

# INTERNATIONAL POVERTY CALCULATIONS AND COMPARISON

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**Jairo Acuña-Alfaro**

[jaacum@essex.ac.uk](mailto:jaacum@essex.ac.uk)

“Poverty is hunger... lack of shelter... being sick and not being able to see a doctor... not being able to go to school, not knowing how to read, not being able to speak properly... not having a job, is fear for the future, living one day at a time... is losing a child to illness brought about by unclean water... Poverty is powerlessness, lack of representation and freedom”  
*World Bank's Poverty Net.*

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The main purpose of this paper is *to assess the usefulness and limitations of international poverty calculations and comparison* based on the 1990 World Development Report, by the World Bank. To do this, I will first briefly state what the Report says about poverty, then I will try to define what exactly is it (taking into account its multidimensional characteristics). Furthermore, the next section is dedicate to explain the actual methods to measure poverty, (Headcount Index, the Poverty Gap, and Income Gap), then I will present the its limitations. Finally, I will conclude arguing that poverty can not be eliminated, but alleviated, and that new methods of measurement should be developed in order to understand really why there are poor people.

It may be said, in accordance with Townsend, the importance on understanding poverty and measuring it, goes beyond income/expenditures indicators and indexes, because it is related to human beings and its basic needs. Poverty is a world wide phenomenon which spreads in rich and underdeveloped countries in different ways, and is destined to worsen unless new approaches are developed and new scientific knowledge about its causes is discovered. (Townsend, 1993). Thus, this paper deals with one of the most controversial and interest themes in economics literature.

## WHAT DOES THE REPORT SAY?

First, I may say that reducing poverty is the fundamental objective of economic development. Thus, as the 1990 World Development Report states, when talking about poverty, three important questions may be addressed: How many poor there are? Where they live? And above all, why they are poor? In this endeavour, the Report satisfactorily answers the first two questions, and lacks to provide answers to the latter. It states that in 1985 more than one billion people in the developing world lived in poverty, and millions in the Sub-Saharan Africa and Latin America were experiencing “relative” deprivation (table 1).

To measure how many poor people there are in the world, a universal poverty line<sup>1</sup> is used. This line is useful because it permits cross-country comparisons and aggregations. Besides that, the Report uses two different poverty lines to measure poverty. The extremely poor are those with an average income of US\$275 per year, while the poor are those with an income of US\$370 per person a year (the amounts are in constant 1985 PPP<sup>2</sup> prices). Furthermore, the Report states that, “the use of the upper poverty line –US\$370– gives an estimate of 1,115 million people in the developing countries in poverty in 1985. That is roughly one-third of the total population of the developing world. Of these, 630 million –18 percent on the total population of the developing world– were extremely poor: their annual consumption were less than US\$275” (page 28).

**Table 1. Poverty and Extreme Poverty in 1985.**

Region	Extremely poor			Poor (including extremely poor)		
	Number (millions)	Headcount index (percent)	Poverty gap	Number (millions)	Headcount index (percent)	Poverty gap
Sub-Saharan Africa	120	30	4	180	47	11
East Asia	120	9	0.4	280	20	1
<i>China</i>	80	8	1	210	20	3
South Asia	300	29	3	520	51	10
<i>India</i>	250	33	4	420	55	12
Eastern Europe	3	4	0.2	6	8	0.5
Middle E. and N. Africa	40	21	1	60	31	2
Latin America/Caribbean	50	12	1	70	19	1
<b>All developing countries</b>	<b>633</b>	<b>18</b>	<b>1</b>	<b>1,116</b>	<b>33</b>	<b>3</b>

Source: World Bank, World Development Report, 1990.

<sup>1</sup>According to the Report, “a consumption-based poverty line can be thought of as comprising two elements: the expenditure necessary to buy a minimum standard of nutrition and other basic necessities and a further amount that varies from country to country, reflecting the cost of participating in the everyday life of society” (page 26). Thus, traditionally the international poverty line is calculated at a rate of US\$275, any average income earned below that amount, will be in poverty (i.e., if a person earns US\$200 per year, s/he is poor, no matter where s/he lives or what he does, that person barely can satisfy his/her basic needs such as food and shelter).

<sup>2</sup>Purchasing Power Parity (PPP) measures the relative power purchasing of currencies across countries. Michael Todaro, defines it as “...the number of units of [a country’s] currency required to purchase the same basket of goods and services that a U.S. dollar would buy in the United States” (2000, p. 761).

Furthermore, the Report defines poverty as the inability to attain a minimal standard of living; stressing that poverty is not the same as inequality. But, the careful reader may ask to him/herself, how do we measure the standard of living? Thus, having identified the poor, how do we express the overall severity of poverty in a single measure or index?. In order to measure the standard of living, the Report uses household incomes and expenditures per capita, as long as they include own production. But neither measure, however, captures such dimensions of welfare as health, life expectancy, literacy, and access to public goods or common-property resource.

### ***SO, WHAT EXACTLY IS POVERTY?***

The development economist Michael P. Todaro, defines poverty in absolute terms as a “situation where a population or section of a population is able to meet only its bare subsistence essentials of food, clothing, and shelter to maintain minimum levels of living” (2000, p. 732). Furthermore, an influential World Bank economist, defines poverty as the existence “in a given society when one or more persons do not attain a level of material [or physical and mental] well-being deemed to constitute a reasonable minimum by the standards of that society” (Ravallion, 1992, p.4 parenthesis added).

Also, another definition of poverty, and widely used in poverty measures is the poverty line (footnote 1), which says that poor are those below that line. Thus, as Debraj Ray explains, it is a critical threshold which “represents a minimum level of “acceptable” economic participation in a given society at a given point in time ... [Thus] we will consider a poverty line to be an expenditure threshold that is regarded as minimally necessary for “adequate” participation in economic life. People below this threshold will be said to be poor” (Ray, 1998, p. 250 and 253). In that sense, and related to the above definitions, poverty is related to persons inability to meet basic needs and achieve minimum standards (materially or physically) of living.

Furthermore, taking into consideration the above definitions of poverty, I may argue, the characteristics of the poor are: (i) it is more evident in rural than urban areas, (ii) reverts specific demographic characteristics, (iii) constitute a lack of assets and income, (iv) the sources of income , for poor people, are variable (job and savings instability), (v) the spending of income is almost only on food, and so on. This characteristics are important to be kept in mind in order to have a better understanding of who are the poor, how poor they are and why they are poor. Then, it will serve as a starting point for defining economic and social policies geared toward reducing poverty, and thus improving the economic development of societies.

Moreover, these characteristics allows us to understand that poverty, is a multidimensional problem with many faces. We must consider economic, social, political and environmental conditions, and the human nature of the poor. Indeed, its understanding and definitions, may provide basic explanations to develop new measures and indexes of poverty, which should go beyond income.

### ***AND, HOW POVERTY IS MEASURED?***

Having recalled what the 1990 World Development Report says about poverty and also having define it, now it is time to explain how the Report measures poverty. Then in the next section, I will argue the limitations of these methods.

The first typical method of measuring poverty is called the **Headcount Index (HC)**, which simply count the number of poor people. Thus, the HC tell us the amount of people below any poverty line, such that  $y_i < p$  (where  $y$  is income,  $i$  represents the individuals and  $p$  is the poverty line).

Hence, to calculate the relative incidence of the poor in a given society, we dived HC by the total population under consideration. This is called the **Headcount Ratio** and is calculated by the equation;

$$(1) \quad \text{HCR} = \frac{\text{HC}}{n}, \text{ where } n \text{ is total population.}$$

A more advanced method of calculation is the **Poverty Gap Ratio**, which measures the total amount of income that a person needs to reach the poverty line. Then it is divided by the average income of the society, in order to understand how wide is the poverty gap relative to the resources required to eliminate it. Thus we have the equation;

$$(2) \quad \text{PGR} = \frac{\sum_{y_i < p} (p - y_i)}{nm}$$

Where  $y$  denotes income or expenditure,  $p$  the poverty line,  $m$  is the mean income of the economy and  $i$  refers to individuals.

Finally, a third method that measures poverty (and also used in the 1990 World Development Report) is know as the **Income Gap Ratio**. This is similar to the PGR, but divides the gap by the total income required to bring all the poor people just to the poverty line. Thus, it captures the acuteness of poverty, measuring it relative to the total income needed to alleviate poverty. Hence it is given by the equation,

$$(3) \quad \text{IGR} = \frac{\sum_{y_i < p} (p - y_i)}{\text{PHC}}$$

### ***BUT, WHAT ARE THE LIMITATIONS OF THESE METHODS OF POVERTY CALCULATION?***

Now that we have stated what are the three typical methods of poverty calculations, it is time to state what are their limitations. First, even the **Headcount Index** tells us how many poor there are, it lacks of definition of why they are poor, or how poor they are. Also, this Index does not take into account the extent to which the individual's incomes falls below the poverty line, and moreover is insensitive to the distribution of income among the poor.

In accordance to the **Poverty Gap Ratio**, it may be said that while it tells us how poor the individual is, its limitations lies in the fact that it does not tell us how to get them out of poverty, as well as it provides a misleading measure in wealth but highly unequal societies with a large number of poor people. Finally, this measure is better to calculate the resources required to alleviate or eradicate poverty, than to measure poverty itself.

Last, but not least, the **Income Gap Ratio**, even though it captures the individual's intensity of poverty, lacks the opposite than the PGR. It is, it ignores the society's wealth, and tell us little about how the poverty problem can be approached.

All the more said, table 2 summarises and clarifies, at an eyes view, the previous discussion. It shows the usefulness and limitations of each one of the methods of poverty calculation used in the 1990 World Bank's Development Report. Moreover, it may be noted, that these methods are based on income or consumption levels, thus consider poverty limited to the extent in which a person falls below some minimum level necessary to meet basic needs. And as such, they do not take into account the "other" dimensions or faces of poverty, like education, health, sanitation, etc. In sum, even these methods are important, they only consider one face of poverty, which is income.

**Table 2. Usefulness and limitations of poverty calculation**

METHODS	USEFULNESS	LIMITATIONS
<b>Headcount Index</b>	Tell us how many poor there are.	Does not tell us why they are poor, or how poor they are. Fails to capture the extent to which income falls below the poverty line. It is insensitive to the distribution of income among the poor.
<b>Poverty Gap Ratio</b>	Tell us how poor they are. As well as gives an idea of how large the gap is relative to resources that potentially may be used to close the gap.	Does not tell us how to get them out of poverty. Provides a misleading measure in wealth but highly unequal societies with a large number of poor people. It is more a measure of resources required to eradicate poverty, than poverty itself.
<b>Income Gap Ratio</b>	Captures the "per capita intensity" of poverty.	It ignores the overall wealth of the society, and tell us little about how the problem can be tackled.

## **CONCLUSION**

First a few words may be said on the importance of poverty comparisons among countries with these methods. As stated previously (table 1), the 1990 World Development Report states accurately who are the poor and how many poor there are in the world. Table 1 clearly states that the region with the most number of poor people in 1985 was South Asia with 520 million poor people, followed by East Asia with 280 million. Thus, when the World Bank estimates poverty world wide, the used method is the definition of the International Poverty Line, but expressed in a common unit across countries. Therefore, for the purposes of comparing countries, the World Bank uses reference lines set a US\$1 and US\$2 per day PPP (see footnote 2).

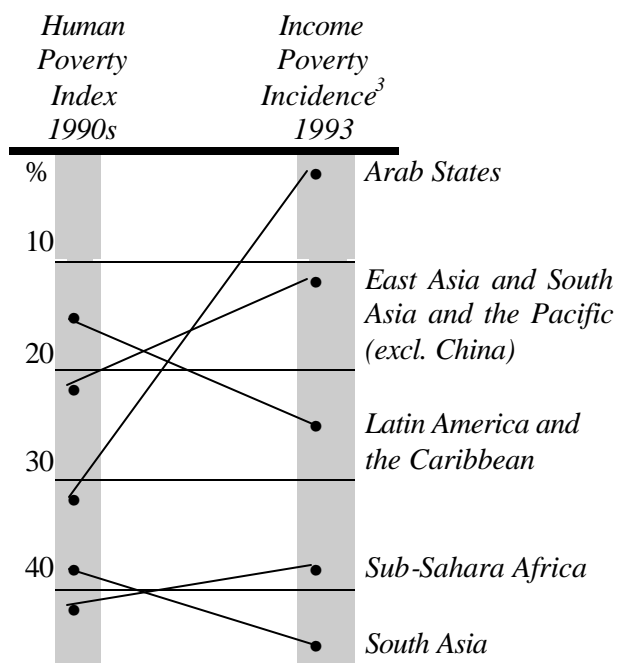
But these comparisons are made related to income based measures, thus the extent of poverty in its truly dimension is not captured. Indeed, when comparing poverty among different countries, the first we may think is in the size of its population. It is not the same to say that 20% of the inhabitants of Costa Rica live in poverty with a total population of almost 4 million people, than the 20% of Peruvians, live in poverty, with a population of 25 million. Moreover, poverty has many variants and differences among countries, developed countries also has poor people, but their conditions differ to those in developing countries. For example, in some countries or regions, access to safe water through aqueducts is a normal characteristic, while in other parts it is a luxury. Also, in developed societies, the most of “poor” people have access to social security services and in some cases they have an “unemployment” insurance, while in developing countries, most of the population do not have access either to basic social services, such as hospitals or clinics. Indeed, it is not the same been “poor” in a Nordic society, than in the Sub-Saharan region or in South Asia (I may say it is a relative concept).

As the World Bank has expressed and developed, much progress has been made in measuring and analysing poverty in terms of income. But now, efforts have to be made in order to measure and study the other dimensions of poverty (as quoted at the beginning). New methods of poverty calculation and thus comparison should be developed, taking into account other aspects of human life, such as education, health, sanitation, and access to services and infrastructure, rather than only income. A good example is the work done by the United Nations Development Programme with the **Human Poverty Index**. This Index concentrates in three essential elements of human life; (i) longevity, measured as the vulnerability to death at a relatively early age (40); (ii) knowledge, based on the exclusion from the world of reading and communication; and (iii) a decent standard of living, related in terms of overall economic provisioning (UNDP, 1997, p. 18).

Thus, the 1997 Human Development Report shows graphically (figure 1) the differences between income poverty and the human poverty index. In this figure it is very clear and easy to understand the differences among poverty indexes, according to the method of measurement used. It shows that while income poverty in the Arab States was only 4%, human poverty was about 32%. Also it shows that in East Asia and South Asia and the Pacific (excluding China), human poverty in the 1990s was about 23%, but human poverty decreased to 12%. Contrary, in Latin America and the

Caribbean, while human poverty was around 15%, income poverty increased to 24%, while in South Asia, human poverty was about 38%, income poverty in 1993 was almost 50%.

**Figure 1. Human Poverty Index vs. Income Poverty Incidence**



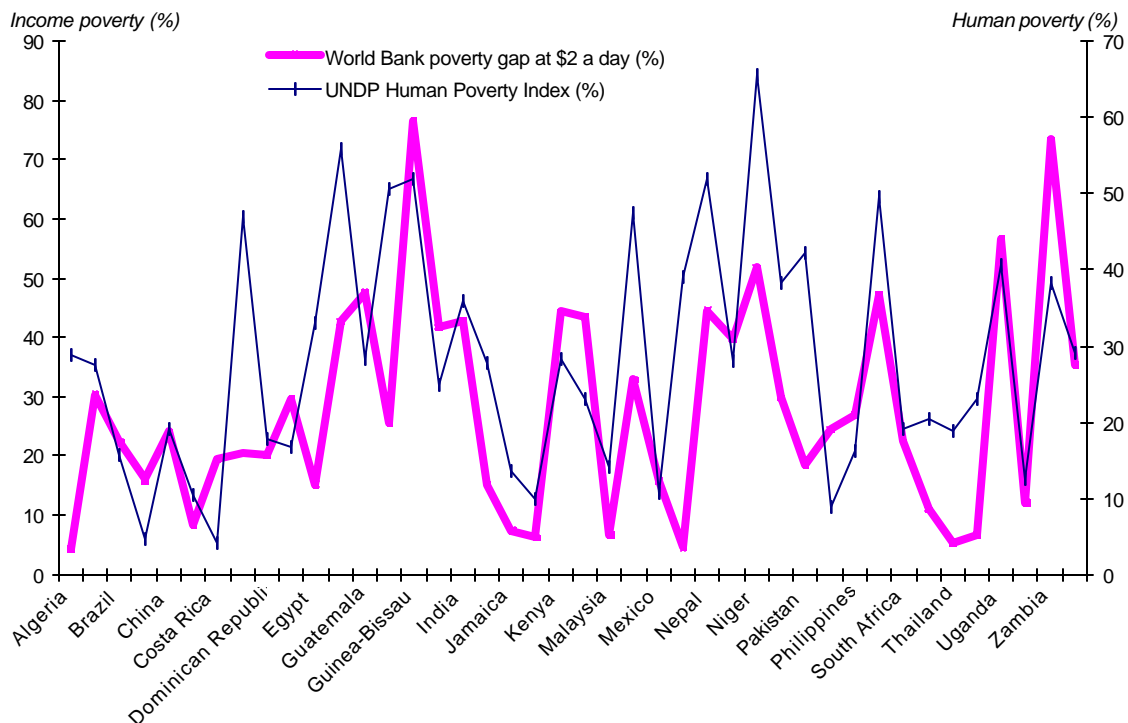
Source: Human Development Report 1997, p.23

Indeed, if taken countries' measures separately, the differences are still more evident. Graph 1 shows these differences by plotting together both measures – Income Poverty and Human Poverty. The former is identified by the thicker line and in the left-side margin of the graphic.<sup>4</sup> In sum, what graph 1 shows is the relationship between both methods of poverty measurement. It varies according to countries' specific circumstances and methods of calculations (indeed a factor which can lead to these difference can also be the sources of information, which in some cases are not reliable).

<sup>3</sup> Percentage of people below the US\$1-a-day poverty line (1985 PPP\$).

<sup>4</sup> For a more detailed information of these differences, the careful reader may want to take a look at the Appendix 1, which presents a table with the values and percentages to 40 countries in both poverty measures.

**Graph 1. Differences among Income Poverty and Human Poverty**



Thus, it is urgent to reconcile “definitions and measures of poverty as a scientific basis for comparison and the definition of development policy. The search for a radical but scientific definition will be laid out in relation to the principal historical ideas of subsistence, basic needs and relative deprivation” (Townsend, 1993, p. vii). Indeed an interesting approach to this new poverty measure would be a combination of the Human Poverty Index and the Income Gap Ratio, where both indicators and statistics should be weighted as equals, and thus it will give us a better picture of poverty in its truly dimensional way. Thus the new equation to measure poverty could be indicated by

$$(4) \quad P_t = \alpha [F(\text{HPI}_t, \text{IGR}_t \text{ or } \text{PGR}_t)]$$

Where  $P_t$  is poverty at time  $t$ ;  $\text{HPI}_t$  is the Human Poverty Index;  $\text{IGR}_t$  is the Income Gap Ratio;  $\text{PGR}_t$  is the Poverty Gap Ratio; and  $\alpha$  would be the parameter or value to be estimated from the function.

Last but not least, it is important to remember that poverty has many faces, and it changes from place to place and across time. That poverty is a situation people strive to avoid. As the World Bank has manifested “to know what helps to alleviate poverty, what works and what does not, what change over time, poverty has to be defined, measures and studied. As poverty has many dimension, it has to be looked at through a variety of indicators – levels or income and consumption, social indicators, and now increasingly indicators of vulnerability to risks and of socio/political access” (World Bank’s Poverty Net).

As has been proved in this essay, much progress has been made in measuring and analysing poverty, but in income terms. It is time now to create and develop new measures, in order to understand and visualise the other dimensions of poverty. This new measures may include comparable social indicators (ie, education, health, access to services and infrastructure). As well as may track other dimensions, like risk, vulnerability, social exclusion, access to social capital. It may also include how cultural factors and ethnicity interact and affect poverty, how social exclusion sets limits to people's participation in development, and how barriers to such participation can be removed, because poverty changes, across regions and from time to time.

#### Appendix 1. Differences among Poverty Measures, 1990s.

<i>Country</i>	<i>World Bank poverty gap at \$2 a day (%)</i>	<i>UNDP Human Poverty Index (%)</i>	<i>Country</i>	<i>World Bank poverty gap at \$2 a day (%)</i>	<i>UNDP Human Poverty Index (%)</i>
Algeria	4.40	28.80	Lesotho	43.50	23.00
Bostwana	30.40	27.50	Malaysia	6.80	14.20
Brazil	22.40	15.80	Mauritania	33.00	47.50
Chile	16.00	4.80	Mexico	15.90	10.60
China	24.10	19.00	Morocco	4.60	39.20
Colombia	8.40	10.50	Nepal	44.60	51.90
Costa Rica	19.40	4.10	Nicaragua	39.70	28.10
Cote d'Ivoire	20.40	46.80	Niger	51.80	65.50
Dominican Republic	20.20	17.70	Nigeria	29.80	38.20
Ecuador	29.60	16.80	Pakistan	18.60	42.10
Egypt	15.30	33.00	Panama	24.50	9.00
Ethiopia	42.70	55.80	Philippines	27.00	16.30
Guatemala	47.60	28.30	Senegal	47.20	49.60
Guinea	25.60	50.50	South Africa	22.50	19.10
Guinea- Bissau	76.60	51.80	Stri Lanka	11.00	20.40
Honduras	41.90	24.80	Thailand	5.40	18.70
India	42.90	35.90	Tunisia	6.80	23.10
Indonesia	15.30	27.70	Uganda	56.60	40.60
Jamaica	7.50	13.60	Venezuela	12.20	12.40
Jordan	6.30	9.80	Zambia	73.40	38.40
Kenya	44.40	28.20	Zimbabwe	35.50	29.20

Sources: United Nations Development Programme and World Bank (various years).

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