronic Poverty, Transitory or Transient Poverty etc. Income Poverty is the lack of money and inability to gain access to income generating employment and it depends on a single factor, income; while Human Poverty refers to deprivation in certain essential aspects of human life which is multidimensional. It reflects the distribution of progress and backlog of deprivation that still exists. Food Poverty is considered as the inability of the individual to obtain one decent and nourishing square meal a day (UNDP, 1998). De Beer and Swanepoel (2000) mention about the Case Poverty and Community Poverty where they consider Case Poverty as occurring when individuals do not share in the general well-being of the society. Specific individuals may be experiencing poverty while the general society is experiencing prosperity. On the other hand, Community Poverty occurs when almost everyone in the community is poor. Further, depending on the levels of deprivation or disadvantage experienced, we can have 'relative' and 'absolute' poverty. Absolute poverty refers to a below absolute standard of minimum requirements, while relative refers to falling behind most other in the community (Lauer, 1998). Absolute poverty refers to a situation where incomes are low and the minimum living standards cannot be maintained. This means '...a person is so poor that his next meal may mean the difference between life and death' (De Beer and Swanepoel, 2000). Relative poverty refers to the poverty of one entity or community in relation to another. This type of poverty determines whether one has fallen behind most others by comparison. In doing so one would find that the poor in one community in relation to or compared to others may not be really poor. Thus, Relative poverty can be equated to 'Case Poverty'. Moreover, Absolute Poverty refers to a desperate situation and Relative Poverty refers to a comparison of levels of poverty. Chronic Poverty which is also known as persistent poverty refers to poverty of long duration. Currently, it is this aspect of poverty and that of transient poverty that are attracting the interest of poverty analysts and being discussed more in Development Economics literature. Chronic poverty is the poverty of those who are poor and most of their lives transmit poverty to subsequent generations. Unlike Chronic poverty, transient or transitory poverty occurs over a short period of time when one moves from 'non-poor' to 'poor' for a short period and moves back to non-poor.



Some development economists have argued in recent years that although income focuses on an important dimension of poverty, it gives only a partial picture of the many ways human lives can be blighted. As noted by the Human Development Report (1997), "Someone can enjoy good health and live quite long but be illiterate and thus cut-off from learning, from communication and from interactions with others. Another person may be literate and quite well educated but prone to premature death because of epidemiological characteristics or physical disposition. Yet, a third may be excluded from participating in the important decision-making processes affecting his/her life". Poverty is thus a denial of choices and opportunities for living a tolerable life. This is the concept of human poverty. It means that opportunities and choices are most basic to human development are denied to lead a long, healthy, creative life and to enjoy a decent standard of living, freedom, dignity, self-respect and respect of others.

### **5. Poverty as Capability Deprivation**

Sen (2000) has defined poverty in terms of 'capability deprivation'. This concept is akin to the concept of human poverty. According to Sen, "in analyzing social justice, there is a strong case for judging individual advantage in terms of the capabilities that a person has, that is, the substantive freedom he or she enjoys to lead the kind of life he or she has reason to value. In this perspective, poverty must be seen as the deprivation of basic capabilities rather than merely as lowness of incomes, which is the standard criterion for identification of poverty". This view does not deny the fact that low income is one of the major causes of poverty since lack of income can be a principal reason for a person's capability deprivation. However, what it does emphasize is the fact that lowness of income is only one cause of capability deprivation, there are other causes as well. In this context, Sen particularly highlights the role of basic education and health. Absence of these is a significant capability deprivation. Better education and health care improve the quality of life directly. In fact, they also increase a person's ability to earn income and be free of income-poverty as well.

### **6. Approaches to Multidimensional Poverty**

In recent years, a consensus has emerged among those studying and making policies related to individuals' well-being. Poverty is best understood as a multidimensional phenomenon. However, views differ among analysts regarding the relevant dimensions and their relative importance. Welfarists stress the existence of market imperfections or incompleteness and the lack of perfect correlation between relevant dimensions of well-being (Atkinson, 2003; Bourguignon and Chakravarty, 2003; Duclos and Araar, 2006) which makes the focus on a sole indicator such as income somewhat unsatisfactory. Non-welfarists point to the need to move away from the space of utilities to a different and usually wider space, where multiple dimensions are both instrumentally and intrinsically important. Among the non-welfarists, there are two main strands: The basic needs approach and the capability approach (Duclos and Araar, 2006).

The first approach, based on Rawls' Theory of Justice, focuses on a set of primary goods that are constituent elements of well-being and considered necessary to live a good life (Streeten et al, 1981).

The second approach, championed by Sen (1992), argues that the relevant space of well-being should be the set of functioning (or outcomes). This set is referred to as the capability set 'reflecting the person's freedom to lead one type of life or another (Sen, 1992).

All the above-mentioned approaches, which are rooted in different theoretical understanding of what constitutes a good life, face the same problem, that is, if well-being and deprivation are multidimensional, how should we make comparisons between two distributions and assess, for instance, whether one distribution exhibits higher poverty levels than the other? To answer this question, one needs to make decisions about the domains relevant to well-being, their respective indicators and threshold levels, and the aggregations function. These choices might differ substantially across the approaches.

There is a longstanding literature on poverty analysis in Latin American Countries, based on both the Unsatisfied Basic Needs (UBN) approach and on Income Poverty. The former approach was promoted in the region by the United Nation's Economic Commission for Latin American and the Caribbean (ECLAC) and used extensively since at least the beginning of the 1980s. The latter was spurred by the relatively early development of calorie consumption-based national poverty lines derived from consumption and expenditure surveys (Altimir, 1982). Most commonly, the UBN approach combines population census information on the condition of households( construction materials and number of people per room), access to sanitary services, education and economic capacity of household members( generally household head). The UBN indicators are often reported by administrative areas in terms of the proportions of households unable to satisfy one, two, three or more basis needs, and are often presented using poverty maps. Thus, in practice, the approach does not offer a unique index but rather the headcounts associated with the number of basic needs unmet. In a context where household surveys were not as widespread as now a day and income and consumption were difficult variable to measure, the census-based UBN measures became the poverty analysis tool par excellence in the region, while income poverty studies were restricted to specific surveys and individual studies (Gasparini, 2004). However, as household surveys started to be regularly administered and progressively available to the public, distributional studies using income became widespread as well as official poverty estimates started to be reported periodically. Since then both methods have co-existed.

The UBN method has also been called the 'direct method' to measure poverty since it looks directly at whether certain needs are met or not, as opposed to the 'indirect (or poverty line) method', which looks at the income level and compare it to the income level necessary to achieve these needs. Consistent with a multidimensional understanding of poverty, it has been long argued that both methods capture partial aspects of poverty, that both the income dimension as well as the UBN indicators are relevant for assessing well-being, and that there are significant errors in targeting the poor (either of inclusion or exclusion) when only one of them is used.

Human beings are diverse in many important ways. They vary in age, gender, ethnicity, nationality, location, religion, relationships, abilities, personalities, occupations, leisure activities, interest and values. Poverty measures seek to identify legitimate, accurate and policy-relevant comparisons across people respecting their basal diversity. Further, they seek to do so using data that are affected by several kinds of errors and limitations. This is no straight forward task.

After a measurement methodology has been chosen, the design of poverty measure—whether unidimensional or multi-dimensional—also require a series of choices. The choices relate to the space of the measure, its purpose, unit of identification and analysis, dimensions, indicators, deprivation cut-offs weights and poverty line. Of these, 'purpose' is particularly influential in shaping the measure.

## 6.1 The Elements of Poverty Measures and Designs

Poverty measurement is important as it gives meaning and understanding of the incidence and extent of poverty. It serves as aid to evaluate policy impact and targets set to reduce poverty. Furthermore, measurement of poverty is crucial because if any anti-poverty action is to be taken, authorities need to know its extent, severity and effects so as to be persuaded to take such action. Here we may have eight design elements where the first five serve to construct a poverty measure and the last three calibrate key parameters (cut-offs and weights) (Alkire and Foster, 2009) as follows-

1. Purpose of the measure: The purpose of a measure may include its policy applications, the reference population, dimensions and time horizon.
2. The choice of space: The choice of space determines whether poverty is measured in the space of resources, inputs and access to services, outputs or functionings and capabilities.
3. The unit(s) of identification and analysis: it reflects the joint distribution of disadvantages and identifies who is poor and analyses poverty.
4. Indicators: Indicators are the building blocks of a measure; they bring into view relevant facets of poverty and constitute the columns of the achievement and deprivation matrices.
5. Dimensions: Dimensions are conceptual categories into which indicators may be arranged for intuition and ease of communication.
6. Deprivation cut offs: The deprivations cut offs for an indicator shows the minimum achievement level or category required to be considered for non-deprived in that indicator.
7. Weights: The weight or deprivation value affixed to each indicator reflects the value that a deprivation in that indicator has for poverty, relative to deprivation in that other indicator.
8. Poverty cutoff: The poverty cutoff shows what combined share of weighted.

## 6.2 Dimensions

The term 'dimension' in this analysis refers to conceptual categorizations of indicators for ease of communication and interpretation of results. A multidimensional poverty measure is constructed using indicators. In some cases, these indicators may each represent distinct facets of poverty. In other words, it may be useful to talk about several indicators as forming a 'dimension' of poverty. Question is that why we use dimension? Dimensions may reflect the categories defined by some deliberative or synthetic processes. For example, a dimension might be children's education; indicators might include a child's years of completed schooling and their achievement scores last period. In this case the indicators may be the best possible approximation of those dimensions from an existing data set. It may also arise from a theory or policy source. Noll (2002) develops a systematic conceptual framework for social indicators in Europe by reviewing concepts of welfare and common policy goals, then identifying fourteen dimensions that fit the measurement's purposes. Grouping indicators into dimensions may facilitate the communication of results because there are likely to be fewer dimensions than indicators and they are likely to be intuitive and accessible to non-experts.

## 6.3 Indicators

Indicators are the backbone of measurement. Their quality, accuracy and reach determine the informational content of a poverty measure. Given data constraints the process through which these are selected may include participatory and deliberative exercises, legal or political documents, statistical explorations, robustness tests or theoretical guidelines.



While a considerable amount of attention, discussion and practice has focussed on the normative selection of dimensions of poverty and wellbeing, there is a paucity of comparable normative literature on the selection of indicators. The literature on indicators is, however, richly arrayed with plethora of empirical considerations. These include--- indicators' comparability across time and for different population subgroups; dataset-specific issues such as data quality, sample design, seasonality and missing values; and the justification of indicators as proxies for a hard-to-measure variable of interest.

Alongside these, numerous guidelines seek to match indicator selection with policy purposes. For example, Atkinson and Marlier (2010) provide an insightful overview of the purposes for which appropriate indicators should be stock or flow, subjective or objective, relative or absolute, static or dynamic, input or output or outcome and so on. When statistics are used by the public, issues such as ease of interpretation also affect the choice.

Naturally, the cost of data collection, cleaning and preparing an indicator are also likely to influence indicator selection, especially when new surveys are fielded or regular updates are anticipated. This is a very important and under documented consideration, given the need for both better and more frequent data and for timely and thorough analysis of new data (Alkire, 2014).

The selection of indicators should be transparently justified. The criteria for selection will vary. Atkinson and Marlier (2010) outline five criteria for internationally comparable indicators of deprivation in social inclusion:

- i. An indicator should identify the essence of the problem and have an agreed normative interpretation.
- ii. An indicator should be robust and statistically validated.
- iii. An indicator should be interpretable in an international context.
- iv. An indicator should reflect the direction of change and be susceptible to revision as improved methods become available.
- v. The measurement of an indicator should not impose too large a burden on countries, on enterprises or on citizens.

## 7. Measurement of Poverty

Measurement generally imply quantification which are to deliver objective facts. Therefore, measurement is both quantitative and qualitative. Poverty measurement is important as it gives meaning and understanding of the incidence and extent of poverty. It serves as aid to evaluate policy impact and targets set to reduce poverty. Measurement of poverty is also crucial because if any poverty action is to be taken, authorities need to know its extent, severity and effects so as to persuade to take such action.

Different measurements can produce different results based on indicators and standards (poverty line) against which the poor are assessed. The nature and extent of poverty as well as its causes in a country are known and determined by some differing measurement criteria. These criteria may be qualitative or quantitative. It requires identification of indicators and division of a population into two groups—the poor and non-poor—on the basis of the indicators.

It is argued by many academics that measuring 'poverty' and 'inequality' can be approached at 'objective' and 'subjective' levels which are aligned to quantitative and qualitative measurements respectively. The objective level deal with socio-economic indicators such as income levels, consumption expenditures, life expectancy and housing standards; while the subjective level deals with attitudes, needs and perceptions gathered directly from people through the use of participatory methodologies such as Participatory

Learning Action (PLA), Participatory Rural Appraisal (PRA), Participatory Action Research (PAR) (Du Toit,2005; Kotze,1997; Chambers,1986). These measures reflect the constituents of well-being or measure the access that people have to the determinants of well-being. 'Well-being' is difficult to measure, while 'access' is easily measurable, practical and uses conventional money metric measure thereby allowing inter-personal comparisons. Du Toit (2005) is of the view that even though a money metric measure of poverty is used, it is an imperfect means of measurement. It is used because many aspects of human well-being are hard to quantify for measurement and for making comparisons. Monetary dimensions include income and consumption and non-monetary measures include health and education (Carter and Ikegami, 2000)

## **8. Tools of Quantitative Measurement**

Many quantitative measurement tools are used to determine the nature and extent of poverty. The tools include household survey, poverty lines, poverty gap and head count index.

### **8.1 Household Survey (HHS)**

It is based on income and consumption expenditure patterns of households and draws on indicators. The use of household survey for poverty measurement has several strengths, according to the World Bank (2001), because it is based on national representative samples and allows influences about the conditions and evolution of poverty at the national as well as local levels. It enables investigation into the relationship among different dimensions of poverty. Of course, the use of the household survey is not problem free. One problem is the difficulty in making comparisons because there are variations in survey designs of different countries over time. In the household surveys, some countries ask respondents about their spending on food once a month whilst others ask of spending over a week. Thus, lack of consistency makes converting information from household surveys into measures of well-being to require many assumptions. In addition, data collected at household levels do not reveal inequality within households. Therefore, they understate inequality and poverty (World Bank, 2001).

Concerning the use of income and consumption patterns in this measurement, the use of consumption measure should be more preferred to income because, it is more closely linked to a person's well-being. Secondly, it can be calculated and recalled more than income or better measured than income in an agrarian rural household environment, where income may fluctuate according to harvest season and remittance. Thirdly, consumption also reflects a households' actual standard of living and ability to meet basic needs (Klugman, 2002).It is further argued that the use of income measure has its own advantage as it allows distinctions to be made between sources of income. Income data from various sources are then easily compared to check the quality of data collected. However, it is necessary to aggregate information in the household survey and to make adjustments when dealing with either measure. The reasons for the adjustments are that there are many differences in needs between households and intra-households' inequality. Differences exist also in price levels at different points in time and at different places in the country. Without adjustment, the problem of over stating expenditure or double counting may occur.

### **8.2 Poverty Line**

To have a credible measurable analysis of income and consumption poverty, the use of poverty lines is considered to be a very effective tool and a key building block in poverty measurement. Poverty line is defined as cut off in income or consumption below which an individual is considered poor (Klugman, 2002; World Bank, 2001). Klugman conceptualizes it as cut off points separating the poor and non-poor. The poverty line is a separation line between the poor and non-poor based on 'expenditure necessary to buy a minimum standard of nutrition and other necessities.

In practice, the poverty line's test for the ability to purchase a basket of commodities is roughly similar across the world. Countries have their country specific poverty lines that reflect the country's economic and social circumstances and expenditure pattern. When a poverty line is specified, the extent of poverty in a particular area can be easily assessed (World Bank, 2001). Many researchers and academics go along these lines basing the income or consumption levels on money terms because that is easy and tractable. Though straight forward, it has some disadvantages because it fails to realize that, among the poor people, there are income and consumption disparity levels. Some are just below the poverty line, whilst others are far below it. Therefore, policy makers should note that if all the poor were lumped together, poverty alleviation resources may only reach those closest to the poverty line. Therefore, a solution is necessary here and solution to this problem is the use of multiple lines which can help distinguish between different levels of poverty. This is done based on various attributes of well-being, be they quantitative or qualitative. In this circumstance, a poverty line can be further defined as a certain defined threshold or point of time or consumption of non-monetary or monetary attribute.

### 8.3 Headcount and Head-Count Ratio

Absolute poverty is measured by the number of head count, of those whose incomes fall below the absolute line. We can find the head-count ratio as follows-

$$HCR = \frac{H}{N}$$

where N is the total population.

The main problem with the head-count ratio is that it fails to capture the extent to which the individual income or expenditure is below the poverty line. The condition of the people who are much below the poverty line is considerably worse than the people who are just below the poverty line but HCR is insensitive to this observation. But as noted by Ray (1998), "the use of the head count as a measure of poverty systematically biases policy in favour of individuals who are very close to the poverty line". Governments are generally interested in trying to prove that poverty levels have declined. Accordingly, they adopt economic policies in favour of those people who are just below the poverty line because these people can be easily above the poverty line. However, of all the poor, these people are in the least need of help.

### 8.4 Poverty Gap

To tackle these problems, economists define a poverty gap which measures the total amount of income necessary to raise everyone who is below the poverty line up to that line. It is defined as follows-

Total Poverty Gap (TPG) =

$$\sum_{i=1}^H (Y_p - Y_i)$$

Where  $Y_i$  is the income of the  $i$ th individual and  $Y_p$  is the poverty line? Accordingly, Average Poverty Gap (APG) can be obtained as follows—

$$APG = \frac{TPG}{H}$$

Another measure that is often used in poverty analysis is known as Normalised Poverty Gap (NPG) defined as  $\frac{APG}{Y_p}$ .

Poverty gap reflects the depth of poverty as well as its incidence. However; the poverty gap index is insensitive to the extent of inequality among the poor. A good measure should give more importance to the people who are much below the poverty line rather than to those people who are just below the poverty line. In other words, it should take into account the relative deprivation among the poor. For this purpose, poverty gaps are raised to a power  $\alpha$ .

This gives a class of poverty measures called the **Foster-Greer-Thorbecke (FGT)** class.

$$P_\alpha = \frac{1}{N} \frac{\sum_{i=1}^H (Y_p - Y_i)^\alpha}{Y_p}$$

Depending on the value of  $\alpha$ , the  $P_\alpha$  index takes on various forms. If  $\alpha=0$ , the measure  $P_0$  is simply the head-count ratio. For  $\alpha=1$ , the measure  $P_1$  is the normalised gap. As  $\alpha$  rises beyond 1, larger poverty gaps begin to acquire greater weight and the measure becomes increasingly sensitive to those gaps and therefore, to questions of income distribution. The poverty measure that is gaining more and more currency among the various agencies conducting studies on poverty and various researches is the squared poverty gap index where  $\alpha$  is taken as 2 in the above equation (World Bank, 2001).

### 8.5 Multidimensional Poverty Measurement: from H to $M_0$

In the multidimensional context, distributional data are presented in the form of a matrix of size  $n \times d$ ,  $X^{n,d}$ , in which the typical element  $x_{ij}$  corresponds to the achievement of individual  $i$  in dimension  $j$  with  $i=1,2,3,\dots,n$  and  $j= 1,2,3,\dots,d$ . Vector  $x_i$  contains the achievements of individual  $i$  in the  $d$  dimensions. Analogous to the one-dimensional approach, the measurement of poverty in the multidimensional approach involves two steps (Sen, 1976): first, the identification of the poor, second, the aggregation of the poor.

The most common approach for identifying the poor in the multidimensional context is to first define a threshold level for each dimension  $j$ , below which a person is considered to be deprived. The collection of these thresholds can be expressed in a vector of poverty lines  $z = (z_1, \dots, z_d)$ . In this way, whether a person is deprived or not in each dimension can be defined. However, unlike unidimensional measurement, a second decision needs to be made: among those who fall short in some dimension, who is to be considered multidimensionally poor.

In terms of Alkire and Foster (2007), the number of dimensions in which someone is required to be deprived so as to be identified as multidimensionally poor constitutes a second cut-off (the first cut-off were the dimension-specific ones contained in vector  $z$ ). This second cut-off is termed as  $k$  and  $c_i$  is defined as the number of deprivations suffered by individual  $i$ . Then, an identification function  $\rho_k(x_i; z)$  is defined, such that:

$$\rho_k(x_i; z) = \begin{cases} 1 & \text{if } c_i \geq k \\ 0 & \text{if } c_i < k \end{cases}$$

In other words, if  $c_i \geq k$ , the individual is defined as multidimensionally poor, and if  $c_i < k$ , that individual is not poor, despite he/she may be experiencing some deprivation.

For the aggregation step, one natural first measure is the headcount ratio, also frequently known as the poverty incidence, which is the fraction of the population identified as being multidimensionally poor. It is simply given by:

$$H = \frac{\sum_{i=1}^n \rho_k(x_i, z)}{n} = \frac{q}{n}$$

Where  $q$  is the number of people identified as multidimensionally poor. Clearly, the value of  $H$  varies with the selected  $k$  cut-off, decreasing as  $k$  increases. The  $H$  measure is what the UBN approach has used, most frequently using  $k$  cut-off of one, that is, the union approach. If an individual identified as poor becomes deprived in an additional dimensional, the multidimensional headcount does not change, that is it violates what the Alkire and Foster (2007) call dimensional monotonicity. In simpler words, it is insensitive to the breadth of poverty: the number of deprivations suffered by the poor. Related to the latter point, another informative measure is the average deprivation share across the poor, that is, the average fraction of dimension in which poor is deprived. This can be expressed as:

$$A = \frac{\sum_{i=1}^n c_i}{qd}$$

Where  $H$  and  $A$  can be easily combined into one single measure, called as  $M_0$ , which is just the headcount ratio 'adjusted' (i.e. multiplied by the breadth of poverty).

$$M_0 = HA,$$

$M_0$  is called the Adjusted Headcount Ratio.

## 9. Conclusion

The past few years have seen a surge in mainstream multidimensional approaches to poverty and well-being in countries at various levels of economic development as poverty reduction becomes a shared mandate across the world. The impetus to develop a multidimensional framework has a range of diverse sources, which gives it a distinctive strength and stability. Amartya Sen, Robert Fogel and other leading social scientists have given a normative account of the need for broader approaches while others have documented the lack of satisfaction resulting from development based on income alone.

Traditional approach to a measure of poverty or quality of life is typically based on the net monetary income of a household unit, or on their consumption. This approach defines a person as poor if their income is below a poverty line that may be subjective, objective or hybrid. It is often established at a nationally determined level based on a food or consumption basket or as a percentage of mean or median of overall income distribution. Apart from income, other monetary measures of poverty include consumption-expenditure spending as well as savings. But a multidimensional approach moves away from the traditional unidimensional approach by arguing against the focus on a single dimension—in particular a monetary dimension—as a sufficient proxy of human welfare. The present paper has reviewed the concept of poverty and its measures in the literature. It establish that poverty is multidimensional in nature and extent and therefore, has to be approached multidimensionally. The definition of poverty is not only quantitative and qualitative, but subjective also.



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