

2008 Philippine Human Development Report

Technical Annex

Sharon Faye A. Piza
with Regina Salve B. Baroma

PHDR TECHNICAL/ISSUE NOTE

PHDR ISSUE: 2008/2009

NO. 1



HDN Discussion Papers are commissioned by HDN for the purpose of producing the Philippine Human Development Reports. This research is funded by the United Nations Development Programme (UNDP). Papers under the Discussion Paper Series are unedited and unreviewed.

The views and opinions expressed are those of the author(s) and do not necessarily reflect those of the Network.

Not for quotation without permission from the author(s) and the Network.

For comments, suggestions and further inquiries, please contact:
Room 334, School of Economics, University of the Philippines, Diliman, Quezon City
+632-927-8009 +632-927-9686 loc.334 <http://www.hdn.org.ph>

2008 Philippine Human Development Report

Technical Annex

Sharon Faye A. Piza
with Regina Salve B. Baroma

17 April 2008

This technical annex discusses the process in computing the different human development indicators. The discussion is divided into two parts. The first enumerates the data requirements and the steps involved in preparing the data for the computation of the indicators. The second part is a step by step guide on how each of the indices is derived. This annex ends with tables of the computed indices by province.

Data preparation

Data source

The different data sources have evolved through the years since the first PHDR was released for 1994. Since the computations have to be disaggregated at the provincial level, the data sources should be able to support this level of disaggregation. All sources are secondary data collected by government agencies. The following table lists the different sources for each of the indicators needed in the computations.

Index	Components	Indicator	Source
HDI 1	Life expectancy	• Life expectancy at birth	• Flieger & Cabigon (1999) and Cabigon (2009)
	Education	• Primary & HS enrolment rates • HS graduate rate	• APIS 2004 • LFS 2006
	Income	• Per capita income adjusted by cost of living	• FIES 2006
HDI 2	Life expectancy	• Life expectancy at birth	• Flieger & Cabigon (1999) and Cabigon (2009)
	Education	• Primary & HS enrolment rates • Functional literacy	• APIS 2004 • FLEMMS 2003
	Income	• Per capita income in \$PPP terms	• FIES 2006
HPI	Longevity	• Probability at birth of not surviving the age of 40	• Flieger & Cabigon (1999) and Cabigon (2009)
	Education	• Adult illiteracy	• FLEMMS 2003
	Decent standard of living	• W/o access to improved water sources • Underweight children under age 5	• FIES 2006 • NNC admin data 2006

1. Gender Specific Life Tables – the most recent (2009) provincial life tables estimated by Josefina V. Cabigon based on the 2000 Census of Population and housing and the life tables estimated also by Cabigon together with Wilhelm Flieger, SVD in 1999 based on the 1995 Census of Population are the basis for the life expectancy figures.
2. Annual Poverty Indicators Survey (APIS) – this household survey conducted by the National Statistics Office (NSO) is fielded in between FIES years¹. It is designed to generate information on different indicators related to poverty. Member specific variables such as

¹ Note though that the conduct of this survey is subject to availability of funds.

demographic characteristics, educational attainment, and health status can be derived from this survey. The latest survey was conducted in 2007 but the data gathered is not yet available for this issue's HDI computations. The most recent available APIS data is in 2004.

3. Labor Force Survey (LFS) – conducted quarterly by the NSO since 1988, this household survey gathers information on employment, unemployment and underemployment. Other household member specific variables are collected on demographics and education. All the quarterly surveys in 2006 were used.
4. Functional Literacy, Education and Mass Media Survey (FLEMMS) – envisioned to be conducted every five years, this survey conducted by NSO in coordination with the Department of Education seeks to gather information on functional literacy, educational and skills qualification, and exposure to mass media. The FLEMMS data in 2003 was used in the computations.
5. Family Income and Expenditures Survey – data is collected every three years also by the NSO mainly to obtain information on households' expenditures and disbursements and their sources of income and receipts. Households' housing characteristics such as housing materials, floor area, status of ownership, household furnishings, as well as access to amenities such as electricity and water are also obtained. The most recent FIES data was used for this issue, FIES 2006.

Diagnostics

To ensure the reliability of the estimates, each of the indicators mentioned earlier were subjected to consistency checks. Among the indicators, per capita income would have the widest range of values. Consequentially, averages of this indicator may either be misleadingly higher or lower than the true average depending on the extreme values. This is not the case for the other indicators since most are rates with values ranging between 0-100.

Year	Minimum	Maximum
1997	98.1	16.7
2000	178.9	9.9
2003	272.8	16.6
2006	128.6	19.6

In the estimation of per capita incomes for the PHDR 2005, most coefficients of variation (CVs) of mean provincial per capita incomes were extremely high compared to CVs computed in the previous FIES years (see Table 2). This problem was addressed by the *trimmed means* technique. This is done by simply excluding samples at the extreme ends. By doing so, one can be assured of obtaining the true mean income of the province. One percent (0.5% from both ends) of the total sample by province was trimmed. The trimming was also applied to previous years for consistency.

The same procedure in trimming was applied in this year's computation to be consistent with the previous years. However, the 1% trimming does not substantially improve the CVs for majority of the provinces (see Table 3). About two-thirds of the provinces have CV levels higher than those in 2003.

Table 3. CVs by province*			
Province	Full sample 2006	Trimmed 1% 2006	Trimmed 1% 2003
Basilan	75.6	75.6	27.1
Aurora	94.4	87.4	45.9
Catanduanes	106.9	72.3	41.7
Siquijor	65.8	60.8	33.6
Northern Samar	64.2	56.5	37.3
Zambales	101.4	55.0	38.7
Albay	101.0	59.4	44.9
Eastern Samar	128.6	57.4	43.6
Camiguin	43.9	43.0	31.1
Kalinga	36.1	35.7	23.8
Biliran	56.0	47.3	35.5
Apayao	28.2	27.9	16.6
Tarlac	52.6	47.7	37.4
Romblon	45.9	37.7	27.9
Mountain Province	59.8	35.7	26.4
Surigao Del Norte	89.4	41.9	32.8
Misamis Occidental	48.6	44.6	35.5
Bohol	59.2	51.1	42.4
Masbate	115.8	54.5	46.0
Misamis Oriental	59.0	45.8	37.7
Zamboanga Del Norte	64.3	53.4	45.8
Nueva Ecija	58.6	40.9	33.6
Surigao Del Sur	44.4	37.1	29.9
Pampanga	54.3	44.5	37.8
Ilocos Norte	39.3	37.3	30.8
Bulacan	45.6	41.5	35.1
Bukidnon	68.1	53.1	46.8
Leyte	62.2	51.2	45.0
Capiz	70.5	47.2	41.3
Davao Oriental	42.9	38.9	33.1
Palawan	49.3	40.0	34.4
Laguna	58.4	48.3	42.9
Tawi-Tawi	37.6	29.2	23.8
Cotabato (North Cotabato)	44.8	38.5	33.2
Abra	38.6	31.9	26.8
Batanes	23.3	23.3	18.2
Agusan Del Sur	47.2	39.3	34.3
Lanao Del Norte	66.6	62.0	57.0
Cagayan	42.2	36.2	31.2
Ilocos Sur	49.9	40.6	35.8
Occidental Mindoro	57.1	43.9	39.6
Cavite	45.4	40.8	36.6
Agusan Del Norte	34.6	30.5	27.1

Province	Full sample	Trimmed 1%	Trimmed 1%
	2006	2006	2003
Bataan	49.2	43.1	39.8
Saranggani	39.5	36.2	33.4
Isabela	41.1	35.4	32.7
Pangasinan	40.7	36.0	33.4
Rizal	53.0	46.0	43.4
Benguet	40.0	27.9	25.8
Negros Oriental	73.8	55.0	53.0
Zamboanga Del Sur	59.2	51.2	49.2
Cebu	52.6	45.1	43.5
Sultan Kudarat	43.5	35.7	34.2
Negros Occidental	50.6	45.3	44.1

**Provinces not shown here have CVs similar to values in 2003*

One may conclude that the reason for the persistently high CVs is that the sample for the province may not be representative of the population. To address the problem, further trimming was done in each of these provinces until the CVs are comparable to their respective acceptable values in 2003.

Note that the CVs are relatively high because these are computed at **per capita** levels of incomes. The FIES is a **household** survey. If CVs are computed for household incomes, the values are actually low. These are the figures we see attached to per capita incomes in official data publications.

Furthermore, the FIES is only representative at the regional level. Estimates calculated at finer disaggregation (i.e., by province) should be used with caution. In fact, the same is true for all household surveys used here.

% trimmed	Number of provinces
1	25
2	12
3	10
4	8
5	8
6	6
7	2
8	2
9	1
10	4

Trimming reached up to 10% of the sample for some provinces. In Table 4, the distribution of the provinces according to the percentage trimmed to arrive at the target CVs are shown.

Data transformations

Previous transformations of per capita incomes to real values were done using the old consumer price index (CPI) series (base year is 1994). A new series was published in 2004 with 2000 as its base year. Since then, the CPI for the old series was no longer available. This led to a re-computation of the per capita incomes in previous HDIs applying the new CPI series. This transformation is necessary to ensure comparability of incomes over the years. All nominal values were transformed to 1997 prices. Further transformation was done by adjusting the real incomes with the cost of living indices (Balisacan 2000) to ensure comparability across provinces. The base used is Metro Manila.

Purchasing power parity equivalents of nominal per capita incomes were also computed. This was done by applying the implicit exchange rate derived from the 2007 Human Development Report and Peso GDP in 2006.

Index computations

Human Development Index

The Human Development Index (HDI) is the summary measure of human development. It has three basic dimensions: longevity, knowledge, and standard of living.

1. Longevity is measured by the life expectancy at birth. A straight line interpolation using 1995 and 2000 actual estimates was done to obtain values for 2006².
2. Knowledge on the other hand, is measured by the basic enrollment ratio or the enrollment ratio of children 7 to 16 yrs old, by the high school graduate ratio of population aged 18 years old and above, and by the functional literacy rate.
3. Lastly, standard of living is measured by the real income per capita (per capita income in 1997 Metro Manila prices and per capita income in PPP US\$).

The report computed for two HDIs—HDI1 for interprovincial comparisons and HDI2 for international comparisons.

To compute for the HDI, an index for each dimension is created.

The formula for calculating the index for each dimension is as follows:

The maximum and minimum values used are obtained from recent Global HDI except for the income index, where the maximum and minimum values used for the computation of HDI-1 are obtained from the observed data itself. Due to lower levels of real per capita incomes computed for this issue, the minimum value set in previous years used in the computation of the provincial HDIs has been breached. Using the previous minimum value in computing the HDI of provinces with per capita incomes lower than the set minimum would result in negative values. To remedy, the lowest real per capita income computed from the recent data was set as the minimum value.

² Life expectancy projections for 2003, 2000 and 1997 using the new 2000 life tables were computed as well.

The goalposts used in this report are as follows:

Table 5. HDI goalposts		
Indicator	Maximum value	Minimum value
Life expectancy at birth, years	85	25
Basic enrollment ratio, %	100	0
High school graduate ratio, % (for HDI-1)	100	0
Functional literacy rate, % (for HDI-2)	100	0
Real per capita income, 1997 Metro Manila pesos (for HDI-1)	46,837 ^a	6,664 ^b
Real per capita income, PPP US \$ (for HDI-2)	40,000	100

^a Metro Manila per capita income, 1997

^b Tawi-Tawi per capita income, 2006

Differences, whenever applicable, in the computation of these dimension indexes according to the HDI index being computed (either for interprovincial or international comparison) are illustrated in Table 6. Note that the education index is a composite index of two of the knowledge measures described earlier.

Table 6. Dimension index computations		
Dimension	HDI-1	HDI-2
Life expectancy		
Education		
Income		

Where life expectancy, basic enrollment ratio, high school graduate ratio, functional literacy rate and per capita income.

The HDI is then computed by getting the average of the three dimensions:

As an illustration, the HDIs of Benguet province are computed in the following table.

Table 7. HDI computations for Benguet		
Dimension	HDI-1	HDI-2
Life expectancy		
Education		

Income
HDI

Indices for 1997, 2000 and 2003 were re-estimated to reflect the latest data on life expectancy and the changes in the goalposts particularly in per capita income.

Gender-Related Development Index

The Gender-related Development Index is the adjustment of the average achievement of the country in human development to reflect the inequalities between men and women. To obtain estimates for male and female, the report used the 2006 Labor Force Survey and the 2004 Annual Poverty Indicator Survey for the male and female population shares and for the total income shares respectively.

The computation of GDI has the following steps:

1. Compute separately for the indices of each of the dimensions for male and female using the following formula introduced in the HDI computations earlier but this time using the following minimum and maximum values.

Indicator	Maximum value	Minimum value
Female life expectancy at birth, years	88	28
Male life expectancy at birth, years	83	23
Basic enrollment ratio, %	100	0
High school graduate ratio, % (for GDI-1)	100	0
Functional literacy rate, % (for GDI-2)	100	0
Real per capita income, 1997 Metro Manila pesos (for GDI-1)	62,758 ^a	4,346 ^b
Real per capita income, PPP US \$ (for GDI-2)	40,000	100

^a Metro Manila estimated male per capita income, 2000

^b Basilan estimated female per capita income, 2006

2. Then, compute for the equally distributed index by combining the male and female indices calculated. The formula for computing the equally distributed index is as follows:

In the GDI $\epsilon = 2$. Thus the equation above becomes,

3. Lastly, compute for the GDI by combining the three equally distributed indices in an unweighted average.

The GDI for Benguet is computed as follows:

Table 9a. GDI-1 computations for Benguet			
Dimension	Male	Female	Equally distributed index
Life expectancy			
Education			
Income			
GDI-1			

Table 9b. GDI-2 computations for Benguet			
Dimension	Male	Female	Equally distributed index
Life expectancy			
Education			
Income			
GDI-2			

Human Poverty Index

The Human Poverty Index (HPI) is a measure of deprivation in the three basic dimensions of human development. It has three components: deprivation of a long and healthy life; deprivation of knowledge; and deprivation of a decent standard of living.

1. Deprivation of a long and healthy life is the vulnerability to death at a relatively early age. It is the probability at birth of not surviving to age 40.
2. Deprivation of knowledge, on the other hand, is the exclusion from the world of reading and communications, as measured by the percentage of population who did not graduate from high school.

3. Lastly, deprivation of a decent standard of living is defined as the lack of access to overall economic provisioning. It is measured by the percentage of the population not using improved water sources and the percentage of children under five who are underweight.

The formula in computing the HPI is as follows:

To illustrate, the HPI for Benguet is computed as follows.

Table 10. HPI computation for Benguet	
Dimension	Deprivation index
Deprivation of a long and healthy life	
Deprivation of knowledge	
Deprivation of a decent standard of living	
HPI	