



Poverty and Inequality in Bhutan

Computation of a National Poverty Line, and Derived Poverty and Inequality indicators

- **The national poverty line**, which represents the amount that a person should consume (in real terms) to be considered as non-poor, **has been established at 740.36 Nu. per month.**
- Based on this poverty line, it was estimated that **31.7 percent of the population of the country is poor.** Only 4.2 percent of the urban population is poor, against 38.3 percent of the rural population.
- **Inequalities are relatively high**, with the richest 20 percent of the population consuming almost eight times more than the poorest 20 percent (Gini coefficient of 0.416).

Background

Bhutan is a least developed country, and its economy is essentially an agrarian one with 79 percent of the people dependent on agriculture and livestock rearing for their livelihood.

Bhutan embarked on its first development initiative with the inception of the first five-year plan in 1961. Prior to this, a vast majority of Bhutanese lived rugged lives of isolation. However, Bhutan has undergone major transformation and there has been remarkable improvement in all aspects of the lives of Bhutanese people.

The Gross Domestic Product (GDP) of the country grew with an average growth rate of 6.6 percent over the years and the GDP per capita has been recorded at US\$ 755 today. It is estimated that on average, a Bhutanese born today could expect to live to the age of about 66 years. There has been visible achievement in the field of education with the gross enrolment reaching to 72 percent in 2002. The progress we have recorded would have been impossible without the continuity

and vision that have been bestowed upon our nation by the institution of a hereditary monarchy (Bhutan 2020).

It is the monarchy that has led the way in establishing the conditions required for development as well as in the articulation of the nation's approach to development.

The Bhutanese approach to development has been shaped and guided by the concept of Gross National Happiness (GNH) enunciated by His Majesty King Jigme Singye Wangchuk in the late 1980s. This unique concept of GNH was articulated by His Majesty to indicate that development has many more dimensions than those associated with GDP, and that development should be understood as a process that seeks to maximize happiness rather than economic growth. The concept places the individual at the center of development efforts, and it recognizes that the individual has material, spiritual and emotional needs.

Although no special poverty interventions have been targeted in the past, the Royal Government of Bhutan (RGoB) has addressed a wide range of poverty issues broadly through the expansion of social services, rural development and income generation activities, wherein a vast majority of our population had benefited in very tangible ways.

The National development targets as reflected in the Ninth Plan and Bhutan 2020 closely match the Millennium Development Goals (MDGs) and as such, stand as a testimony of a strong national political commitment to socio-economic development and GNH which ensures that our people not only live above the

poverty line but also enjoy better quality of life. Poverty and related issues are, however, now being addressed nationally and have been an important thematic subject at various national and international forums. The RGoB is also a party to a Poverty Reduction Partnership Agreement wherein the Government has committed itself to attainment of international development goals as enunciated in the World Summit for Social Development Declaration in 1995.

The Pilot Household Income and Expenditure Survey (HIES) 2000 and Poverty Assessment and Analysis Report 2000 indicated that despite a remarkable progress in the socio-economic development of the country, poverty is still a reality in contemporary Bhutan.

Efforts to assess, analyze and monitor poverty in the country have begun very recently and there is significant lack of quantitative data. The main purpose of the *Quantitative Poverty Analysis* is to assess the impact of the policies that the RGoB has pursued till date in improving the quality of life in our country. It is also envisaged that the data collected and developed during the study will become a valuable guide and tool for development planning in future, particularly for setting priorities. This exercise is an attempt in a process to construct a quantitative database at national level with a wide range of living standard indicators covering both income and non-income aspects of well-being, including health, education, economic activities, physical infrastructure etc. These living standard dimensions demand new programs that deliberately target poor and seek to bring them closer to the mainstream of the nation's development process with a view to maximize the Gross National Happiness.

Current Institutional Set-up

Unlike other developing countries, Bhutan does not have a formal agency to tackle poverty as a separate programme. Many of its development activities are directly or indirectly geared towards alleviating the living standards of the people.

Bhutan, until recently, claimed that abject poverty per se did not exist in the country. The fact that most development programmes are people oriented, it is subsumed that the real needs of the poor are attended to and there was no need to give an additional emphasis. However, with the current pace of development, and in consideration of the

current practices in other countries for measuring and analyzing poverty, it is apparent that poverty does exist in our country.

Further, the RGoB's policy of Decentralization mandate that all development programmes which are prepared at the geog and community level must reflect the actual needs of the very poor. The successive plans, particularly the 9th Five Year Plan, which is geog-based takes care of much of the community needs and for this very reason, so far no particular agency is assigned to undertake any of the poverty related programmes. However, since Bhutan is a signatory to the 2000 Millennium Declaration which sees to work toward the MDGs, the Department of Planning is currently spearheading a project in the preparation of Poverty Reduction Strategy Paper (PRSP), the first draft of which has been completed. The PRSP outlines Bhutan's step-by-step strategy in addressing the poverty situation in the country.

Further, with the emergence of this new phenomenon, it is increasingly felt that there is need for the RGoB to consolidate and take stock of what has been done so far in actually addressing the specific needs of the poorer sections of the society. Therefore, a special agency, although not identified, needs to be established immediately so that poverty alleviation programmes can be undertaken in a more focused manner.

The objective of the Study

Although a huge amount of budget has been spent on development over the past four decades, the RGoB recognizes that much needs to be done as poverty still persists. While the Royal Government ensures that funds are provided wherever necessary, limited resources of its own are left but with less options in its development planning. On the other hand, the changing scenario in international development assistance has compelled the RGoB to re-orient its development focus. As such, much emphasis is being paid towards the development of more vulnerable groups.

The present study therefore is an attempt in this direction in that the findings will enable the policy makers to understand the actual poverty situation and accordingly formulate appropriate policies.

The Bhutan Living Standards Survey (BLSS) 2003

The source of data used to compute the poverty line and the related poverty and inequality indicators is the Bhutan Living Standard Survey (BLSS) 2003, conducted by National Statistical Bureau (NSB) with the support of the Asian Development Bank (ADB). Data was collected between April 2003 and June 2003 on a sample of 4,007 households, out of an initial sample of 4,200. The geographical coverage extended over the entire area of Bhutan with the exception of some rural gewogs in Sarpang and Samdrup Jongkhar Dzongkhags, not accessible at the time of the survey.

In order to get a representative sample of the households the entire country was divided into three regions based on the number of households and their geographic location; namely Western, Central and Eastern. The division of regions was done in a vertical form.

Western Region:Thimphu, Paro, Ha, Samtse, Chhukha, Punakha and Gasa

Central Region:Wangduephodrang, Daga, Tsirang, Sarpang, Zhemgang, Trongsa and Bumthang

East Region:Lhuntse, Mongar, Pemagatsel, Samdrup Jongkhar, Trashigang and Trashi Yangtse

This sample represents a total extrapolated population of 547,178 people. This figure is an estimate based on the sample frame, which does not cover the whole population of the Kingdom.

The population coverage included all households in the country except the following:

- Households of expatriates;
- Residents of hotels, boarding and lodging houses, monasteries including nunneries, school hostels, orphanages, rescue homes, vagrant houses, and under-trial in jails and indoor patients of the hospitals, nursing homes etc.; and
- Barracks of military and paramilitary forces including the police.

The survey collected data on household expenditure, as well as on households' characteristics (demographics, education, health, assets ownership, sources of income, housing, employment, priorities, etc).

The survey had two objectives: (i) to establish a comprehensive poverty profile of Bhutan; (ii) to provide detailed data on household consumption and expenditure, for updating the consumption basket used for computing the consumers' price index (CPI), and for rebasing the CPI and national accounts using 2003 as new base year.

Methodology of Poverty Measurement

A method widely used in developing countries was used to compute a national poverty line. A household is said to be poor if its consumption level is insufficient to acquire a given level of goods and services regarded as essential for a minimum standard of living. The poverty line is thus established at a level of consumption that assures basic needs are met. Details on the computation of household consumption are provided in Technical Note 1. Consumption includes items purchased, produced, and received.

The national poverty line is made of two components: (i) a food poverty line, giving the cost of a bundle of goods attaining a pre-determined minimum food energy requirement, and (ii) an allowance for basic non-food goods. The approach to compute the national poverty line thus involves two steps:

1. Computation of a *food poverty line* by setting and valuation of a basic needs food bundle. The basket of goods must be consistent with the observed consumption patterns among low-income households in the country, and represent a certain nutritional value.

2. Valuation of the non-food component of the basic needs bundle, to obtain an *overall poverty line*.

Food Poverty Line

The food poverty line is constructed on the basis of calorie requirements of individuals. We assumed that, considering the typical Bhutanese diet, households that fulfill their calorie requirements will also fulfill their protein requirements.

The calorie norms vary from country to country. Since no specific food energy requirement is available for the Bhutanese

population, the norm applied in Nepal has been used, i.e. 2,124 Kcal. per day per person.

The composition of the food basket used for establishing the national poverty line must bear resemblance to actual eating habits of the poor. We chose to establish the food poverty line using a basket representative of the diet of the poorest 40 percent of the population (based on nominal per capita consumption).

Although some differences exist in regional patterns of consumption, one single national food basket was used. Not all food items were retained. It may be noted that items for those which had data on both the quantity consumed (in standard measurement units), and data on calories intake, was available were retained for the current purpose. Therefore, we obtained a typical food bundle of 33 products, which account for 80 % of the food consumption of the poorest 40% of the population.

The quantity of each item in the reference food basket was rescaled (keeping their relative share unchanged), in such a way that the basket provides a total of 2,124 Kcal per day. Based on these rescaled quantities, the cost of the bundle was estimated using the national median unit price of each item. The cost of purchasing this bundle was estimated at 403.79 Nu. per month per person, which corresponds to the food poverty line. Table 12 in Technical Note 2 provides detailed information on the composition and the valuation of the food basket.

The food poverty line was estimated at Nu.403.79 per capita per month.

Non-food Allowance and Overall Poverty Line

Having set the food poverty line, a non-food allowance was added to obtain an overall poverty line that incorporates both food and non-food needs.

This was done by scaling up the food poverty line by some factor (called the Engel's coefficient) to allow for the purchase of essential non-food items. This factor was computed by measuring what is the typical value of non-food spending by a household that is just able to reach its food requirements. Details on this computation are available in Technical Note 3.

The overall poverty line was estimated at Nu.740.36 per capita per month.

Regional Price Deflators

Prices differ from region to region. What matters is the "real" consumption of households, not their nominal consumption. To obtain the real values, the nominal consumption must be deflated using regional price deflators.

No such deflators were available. Paasche regional price deflators were thus computed for food items using the BLSS data. The Paasche price deflators, which are specific to each household as they are based on each household's consumption pattern, are the most appropriate for money-metric measurement of poverty.

The deflators were computed using the median national unit prices of each food item as reference. Details on these computations are provided in Technical Note 4. Table 1 below provides the median of the food regional price deflators by region.

No price data was available for non-food items. Therefore the food regional price deflators were used as overall regional price deflators.

Table 1 . Paasche regional price deflators, by Dzongkha (median of household-level deflators)

<i>Urban</i>	<i>1.07</i>	<i>Rural</i>	<i>0.99</i>
Chukha	0.96	Chukha	0.91
Ha	1.03	Ha	0.98
Paro	1.07	Paro	1.04
Thimphu	1.11	Thimphu	1.07
Punakha	1.06	Punakha	1.04
Gasa	1.06	Gasa	0.99
Wangdi	1.06	Wangdi	1.01
Bumthang	1.26	Bumthang	1.16
Trongsa	1.14	Trongsa	1.02
Zhemgang	1.08	Zhemgang	0.96
Lhuntshi	1.09	Lhuntshi	0.98
Mongar	1.07	Mongar	0.97
Trashigang	1.14	Trashigang	0.99
Yangtse	1.12	Yangtse	0.99
Pemagatshel	1.05	Pemagatshel	0.89
Samdrup Jongkhar	0.94		
Samtse	0.90	Samtse	0.82
Sarpang	0.93		
Tsirang	1.00	Tsirang	1.00
Dagana	1.08	Dagana	1.05

Poverty Indicators

Having established the overall poverty line, we identify poor households by identifying those whose members have real consumption below the poverty line. We can also determine the extent by which household consumption fall below the poverty line. This leads to the computation of the poverty incidence, poverty gap index, and poverty severity index.

Poverty incidence

Poverty is measured at the household level. Data does not allow intra-household analysis. If a household is considered poor, then all its members are considered poor. If a household is non-poor, then none of its member is poor.

Overall poverty line and food poverty line are used to compute for poverty and subsistence incidence, respectively.

Table 2 provides the incidence of poverty, in terms of the percentage of the population. Table 3 shows the incidence of poverty as a percent of households. Since poor households are on average larger than non-poor households, the proportion of poor households will be smaller than the proportion of poor population. More information on the computation of the poverty incidence, and

important information on sampling errors, are available in Technical Note 5.

Table 2 provides details on the percent of the population who are poor and subsistence poor, by urban-rural and by region. The same table also shows that poverty headcount is highest in the east and lowest in the west but the share of population is highest in the west accounting for about 40% of the total population.

Using poverty lines for the urban and rural areas and for the three regions of the country and per capita levels, the poverty head count estimates show that 31.7 percent of the Bhutanese population was living in poverty in 2003, or about 173,462, based on the population of 547,179 extrapolated from the sample. The sample frame, however, did not cover two district rural areas. Applying the headcount rate to the population figure of 734,340 in the Statistical Yearbook 2003, the poor population is estimated to be 232,859. We observe that poverty in Bhutan is more of a rural phenomenon. About 40% of the rural population are poor while only less than 5% of the urban population are poor.

The standard errors for the estimates of poverty headcount and subsistence incidence are relatively small. Consequently, estimates for the rural, urban and the three regions are reliable.

Table 2. Poverty and Subsistence incidences (percent of population)

	Poverty Headcount			Subsistence Headcount			Population share (%)
	Index (%)	Standard error (%)	Contribution to total	Index (%)	Standard error(%)	Contribution to total	
<i>Bhutan</i>	31.7	2.3	100	3.8	0.7	100	100
<i>Urban</i>	4.2	0.7	2.6	0.031	0.03	0.15	19.2
<i>Rural</i>	38.3	2.8	97.4	4.7	0.9	99.85	80.8
<i>Region</i>							
<i>Western</i>	18.7	3.1	23.6	1.7	0.6	17.7	40.1
<i>Central</i>	29.5	3.4	24.2	2.2	0.8	14.7	26.0
<i>Eastern</i>	48.8	4.1	52.3	7.6	1.8	67.6	34.0

Table 3. Poverty and Subsistence incidences (percent of households)

	Poverty incidence (%)	Contribution to total subsistence	Subsistence incidence (%)	Contribution to total subsistence	Population share (%)
<i>Bhutan</i>	24.7	100	2.6	100	100
Urban	3.0	2.8	0.02	0.194	22.8
Rural	31.6	97.2	3.4	99.806	77.2
<i>Region</i>					
Western	12.7	21.0	0.95	14.9	40.8
Central	22.2	21.1	1.4	12.5	23.3
Eastern	39.9	58.0	5.3	72.5	35.9

The incidence of poverty can be measured for different categories of population (e.g. according to the level of education of the head of household, by gender, economic activity of the head of household, main source of income, etc).

National poverty lines are based on country-specific methods and datasets. They are therefore not strictly comparable. For information, we, however, provide in Table 4 the poverty incidence in some other countries in the region, based on their own national poverty lines.

Table 4. Poverty incidence in selected Asian countries
(% of population, based on national poverty lines)

Country /Year	Poverty Incidence (% of population)		
	<i>National</i>	<i>Urban</i>	<i>Rural</i>
Bangladesh (2000)	49.8	36.6	53.0
<i>Bhutan (2003)</i>	31.7	4.2	38.3
Cambodia (1999)	35.9	18.2	40.1
India (2000)	28.6	24.7	30.2
Malaysia (1999)	7.5	3.4	12.4
Mongolia (1998)	35.6	39.4	32.6
Nepal (1999)	38.1
Philippines (2000)	34.0	20.4	47.4
Thailand (2002)	9.8	4.0	12.6
Viet Nam (2002)	28.9	6.6	35.6

Poverty gap index

The poverty gap index measures the depth of poverty for the population. For an individual,

the poverty gap is the difference between the poverty line and actual expenditure (*it has a value of 0 for all individuals above the poverty line*).

The poverty gap index gives a good indication of the depth of poverty, in that it adds up the extent to which individuals fall below the poverty line (if they do) and expresses it as a percentage of the poverty line. More information on the computation of this index is available in Technical Note 5.

Poverty severity index

The poverty severity index is similar to the poverty gap index, except that more weight is given to the very poor than to less poor households in its computation. It is calculated as the weighted sum of poverty gaps (as a proportion of the poverty line), where the weights are the proportionate poverty gaps. (see Technical Note 5).

For both indices, the larger the index the greater the degree of poverty. These indices are important for planning of poverty reduction programs and therefore, all things being equal, areas with the higher indices should receive priority.

Table 5 shows that poverty is deeper and more severe in rural Bhutan compared to in the urban areas. Poverty is also shown to be deeper and more severe in the Eastern Region than in other regions.

Table 5. Poverty gap and severity indices (based on population)

	Subsistence Poverty		Poverty	
	Gap Index	Severity Index	Gap Index	Severity Index
Bhutan	0.0041	0.0007	0.08592	0.03084
Urban	0.00001	0.00000	0.00684	0.00164
Rural	0.00508	0.00087	0.10476	0.0378
Region				
Western	0.00125	0.00016	0.0466	0.01576
Central	0.00252	0.00043	0.06622	0.02121
Eastern	0.008868	0.00154	0.14737	0.05599

An attempt to analyze the poverty gap between male and female headed households was also made but the figures from Table 6 do not suggest that any visible difference when it comes to the poverty situation whether the household is headed by male or female.

Table 6 .Poverty measures by gender of household head (based on households)

Gender of household head	Poverty		
	incidence(%)	gap index	severity index
Bhutan	24.7	0.06456	0.02261
Male	23.9	0.06176	0.02136
Female	26.3	0.07075	0.02539

The Cost of eliminating poverty in Bhutan

The estimated total population of Bhutan as of 2003 is 734,340. Based on this estimate, a total of Nu. 560,551,664 would be needed annually if the poverty situation needs to be eliminated. This aggregate consumption shortfall from the poverty line is an amount equivalent to about 1 percent of the gross domestic product. The total amount needed to eliminate subsistence poverty is Nu. 14588742 annually, or about 0.02 percent of GDP. This amount is the absolute minimum needed to raise the consumption levels of all of Bhutan's subsistence poor to above the food poverty line.

Considering that the figures represent the finding, which are based on the limited coverage, i.e. two southern districts were not covered fully by the current survey, the conclusion derived thereof would not portray the actual poverty scenario. It is however understood that even if the survey had covered the whole country, the information

that we have at hand will not be adequate enough for us to identify the actual poor. This leads us to a situation where perfect targeting becomes difficult and so the administration of poverty reduction programs will be substantially costlier, due to leakages.

While consistent efforts have been made to raise the living standards through different government developmental programs, it needs to be seen whether or not initiation of special programs that target the specific needs of those below the poverty line could be advocated.

As the cash direct transfer to those falling below the poverty line is neither sensible nor feasible, an appropriate strategy will need to be adopted. The immediate suggestion is to work out a simple mechanism to initiate income-generating activities with access to easy market and credit facilities.

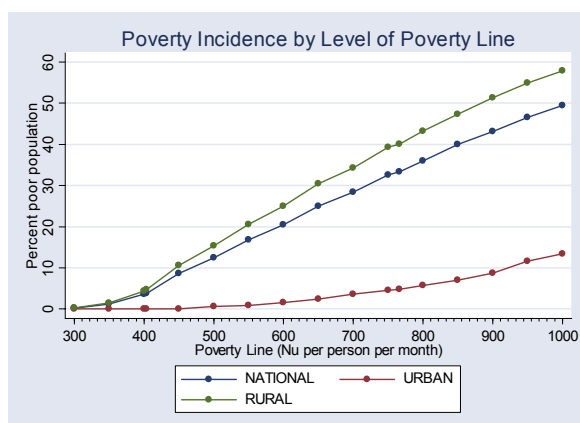
Sensitivity to Poverty Line

The computation of a national poverty line is based on some arbitrary methodological choices. The extent to which the poverty incidence is sensitive to the choice of the poverty line can be seen by computing the poverty incidence corresponding to different poverty lines (Table 7 and Figure 1).

Table 7. Poverty incidence for various poverty lines

Poverty Line	Poverty Incidence (% population)		
	NATIONAL	URBAN	RURAL
300	0.2	0.0	0.3
350	1.2	0.0	1.5
400	3.6	0.0	4.4
403.79	3.8	0.0	4.7
450	8.6	0.0	10.6
500	12.5	0.6	15.4
550	16.8	0.9	20.6
600	20.5	1.6	25.0
650	25.0	2.4	30.4
700	28.4	3.6	34.3
740.36	31.7	4.2	38.3
750	32.6	4.5	39.3
800	36.0	5.7	43.2
850	40.0	7.0	47.3
900	43.1	8.7	51.3
950	46.5	11.6	54.9
1000	49.4	13.4	57.9

Figure 1. Poverty incidence using different poverty lines



Policy implications of the poverty measures

Bhutan did not pursue a mainstream economic growth model, but instead adopted a basic needs model for its development purposes. Thus Five-Year Plans have always placed emphasis on the welfare of the poorest and the most disadvantaged and on enhancing their income. Therefore, poverty was not featured strongly in the past as separate issue by itself as the development thrust was well integrated.

Sectors such as Education and Health have always received the highest priority in its successive plans. In the current 9th FYP plan alone, education and health share amounts to 30 percent of the total plan outlay indicating that Bhutan is committed to the achievement of Universal and Health for All.

Despite its geographical disadvantage, our country has been able to reap the benefit of regional as well as international cooperation. The strong support from the donor community for the royal government's needs based development approach has resulted in improving every aspect of life of many Bhutanese. The traditional institutions on the other hand supplemented to enhance the lives of many unfortunate.

Any Bhutanese could appeal to His Majesty the King for anything and it is ensured that

someone with the genuine problem is provided with the required support. Similar support systems exist even among the communities.

While there is no uniformity, there is a process whereby the self help groups organize and volunteer in times of sickness, death, funeral rites, religious ceremonies, etc. The religious institutions that exist at different levels also provide the necessary services, particularly in the enrichment of spiritual aspects of individual's life.

Although we are an agrarian society, given the limited arable land, extensive agriculture has not been possible. Even with the best efforts, the potential to achieve food security has been limited. It has therefore become important for the country to pursue other economic measures to ensure food availability.

Shift from basic farming to horticulture and other commercial crops have provided the farmers with some form of alternative at least momentarily. The introduction of low interest rural credit schemes, small scale cottage industries etc., could provide a good opportunity in alleviating rural as well as urban poverty.

Inequality Indicators

Quintile dispersal ratio

Each quintile contains 20 percent of the population, ranked by ascending order of per capita real consumption. The quintile dispersion ratio, or the ratio of the richest quintile's consumption share to the poorest quintile's share, is a simple indicator of inequality.

Table 8 shows that, on the average, a person belonging to the richest 20% of the national population consumes almost 8 times more than a person belonging to the poorest 20% of the population. Similar ratios are computed separately for the urban and rural areas. The average per capita consumption of the richest quintile is 6.3 times that of the poorest quintile in the urban areas and 6.2 in the rural areas. The lower quintile dispersal ratios for the rural and urban areas indicate that there is less heterogeneity in the per capita expenditure within the rural and urban areas, and more variability between the urban and rural areas.

Table 8. Mean monthly real per capita consumption (Nu), and share in total consumption, by population quintile, National

Population Quintile	Mean Consumption (Nu per capita per month)	Share in National Consumption (%)
Poorest	467.47	6.5
Second poorest	719.92	9.9
Middle	1012.61	14.0
Second richest	1517.91	20.9
Richest	3534.46	48.7
All	1449.74	100.0

Ratio of fifth to first quintile: **7.6**

Table 9 . Mean monthly real per capita consumption (Nu), and share in total consumption, by population quintile, Urban

Population Quintile	Mean Consumption (Nu per capita per month)	Share in Urban Consumption (%)
Poorest	897.12	7.2
Second poorest	1408.95	11.3
Middle	1893.86	15.2
Second richest	2647.97	21.1
Richest	5682.61	45.3
All	2504.02	100.0

Ratio of fifth to first quintile: **6.3**

Table 10. Mean monthly real per capita consumption (Nu), and share in total consumption, by population quintile, Rural

Population Quintile	Mean Consumption (Nu per capita per month)	Share in Rural Consumption (%)
Poorest	443.99	7.4
Second poorest	650.75	10.8
Middle	888.05	14.8
Second richest	1244.44	20.8
Richest	2770.24	46.1
Total	1198.51	100.0

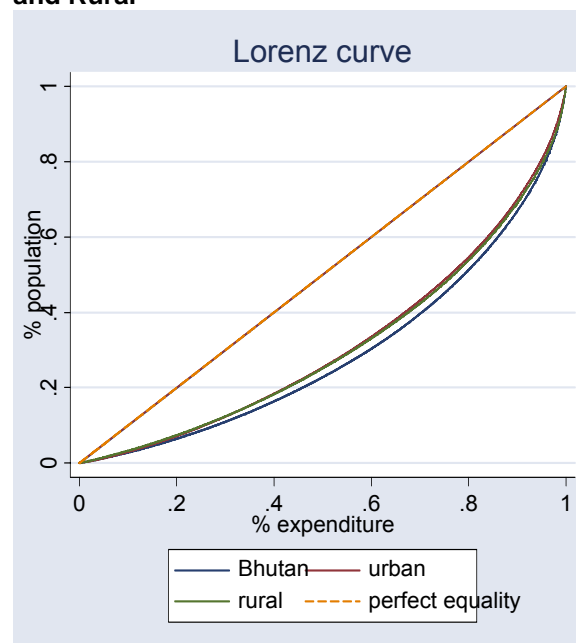
Ratio of fifth to first quintile: **6.2**

Lorenz Curve

The Lorenz curve (Figure 2) maps the cumulative expenditure share on the vertical axis against the distribution of the population

on the horizontal axis. If each individual had the same expenditure, or total equality, the expenditure distribution curve would be the 45-degree line in the graph.

Figure 2. Lorenz Curve, National, Urban, and Rural



Gini coefficient

The Gini coefficient is a measure of concentration of expenditure (or income). The ratio ranges from zero (completely equality) to one (complete inequality, when one person spends/owns everything). See Technical Note 6 for more information. The Gini coefficient is relatively high at .416, although it is lower in the urban areas than in the rural areas.

Table 11. Gini coefficient

National	0.416
Urban	0.374
Rural	0.381

Atkinson Index

The Atkinson class of measures ranges from 0 to 1, with zero representing no inequality. It is computed for various values of a parameter ϵ indicating the society's aversion for inequality (the higher the value of ϵ the more the society is concerned about inequality). See Technical Note 6 for more information.

Table 12 . Atkinson index for various parameters of aversion for inequality

	$\epsilon = 0.5$	$\epsilon = 1.5$	$\epsilon = 2.0$
Bhutan	0.141	0.120	0.386
Urban	0.114	0.277	0.337
Rural	0.120	0.278	0.332

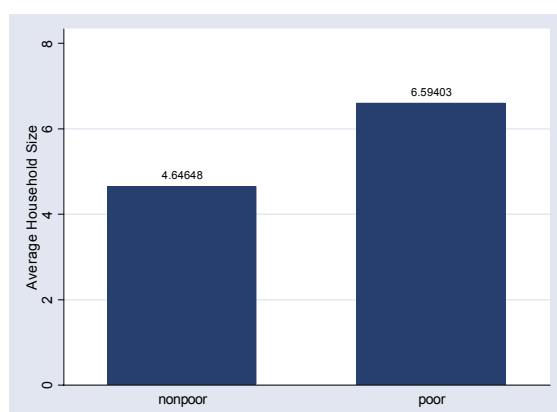
Bhutan's poor: Who are they?

The size of poor households

As shown in Figure 3, the size of poor households is significantly larger than that of non-poor households. On the average, the non-poor households have 4.6 members, while poor households have 1.9 additional persons.

The composition of poor households is considerably different from that of non-poor. In the poor households the age dependency ratio is 83 percent, whereas in the non-poor households it is 68 percent. This implies that for an average family size of 6.6 in a poor household, about 3 are not within the working age. In contrast, in the non-poor household, for an average size of 4.6, almost 2 are outside the working group. Consequently, poor households considerably have more dependents per worker in the household as compared to the non-poor households.

Figure 3. Average household size of poor and non-poor households



Tables 13 and 14 indicate that the incidence of poverty increases as the size of the household increases. For those households with 8 or more members the poverty rate, which measures the proportion of the households

that is counted as poor, is about 58 percent while for single member households the poverty rate is only about 4 percent. This observation holds for all three regions as well as the urban and rural areas.

Table 13 . Poverty incidence among households, by household size

Household size	Poverty Incidence		
	Western	Central	Eastern
1	1.6	1.8	0.0
2-3	1.0	4.5	10.6
4-5	5.0	5.9	23.9
6-8	13.9	22.7	43.2
9+	42.9	47.2	61.9

Table 14. Poverty incidence among households, by urban-rural and national

Household size	Poverty Incidence		
	Urban	Rural	BHUTAN
1	0.0	4.4	1.2
2-3	1.0	11.4	4.7
4-5	4.1	23.1	10.7
6-8	7.8	37.9	24.0
9+	21.3	56.8	48.0

From Table 15, it is also clear that the food poverty incidence is 0 for those households with a single member irrespective of which region they reside. This holds true for both urban and rural areas as well.

However, it is interesting to note that in the urban areas, whatever the size of the household is, food poverty is virtually non-existent. This is depicted in Table 16.

Table 15. Subsistence Incidence among households, by region

Household size	Subsistence Incidence		
	Western	Central	Eastern
1	0	0	0
2-3	0	0	1.3
4-5	0.76	0.46	1.3
6-8	0.76	1.5	12.8
9+	5.7	5.4	13.4

Table 16. Subsistence Incidence among households, by urban-rural and national

Household size	Subsistence Incidence		
	Urban	Rural	BHUTAN
1	0	0	0
2-3	0	0.7	0.5
4-5	0	1.3	0.9
6-8	1.0	5.9	5.0
9+	0	7.9	7.4

Age and sex characteristics of poor households

The difference in the age and sex structure of poor and non-poor households in Bhutan is shown in Table 17. We observe that 58% of the non-poor population consists of the working-age persons. The corresponding share for the poor population is lower at 53%. The proportion of the young population is greater among the poor than for the non-poor.

Table 17. Magnitude (and percentage) of poor and non-poor persons by sex and by age group

Age group in yrs.	Male		Female		Total	
	Poor	Non-poor	Poor	Non-poor	Poor	Non-poor
0-14	31529 (38.1)	57518 (32.7)	31846 (36.4)	61659 (32.1)	63375 (37.2)	119177 (32.4)
15-59	43507 (52.6)	102721 (58.3)	49274 (56.3)	116898 (60.8)	92781 (54.5)	219619 (59.6)
60+	7636 (9.2)	15925 (9.0)	6448 (7.4)	13654 (7.1)	14083 (8.3)	29579 (8.0)
Total	82671 (100)	176164 (100)	87567 (100)	192211 (100)	170239 (100)	368375 (100)

Characteristics of the head of poor households

The head of household is the person who manages the income earned and expense incurred by the household and who is the most knowledgeable person concerning other members of the household.

Figure 4 depicts that 68.9 percent of all the households are headed by males. Among the non-poor households, 69.5 percent households are headed by males and 30.5 percent by females. A lower proportion for male-headed households is observed among the poor households.

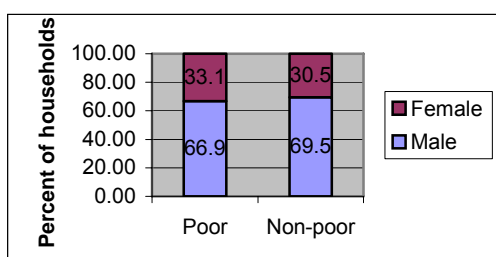


Figure 4. Poor and non-poor households, by gender of household head.

The poverty measures for households defined by the sex of the head of household are shown in Table 18. Headcount index is higher among female-headed households at 28 percent.

Poverty is also deeper and more severe among the female-headed households. Further analysis, however, is needed to determine the implications of these findings relative to the presence or absence of gender disparities.

Table 18. Poverty measures by gender of household head (based on households)

	Male-headed	Female-headed
Mean expenditure per-capita monthly	1789.93	1623.22
Poverty incidence (%)	23.93	26.26
Poverty gap index	0.06176	0.07075
Severity index	0.02136	0.02539

Table 19. Distribution of household heads by marital status

Sex	Married	Never Married	Divorced	Separated	Widow	Total
Poor						
<i>Male</i>	87.34	3	0.98	0.38	8.31	100
<i>Female</i>	60.43	1.91	6.64	0.22	30.8	100
Non-Poor						
<i>Male</i>	86.96	5.31	1.73	0.62	5.38	100
<i>Female</i>	59.14	6.62	5.94	2.1	26.19	100
All						
<i>Male</i>	87.05	4.76	1.55	0.56	6.08	100
<i>Female</i>	59.48	5.38	6.12	1.61	27.4	100

universal enrolment in primary education, i.e., (class 10), basic education has come within the reach of many.

Education

Access to basic education contributes to the well-being of the population and enhances their opportunities. Although basic education is the right of every Bhutanese, it has yet to be made available for every one, particularly to those living in the remote areas. The widely scattered population, and the difficult geographical terrain has amounted to diseconomies in the provision of this service.

Nevertheless, there has been a rapid progress recorded in this area and this must be maintained with the aim of achieving universal enrolment at the earliest opportunity. With the strong current education policy of achieving

a) Primary school enrolment rate

Primary school net enrolment rate is the proportion of primary school aged children (6-12) who are actually enrolled in primary school. Table 20 indicates that there is a considerable gap between the enrolment rates in the rural and the urban areas. This could be attributed to certain factors like distance to the nearest school, and the availability of adequate boarding facilities. There is however a clear indication that the net enrolment rate is higher for the non-poor as compared to the poor. Moreover, boys tend to have higher net enrolment rate than girls, both in the urban and rural areas.

Table 20. Primary School Net Enrolment Rate across Urban and Rural Areas for boys and girls between ages 6-12 (in percent)

As a percent of all children aged 6-12	Poor		Non-Poor		Bhutan	
	Boys	Girls	Boys	Girls	Boys	Girls
Rural						
<i>Net enrolment</i>	60	55	78	68	70	62
Urban						
<i>Net enrolment</i>	78	80	90	86	89	85

b) School participation rate

School participation rate is the proportion of children in a particular age group attending school, irrespective of the level of education.

Table 21 indicates that school participation rate is 70 percent among 6-12 year old children and slightly over 50 percent among 13-19 year old children. School attendance in the rural areas is considerably lower in the rural areas for both the non-poor and the poor.

School participation rate among 6-12 year olds in the rural areas is 65 percent and 89 percent in the urban areas. The proportion of children aged 13-19 years attending school in the rural areas is 46 percent and 77 percent in the urban areas.

Table 21 also shows that about 60 percent of the poor children aged 6-12 attend school, while nearly 80 percent of the non-poor children attend school. Moreover, less than 40 percent of the poor children aged 13-19 attend

school while 77 percent of the non-poor of the same age group attend school.

Table 21. School Participation Rate among the poor by age group across Urban and Rural areas

Poverty status	Urban	Rural	Total
Poor			
Ages 6-12	79.7	56.9	57.7
Ages 13-19	77.0	39.2	40.1
Non-poor			
Ages 6-12	89.5	71.3	76.8
Ages 13-19	77.3	51.2	58.5
All			
Ages 6-12	88.9	65.3	70.2
Ages 13-19	77.3	46.3	52.2

The Western Region has the highest school participation rate among the 6-12 year old children and the 13-19 year old children. School attendance rate is lowest in the Central Region among the 6-12 age group and in the Eastern Region among the 13-19 age group. In all regions, school attendance rate is lower among the poor than among the non-poor.

Table 22. School Participation Rate among the poor by age group (6-12 and 13-19) Across Regions

Poverty status	Western	Central	Eastern
Poor			
Ages 6-12	37.4	53.8	68.1
Ages 13-19	25.2	41.9	45.1
Non-poor			
Ages 6-12	77.8	70.7	80.9
Ages 13-19	63.5	53.2	54.7
All			
Ages 6-12	70.1	65.0	74.4
Ages 13-19	56.4	49.7	49.5

Among the poor, there is a greater proportion of male children attending school for all age groups. This is also true for the non-poor children.

Table 23. Percentage of Students attending schools in the respective age Group by Poverty Status and by Sex

Age group	Poor		Non-poor	
	Male	Female	Male	Female
6-12	60.2	55.1	80.8	73.0
13-14	53.6	39.7	78.0	71.8
15-16	62.8	31.2	66.5	50.5
17-19	39.5	17.9	51.8	40.3
20+	2.2	0.6	3.2	1.9

Table 24 shows that the school participation rate increases as per capita consumption increases for both the 6-12 and 13-19 age groups. The difference between the school participation rates for the richest and the poorest quintiles are as much as 12 percentage points for the younger age group and 14 percentage points for the older group.

Moreover, the school participation rate is considerably lower for the 13-19 age group at 52 percent compared to that of the 6-12 age group at 70 percent.

The proportion of children attending school increases as per capita consumption increases. The school participation rate for the richest quintile is about 30 percentage points higher than that for the poorest quintile.

Table 24. School Participation Rate by age group (6-12 and 13-19) by per capita consumption quintile groups

	Age 6-12	Age 13-19
First Quintile	57.8	37.5
Second Quintile	59.3	42.5
Third Quintile	70.1	51.0
Fourth Quintile	82.2	64.7
Fifth Quintile	86.3	68.1
TOTAL	70.2	52.2

As shown in Table 25, the major reasons for not attending school were the costs of sending the children to school, the need to work to augment household income, problems at home, lack of interest and distance of the school. In the urban areas, the affordability issue was the identified by half of those who did not attend school. This was also the reason cited by one-fourth of those not attending school in the rural areas. The need to work also prevented about one-fifth of the

children from going to school in the rural areas.

Table 25. Proportion of children not attending school by reasons across urban & rural areas

Reasons for not attending school	Urban	Rural	Total
<i>Not interested</i>	7.28	9.06	8.94
<i>Cannot afford</i>	50.02	26.07	27.77
<i>Needs to work</i>	3.72	18.61	17.55
<i>Did not qualify</i>	5.61	5.85	5.83
<i>School is too far</i>	3.37	7.34	7.06
<i>Illness</i>	5.32	2.39	2.6
<i>Too young/old</i>	3.54	4.61	4.53
<i>Problems at home</i>	10.51	9.37	9.45
<i>Caring sick relative</i>	0	0.44	0.41
<i>Other</i>	10.63	16.25	15.85

For the poor children (see Table 26), the leading reasons given for not attending school were the costs, the need to work, problems at home, distance of the school and lack of interest. In the urban areas, another major reason cited was illness.

Table 26. Proportion of poor children not attending school by reasons across urban & rural areas

Reasons for not attending school	Urban	Rural	Total
<i>Not interested</i>	16.28	7.51	7.6
<i>Cannot afford</i>	39.23	26.14	26.28
<i>Needs to work</i>	1.24	17.98	17.81
<i>Did not qualify</i>	9.24	5.8	5.84
<i>School is too far</i>	0	8.31	8.23
<i>Illness</i>	7.67	2.52	2.57
<i>Too young/old</i>	1.57	5.51	5.47
<i>Problems at home</i>	8.04	9.94	9.92
<i>Caring sick relative</i>	0	0.23	0.23
<i>Other</i>	16.73	16.05	16.06

c) Educ. Attainment of household heads

Table 27 shows that about three fourths of all household heads have had no schooling. About 10 percent have had some primary schooling, while about 12 percent have had some secondary schooling. Only 1.6 percent have had some college education. The

percentages of household heads who had some schooling are higher in the urban areas for all levels of education.

Figure 5 shows the educational attainment of household heads in the urban areas by poverty status. There are lower percentages of the non-poor household heads who have had little or no schooling. In contrast, there are larger percentages of the non-poor households who have had secondary or college education.

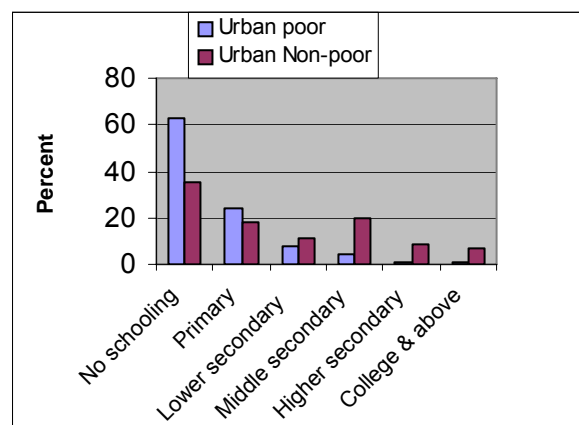


Figure 5. Educational Attainment of Household Heads in the Urban Areas

Figure 6 depicts the educational attainment of household heads in the rural areas by poverty status. The proportion of household heads who have not had any schooling is 93 percent among the poor and 87 percent among the non-poor.

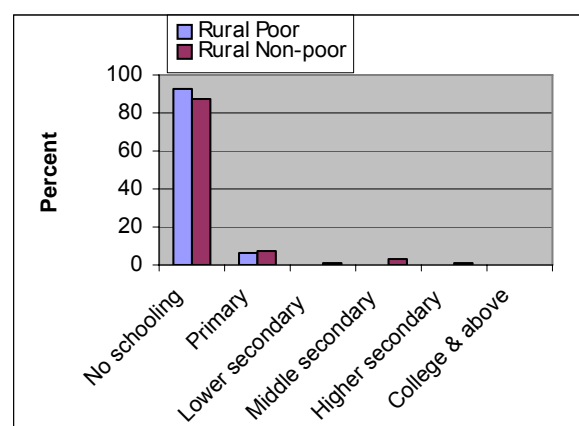


Figure 6. Educational Attainment of Household Heads in the Rural Areas

Table 27. Educational Attainment of Household Heads by poverty status across Urban and Rural Areas

Education level	Urban		Rural		Bhutan
	Poor	Non poor	Poor	Non poor	
No schooling	62.8	34.98	93.93	86.57	76.74
Primary	24.21	18.49	5.71	7.71	9.73
Lower secondary	7.69	11.32	0.22	1.49	3.40
Middle secondary	4.58	19.86	0.14	3.25	6.20
Higher secondary	0	8.58	0	0.88	2.37
College & above	0.71	6.77	0	0.1	1.56

We observe that in the percentage of poor household heads with no schooling in the urban areas is considerably much higher than that of the non-poor. The situation is different in the rural areas where we find that there is no significant difference in the percentages.

On the whole, the higher the level of educational attainment by the head of household, the lesser the chance of the household being poor.

d) Educ. Attainment of Adults

Tables 28 and 29 shows that 84 percent of all persons aged 25 and over have had no schooling. Only 8 percent have had some primary education, 7 percent some secondary education and only 1 percent college education. The non-poor tends to have higher

educational attainment than the poor. Among the poor, the males tend to have higher educational attainment. This is also true among the non-poor. There is also a rural-urban contrast in welfare benefits from education.

It is evident that the completion of middle secondary education generally is sufficient for the individual to raise his or her welfare level above the poverty line, but it is unfortunate that not many individuals are unable to attain this level of education. The most important point to note is that as the education level of adult increases in both poor and non-poor group from the primary level to secondary level, there is a wide reduction in the percentage of being poor. Thus, we find a high correlation between level of education and the poverty.

Table 28. Educational Attainment of Adults Poor and Non- Poor by Sex (Adults age >=25)

Education level	Poor		Non-poor		Bhutan
	Male	Female	Male	Female	
<i>No schooling</i>	89.68	97.88	69.81	88.1	83.49
<i>Primary</i>	9.11	2	12.32	4.97	7.62
<i>Lower secondary</i>	0.68	0.12	4.49	2.43	2.55
<i>Middle secondary</i>	0.4	0	7.58	3.18	3.84
<i>Higher secondary</i>	0.12	0	3.3	0.67	1.4
<i>College & above</i>	0.02	0	2.51	0.65	1.11

Table 29. Educational Attainment of Adults in Urban and Rural Areas by Poverty Status (Adults age >=25)

Education level	Urban		Rural		Bhutan
	Poor	Non poor	Poor	Non poor	
<i>No schooling</i>	74.72	48.49	94.39	88.97	83.49
<i>Primary</i>	18.14	14.89	5.1	6.52	7.62
<i>Lower secondary</i>	4.44	9.04	0.3	1.65	2.55
<i>Middle secondary</i>	2.34	15.6	0.15	2.06	3.84
<i>Higher secondary</i>	0	6.06	0.06	0.64	1.4
<i>College & above</i>	0.36	5.92	0	0.17	1.11

Health

The extensive health care system which has been established since the early sixties meets the requirement of both urban and rural Bhutan. The National and Regional as well as the District hospitals and the BHU's provide free medical services to the people. The numerous Outreach-Clinics and Community Health Workers provide immediate health care needs at the village and community levels. A traditional health care centre which provides alternative means of treatment is also available in most hospitals around the country.

However, given the rugged and difficult terrain, the royal government's effort to achieve universal health has proved to be rather very difficult and expensive. Further, conditions such as the remoteness, sparse population and lack of reliable communication facilities has hindered the smooth delivery of health care services ultimately resulting in higher infant mortality rates in those areas where there are no proper communication and transport facilities.

During the survey, it was reported that, on average, about 12% of the urban population had at least one sick member prior to four weeks of the survey period but had no significant difference among the poor and non-poor (cf. Table 30). The observation was similar in the rural areas except that the proportion of sick members reported an average of 15.8% during the same reference period.

Table 30. Percentage of persons who were sick during the four weeks prior to the enumeration date

Urban		Rural		Total
Poor	Non-poor	Poor	Non-poor	
9.91	12.14	14.46	16.63	15.08

Table 31 shows that while a majority among the sick consults medical professionals, there are disparities across urban and rural areas, and between the poor and the non-poor. Also, among the sick, about one in twenty non-poor residing in urban areas will not consult with anyone, while the corresponding percentage is higher among the poor in urban areas, and among rural folk.

Table 31. Percentage of sick persons by type of medical consultation by poverty status across Urban and Rural areas

Medical Consultation	Urban		Rural	
	Poor	Non Poor	Poor	Non poor
No one	12.17	5.81	13.28	18.26
Professionals	85.22	94.19	74.09	66.76
Traditional Practitioner	1.24	0	8.28	11.7
Others	1.37	0	4.34	3.28

Table 32. Percentage of persons who have not consulted any health professionals by Poverty status and across Urban and Rural areas

Reasons for not consulting health professionals	Urban		Rural	
	Poor	Non-poor	Poor	Non-poor
No need	70.56	100	40.27	37.23
No time	12.4	0	18.19	24.12
No money	0	0	3.59	1.67
No transport/too far	2.41	0	18.49	19.5
Doesn't trust	0.31	0	0	1.34
Other	14.32	0	19.46	16.13

Contraceptives: Knowledge and Use

Regarding the knowledge on contraceptives, the people in the urban areas both poor and non-poor seems to have more awareness as compared to those in the rural areas as indicated in the table below. However, of the 63% of the total population who have some knowledge about contraceptives only 44% actually reported using some forms of contraceptives.

Table 33. Knowledge and Use of Contraceptives in the urban and rural areas, by poverty status

Contraceptive	Urban		Rural		Bhutan	
	Non-poor	Poor	Non-poor	Poor	Non-poor	Poor
Knowledge	75.56	80.89	62.51	59.51	66.27	60.05
Use	43.83	44.78	45.51	43.11	44.96	43.16

Economic characteristics of the Poor in Bhutan

Expenditure patterns of poor households

The expenditure for food accounts for almost 50 percent of total expenditure of Bhutanese households. This proportion is significantly higher for poorer households than for non-poor, and this distinction is maintained in both the urban as well as rural households. As compared to that of rural households, the urban households spend a smaller part of their income on food although the largest chunk of their expenditure also goes for food expenses.

Table 34. Composition of mean per capita monthly expenditure

Percent of mean per capita monthly expenditure	Urban		Rural	
	Poor	Non-poor	Poor	Non-poor
Food	48.9	35.5	59.3	45.4
Clothing & footwear	11.9	12.1	8.4	9.1
Transport & communications	2.0	6.7	1.6	2.1
Household operations	3.2	3.8	1.9	2.3
Recreation	2.3	2.9	0.4	0.9
Furnishing & equipment	2.6	5.6	2.3	3.5
Rent	15.9	18.8	8.5	10.4
Energy for home	8.4	6.9	12.4	14.1
Miscellaneous expenditure	5.3	7.1	6.6	12.1

Sources of income for poor households

Table 35 shows that in urban areas the main source of income is wages and salaries while in the rural areas the major source of income is from own farm enterprises. The proportion of non-poor urban households with main source of income from own business is about thrice that of the poor and the same proportion is noted between the rural poor and non-poor.

Table 35. Sources of Income in the urban and rural areas by poverty status

Percentage Sources of income	Urban		Rural	
	Poor	Non-poor	Poor	Non-poor
Wages (including religious fees)	87.7	73.3	18.7	23.0
Own business	4.9	15.8	3.4	7.6
Own farm enterprise	0.7	2.0	65.8	56.9

Remittances	3.0	2.0	1.6	3.1
Rental/Real estate	0.0	0.3	0.0	0.3
Pension	0.0	1.6	0.6	1.1
Inheritance	0.0	0.1	0.0	0.0
Charity	0.0	0.0	0.1	0.4
Selling of assets	0.0	0.6	2.2	2.0
Others	4.4	3.6	5.7	7.6

Sector of employment for the poor

Table 36 refers to employed individuals aged 15 and above. The industry sector covers manufacturing, construction, mining and quarry, and utilities. The services sector would include government services, personal services, and financial services.

In the rural areas majority of the working people are employed in the agriculture sector. About ninety-five percent of the poor persons work in the agriculture sector while 89 percent of the non-poor persons work in agriculture. A greater proportion of the non-poor work in the services sector than do the poor.

In the urban areas, about 3 in 4 of the poor work in the services sector while 16 percent work in the industry sector. In contrast, 84 percent of the non-poor works in the services sector while only 10 percent are employed in the industry sector.

Table 36. Sector of employment by poverty status

Sector of employment	Urban		Rural	
	Poor	Non-poor	Poor	Non-poor
Agriculture	7.49	5.76	95.52	88.89
Industry	15.96	10.47	0.54	1.81
Services	76.55	83.77	3.94	9.3

Access to Basic Facilities

Access to safe water is 84 percent in Bhutan, and is higher in urban areas compared to rural areas. In the case of electricity, access is much higher in urban areas than in the rural areas. Also, the non-poor have generally greater access to basic facilities than the poor.

Table 37 . Access to facilities by households by urban-rural and by poverty status

% Households with access to facilities	Urban		Rural		Bhutan	
	Poor	Non-poor	Poor	Non-poor	Poor	Non-poor
Safe Water	99.5	98.8	72.0	82.9	72.7	87.5
Electricity	93.0	97.7	34.2	11.6	13.8	52.8

Time to Exit Poverty

It would be useful to know the effect of economic growth on the elimination of poverty. Assuming that economic growth will benefit everyone in the same proportion, it is possible to estimate how long it would take for the average poor person to exit poverty at different potential economic growth rates. For the j -th person below the poverty line, the expected time to exit poverty (that is, for his consumption to equal the poverty line), if consumption per capita is growing at a rate g per year is:

$$t_g^j \approx \frac{\ln(z) - \ln(x_j)}{g}$$

where

- t_g^j is the number of years it takes for the j th poor person to exit poverty
- z is the poverty line
- x_j is the average per capita consumption of the j th poor person
- g is the rate of growth of per capita consumption

Figure 7 shows the average time it takes for a poor person to exit poverty at varying rates of per capita consumption growth.

Real gross domestic product (GDP) grew by 6.5 percent in 2003 and is expected to grow at about this rate over the next few years. Given a population growth rate of 2.5 percent annually, then this economic growth rate translates to per capita GDP growth rate of 4 percent. If we assume that the poor will benefit from the growth so that their average per capita consumption will also grow at the same rate as per capita GDP, then, on average, it will take nearly 8 and a half years for the poor to exit poverty.

In Bhutan, about 4 percent of the population are considered subsistence poor, in that they are not able to meet their basic food needs. The expected time for the very poor (or subsistence poor) to exit poverty is about 15 and a half years. This implies that despite the potency of economic growth, more pro-poor policies and programs are needed to rapidly improve the lives of the very poor. Targeted interventions would be needed to deliver benefits to the poor, especially the subsistence poor.

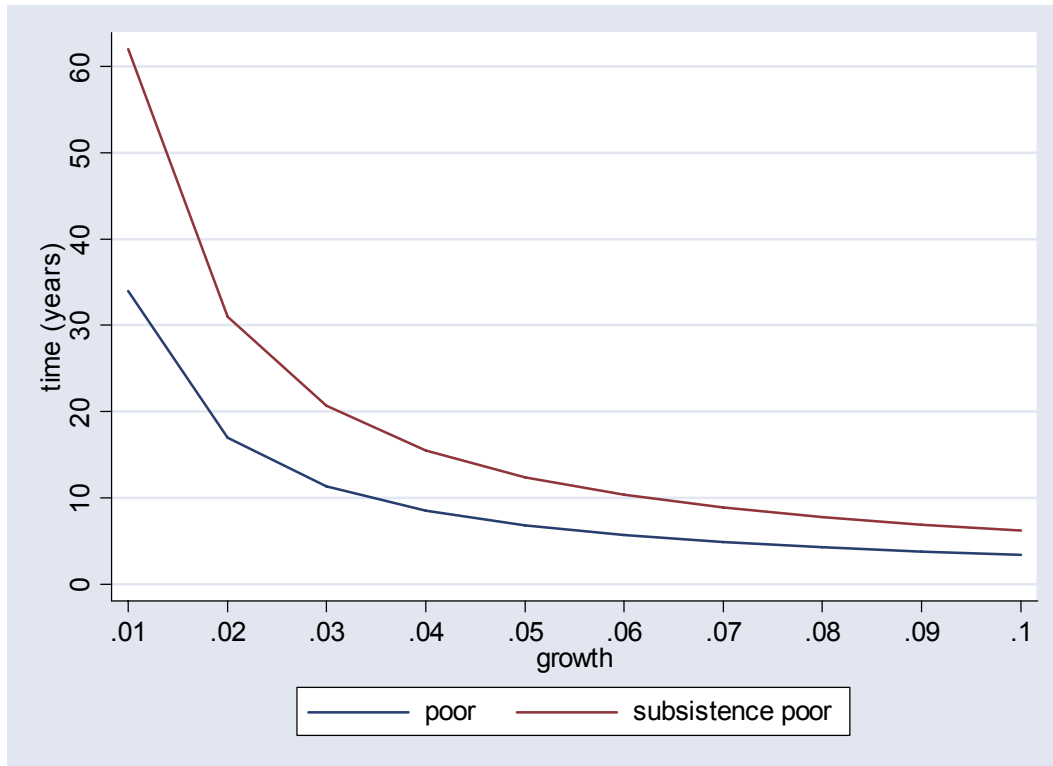


Figure 7. Average Time needed for the poor to Exit Poverty

Determinants of poverty

This section aims to examine the determinants of poverty in Bhutan. There are many factors that could possibly affect per capita consumption expenditure and they could be macro, sector-specific, community, household and individual characteristics.

Regional level characteristics

Regional level characteristics might be associated with poverty. In general, poverty is high in areas characterized by geographical isolation, a low resource base, low rainfall, and other inhospitable climatic conditions. It is generally thought that there are differences among the three regions, including the state of the infrastructure such as roads, employment opportunities, and the level of development.

Community level characteristics

At the community level, infrastructure (ex. Electricity, road) is a major determinant of poverty access to infrastructure.

Household level characteristics

Household level characteristics would include demographic characteristics (ex. size of

household), social characteristics (ex. education), economic characteristics (ex. employment), and ownership of assets (ex. land, livestock, equipment).

Results

A regression model

$$\ln(y_i) = X_i\beta + \varepsilon_i$$

is estimated to identify the determinants of poverty in Bhutan where y_i is the value of nominal per capita expenditure of household i ; X_i is a vector of values pertaining to a set of exogenous variables associated with household i and ε_i is the regression model noise. The explanatory variables used are:

- hh_size = household size
- schoolyrs=school years of household head
- maxsch=maximum level of education by any members in the household
- cattle= cattle(No.>=10)

- horse= horse(No.>=1)
- ricegrind=indicator for rice grinding
- land= indicator for total land holding of dry, wet and orchard(>1acre)
- elec=indicator for electricity
- employed1r=proportion of household members employed in the agriculture sector
- roadacc=indicator for access to road(time to road <=60mins)
- _lreg_2=dummy variable for Central region
- _lreg_3=dummy variable for Eastern region

The regression fit yielded an adjusted R² of 0.4073. The estimated regression coefficients (and measures of their statistical significance) are presented in Table 38.

The coefficients for the variables representing the Central and Eastern Regions are both

negative, indicating that those households residing in the Western Region would tend to have higher per capita expenditure than those in the Central and Eastern Regions. Also, those in the Central Region would tend to have higher per capita expenditure than those in the Eastern Region.

Households with access to electricity and closer to roads (in terms of time to reach a tarred road) tend to be better off, as reflected in the positive coefficients of these variables. Household size is negatively related to per capita consumption expenditure. Larger households tend to have lower per capita expenditure.

Education plays a significant role in determining per capita expenditure. The latter increases with the number of years of schooling of the household head and the other members of the household.

Ownership of assets are important in determining per capita consumption expenditure. Those households that have land, livestock (cattle and horse), and equipment (rice grinder) tend to be better off than those without these assets. Also, households not dependent on agriculture for employment tend to be better off than those that are.

Table 38. Determinants of per capita expenditure in Bhutan

Ipce	Coef.	Std. Err.	T	P>t
hh_size	-0.1291077	0.0053311	-24.22	0
schoolyrs	0.0187554	0.0072972	2.57	0.01
maxsch	0.0217673	0.0036223	6.01	0
cattle	0.166915	0.0340778	4.9	0
horse	0.1336233	0.0288263	4.64	0
ricegrind	0.2722885	0.0493524	5.52	0
land	0.0462556	0.0271925	1.7	0.089
elec	0.3305592	0.0292215	11.31	0
employed1r	-0.2789225	0.0664029	-4.2	0
roadacc	0.0429971	0.0262177	1.64	0.101
_lreg_2	-0.0915533	0.0318341	-2.88	0.004
_lreg_3	-0.4128112	0.0298154	-13.85	0
_cons	10.29794	0.0740327	139.1	0

Technical Notes

Technical Note 1

Measuring household consumption

Aggregations of consumption and expenditure data were made following the recommendations by A. Deaton and S. Zaidi (undated). Most of the information below is quoted from their paper.

Income versus consumption

In most industrialized countries living standards and poverty are assessed with reference to income, not consumption. The empirical literature on the relationship between income and consumption has established, for both rich and poor countries, that consumption is smoother and less-variable than income. Observing consumption over a relatively short period, even a week or two, will tell us a great deal more about annual—or even longer period—living standards than will a similar observation on income. Although consumption has seasonal components they are of smaller amplitude than seasonal fluctuations in income in agricultural societies.

There are several other reasons why it is more practical to gather consumption than income data. Where self-employment, including small business and agriculture, is common, it is notoriously difficult to gather accurate income data, or indeed to separate business transactions from consumption transactions.

Food consumption

Households consume food obtained from a variety of different sources, and so in computing a measure of total food consumption to include as part of the aggregate welfare measure, it is important to include food consumed by the household from all possible sources. In particular, this measure should include not just (i) food purchased in the market place, including meals purchased away from home for consumption at or away from home, but also (ii) food that is home-produced, (iii) food items received as gifts or remittances from other households, as well as (iv) food received from employers as payment in-kind for services rendered.

The BLSS 2003 food consumption module questionnaire contains separate sets of questions on (a) purchased and (b) non-purchased food items.

The BLSS food purchases module contains questions on purchases of a fairly comprehensive list of food items (a) during a relatively short reference period, i.e. the last two weeks, and during a typical month in which such purchases were made. Data are collected on the total amount spent on purchasing each food item, and also on the quantities purchased, during the specified reference period.

Calculating the food purchases sub-aggregate involved converting all reported expenditures on food items to a uniform reference period—one year—and then aggregating these expenditures across all food items purchased by the household.

The literature reviewed in Deaton and Grosh leads to a recommendation in favor of the use of “usual month” data measure over the “last two weeks”. The latter tends to be biased by progressive forgetting, as well as the occasional intrusion of purchases from outside the period. The former has the advantage of being closer to the concept that we want—usual consumption is a better welfare measure than what actually happened in the last two weeks, which could have been unusual for any number of reasons—and reduces problems with seasonality, but suffers from measurement error if respondents find it difficult to calculate a reasonable answer.

The BLSS questionnaire also asked explicitly about the total value of meals taken outside the home by all household members; this amount was also included in the food consumption aggregate part as purchased consumption, part as “received” consumption.

The questionnaire contains a separate set of questions on consumption of home-produced food items. Data were collected on both the value and quantity of consumption of each home-produced food item. The home-production food sub-aggregate can thus be calculated by adding the reported value of consumption of each of the home-produced

food items in a manner analogous to that followed in the case of food purchases.

Consumption of food derived from payment in-kind, as well as in the form of gifts, remittances, etc., was added to the overall food aggregate.

Some quantities were not reported in standard units. The results of the 2002 survey on standardization of quantity units provided the necessary region specific conversion rates.

During data editing, cases were where a household had declared consuming a non-zero quantity of a particular item, but where data on the value of this consumption was missing. Others had data on values, but no corresponding information on quantities. Others had inconsistent data on quantity and value (outliers of unit price). In such instances, median regional unit prices were used to make imputations. Median prices were preferred to mean prices, as they are less sensitive to outliers.

When median price was not available at the lowest geographic level, we used prices reported by other households in the same town, Dzongkha, or stratum, depending on whichever is the next higher level of aggregation for which price information is available.

Median of unit prices per item were computed and used separately for purchased and produced items.

Non-food consumption

Unlike many homogeneous food items, most non-food goods are too heterogeneous to permit the collection of information on quantities consumed, so that BLSS collected data only on the value of non-foods purchased over the reference period. Data on purchases of non food items were collected for different recall periods, i.e. over the past month, or the past 12 months, depending on how frequently the items concerned are typically purchased. Constructing the non-food aggregate thus entails converting all these reported amounts to a uniform reference period—one year—, and then aggregating across the various items.

Not all non-food expenditures were included in the consumption aggregates. Also, some "expenditures" required imputations.

Housing

What is required is a measure in monetary terms of the flow of services that the household receives from occupying its dwelling. Because house purchase is such a large and relatively rare expenditure, under no circumstances should expenditures for purchase be included in the consumption aggregate.

Expenditure on house repairs and improvements were also excluded from the consumption aggregates.

In the hypothetical case where rental markets function perfectly and all households rent their dwellings, the rent paid is the obvious choice to include in the consumption aggregate. Whenever such rental data are available, they were used for constructing the housing sub-aggregate and the consumption total.

In most cases, however, households own the dwelling in which they reside and do not pay rent as such. Others are provided with housing free of charge (or at subsidized rates) by their employer, a friend, a relative, government, or other such entities. Non-renter households were asked how much it would cost them if they had to rent the dwelling in which they reside, and this "implicit rental value" was used in place of actual rent.

Taxes

Expenditures on taxes and levies are not part of consumption, and were not included in the consumption total.

Repayment of debt and interest payments.

All purchases of financial assets, as well as repayments of debt, and interest payments were excluded from the consumption aggregate.

Education

Education expenditure paid by the households were included in the households' consumption.

We also estimated the "cost" of the education provided by the government by level of education, and imputed this cost to the households who benefit from the service.

- Grade 0 to 6: 5,751 Nu per year
- Grade 7 to 8: 5,975 Nu per year
- Grade 9 to 12: 8,701 Nu per year
- Grade 13 to 15: 71,150 Nu per year

Two sets of consumption data were computed, one including this imputed cost, the other one not. For the purpose of poverty assessment, the cost of education provided by the government was not included.

Health

Expenditure on health is to a large extent a lumpy expenditure. One argument for exclusion is that such expenditure reflects a regrettable necessity that does nothing to increase welfare. By including health expenditures for someone who has fallen sick, we register an increase in welfare when, in fact, the opposite has occurred. The fundamental problem here is our inability to measure the loss of welfare associated with being sick, and which is (presumably) ameliorated to some extent by health expenditures.

Including the latter without allowing for the former is clearly incorrect, though excluding health expenditures altogether means that we miss the difference between two people, both of whom are sick, but only one of which pays for treatment. It is also true that some health expenditures—for example cosmetic expenditures—are discretionary and welfare enhancing, and that it is difficult to separate “necessary” from “unnecessary” expenditures, even if we could agree on which is which. It is also difficult without special health questionnaires to get at the whole picture of health financing. Some people have insurance, so that expenditures are only “out of pocket” expenditures which may be only a small fraction of the total, while others have none, and may bear the whole cost. Simply adding up expenditures will not give the right answer.

Expenditure on hospitalizations, consultations, and analyses were excluded from the household consumption. Purchase of medicine was however included.

Remittances

Another group of expenditures are charitable contributions, and remittances to other households.

Their inclusion in the consumption aggregate would involve double-counting if, as one would expect, the transfers show up in the consumption of other households.

We therefore excluded them from household consumption.

Other lumpy expenditures

While almost all households incur relatively large expenditures on relatively infrequent expenditures such as marriages and dowries, births, and funerals at some stage, only a relatively small proportion of households are likely to make such expenditures during the reference period typically covered by the survey. Ideally, we would want to “smooth” these lumpy expenditures, spreading them over several years, but lacking the information to do so—which might come, for example, by incorporating multi-year reference periods for such items—we left them out of the consumption aggregate.

Durable Goods

Another important group of items to consider are items such as consumer durables whose useful life typically spans a time-period greater than the interval for which the consumption aggregate is being constructed.

From the point of view of household welfare, rather than using expenditure on purchase of durable goods during the recall period, the appropriate measure of consumption of durable goods is the *value of services* that the household receives from all the durable goods in its possession over the relevant time period.

To assess the value of services, one would need data on the cost of purchase and year of purchase. Such information is not available in BLSS. Consumption of durable goods was thus not included in the overall consumption aggregate.

Technical Note 2

Computing the food poverty line

BLSS 2003 collected data on 75 different food items. For 33 of them, consumption data was available in standard quantity units, and calories intake data was also available. These items were used to create a reference food basket used for computing the food poverty line (Table 39). These 33 goods account for 80% of the food consumption of the poorest 40 percent of the population.

The quantity of each item in the food basket was established by considering the typical consumption pattern of the poorest 40 percent of the population (based on nominal total consumption per capita). The quantities were

scaled up in such a way that the resulting basket provides a total of 2,124 Kcal. The cost of the basket was calculated using the national median unit prices for each item.

Table 39. Costing of the food poverty line (at national median prices).

Goods	Edible share	Calories per unit	Quantity	Calories Intake	Median unit cost	Cost
rice bhutanese	1.000	3.460	76.049	263.131	0.023	1.763
rice bhog	1.000	3.460	0.962	3.327	0.019	0.018
rice fine	1.000	3.490	46.551	162.463	0.012	0.559
rice fcb	1.000	3.460	126.698	438.375	0.011	1.394
other rice	1.000	3.460	46.585	161.185	0.012	0.559
maize(kharang,maize flour)	1.000	3.420	152.441	521.349	0.010	1.524
ata,maida,kapchi	1.000	3.410	15.088	51.450	0.012	0.181
pulses	1.000	3.450	6.157	21.241	0.030	0.185
fresh milk	1.000	0.670	26.881	18.010	0.015	0.403
milk powder	1.000	4.960	2.071	10.273	0.135	0.280
local butter	1.000	7.290	7.996	58.290	0.150	1.199
eggs	1.000	75.000	0.090	6.782	2.500	0.226
fresh fish	0.780	0.970	1.407	1.065	0.060	0.084
dried fish	1.000	2.550	6.921	17.649	0.060	0.415
fresh beef	1.000	1.140	5.927	6.757	0.040	0.237
fresh pork	1.000	1.140	5.931	6.761	0.080	0.474
fresh chicken	1.000	1.090	3.383	3.688	0.075	0.254
fresh mutton	1.000	1.940	1.274	2.471	0.100	0.127
dried beef	1.000	2.000	1.737	3.474	0.140	0.243
apple	0.900	0.590	0.771	0.409	0.040	0.031
orange	0.670	0.480	26.127	8.402	0.007	0.175
mango	0.740	0.740	1.168	0.639	0.030	0.035
banana	0.710	1.160	18.304	15.076	0.006	0.102
beans	1.000	1.580	16.354	25.839	0.016	0.262
tomatoes	0.980	0.230	6.880	1.551	0.015	0.103
potato	0.850	0.970	68.057	56.113	0.008	0.544
onions	0.950	0.500	13.172	6.257	0.012	0.158
cauliflower	0.700	0.300	1.986	0.417	0.012	0.024
mustard oil	1.000	9.000	19.915	179.231	0.050	0.996
refined vegetable	1.000	9.000	1.187	10.684	0.056	0.066
soya refined oil	1.000	9.000	0.627	5.639	0.060	0.038
green chillies	1.000	0.290	16.563	4.803	0.020	0.331
sugar/gur	1.000	3.980	12.864	51.197	0.022	0.283
Quantities in grams or ml, except eggs in pieces				2124 kcal	13.28 per day	
Cost in Nu.					403.79 per month	

Technical Note 3

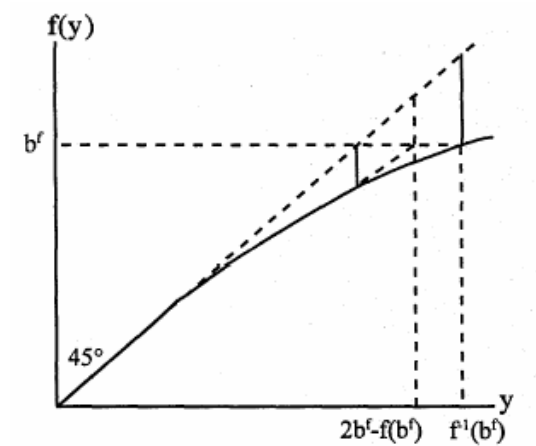
Computing the non-food component of the poverty line

Having set the food poverty line, a non-food component must be added to obtain an overall poverty line that incorporates both food and non-food needs. The non-food needs must be consistent with the consumption behavior of those who can just afford their basic food needs.

The total poverty line is obtained following the methodology proposed by M. Ravallion and Bidani (1992, 1999), by scaling up the food poverty line, to allow for the purchase of some essential nonfood items to reach a final poverty line.

The method consists of determining the average level of total consumption of those people whose food consumption is just equal to the food poverty line. This level of total consumption is then used as the final poverty line.

The best solution is to measure what is the typical value of non-food spending by a household that is just able to reach its food requirements. This will equal the lowest level of non-food spending for households that are able to acquire the basic food bundle. It can thus be considered a minimal allowance for nonfood goods.



Following Ravallion (1998), the total poverty line z_t is the ratio of the food poverty line to the Engel's coefficient. A good initial estimate of Engel's coefficient is given by $w_0^* = (\alpha + \beta) / (1 + \beta)$ where α and β are the estimates of the parameters of the food-share demand system (also called the Engel curve):

$$w = \alpha + \beta \log(x/z_f) + \varepsilon$$

Here, w denotes the budget shares for food, x is the total household per capita expenditure, z_f is the food poverty line, α and β are real parameters, and ε is the error term with standard properties. It follows that α represents the food budget share when $x = z_f$. The initial estimate of Engel's coefficient can be improved upon by iteratively solving the following equation, t times:

$$w_t^* = w_{t-1}^* - \frac{(w_{t-1}^* + \beta \ln w_{t-1}^* - \alpha)}{1 + \beta / w_{t-1}^*}$$

Table 40. Parameters of the regression

α	0.634
β	-0.147
Adjusted R^2	0.402
z_f (food poverty line)	403.79 Nu
Estimate of Engle's coefficient	0.545
Z_u (total poverty line)	740.36 Nu

Poverty lines are expressed in national median prices.

Technical Note 4

Computing regional price deflators

Before our measure of consumption could be used to compare standards of living of individuals residing in different parts of the country, it is necessary to take into account differences in cost of living.

To convert total expenditure into money metric utility, the price index must be tailored to the household's own demand pattern, a demand pattern that varies with the household's income, demographic composition, location, and other characteristics. The calculation of money metric utility thus requires that the nominal aggregate be deflated by a Paasche price index, in which the weights vary from household to household.

Computations of the regional price deflators were made following the recommendations by

A. Deaton and S. Zaidi (undated). Part of the information below is quoted from their paper.

Data collected by the BLSS were used to construct the regional price deflators. The Paasche price index for household h is given by:

$$P_p^h = (\sum w_k^h (p_k^0 / p_k^h))^{-1}$$

where p_k^0 is the reference unit price for good k , p_k^h is the unit price paid for good k by household h , and w_k^h is the share of household h 's budget devoted to good k . The weights used for the price index are the quantities consumed by the household itself and therefore differ from one household to another. In other words, these indexes involve, not only the prices faced by household h in relation to the reference prices, but also household h 's expenditure pattern, something that is not true of a Laspeyres index.

The reference price vector p^0 was inevitably selected as a matter of convenience. To ensure that the vector is not very different from prices actually observed, we chose to take the median of the prices observed from individual households as reference. The use of the national median price vector ensures that the money metric measures conform as closely as possible to national income accounting practice, as well as eliminating results that might depend on a price relative that occurs only rarely or in some particular area.

Quantities and unit values were available at the household level only for food items. For nonfoods, data is not available at the household level. The Paasche price indices were thus computed for food items only.

Technical Note 5

Computing poverty indicators

Incidence of Poverty (P_0)

The incidence of poverty is the proportion of the population that is poor (percentage of the total population below the poverty line). The percentage of households below the poverty line may also be computed (since poor households usually have a smaller size, the proportion of poor households is usually lower than the proportion of poor population).

$$P_0 = q/n$$

where P_0 is the proportion of population deemed to be poor (poverty headcount), q is the number of poor people (below the poverty line), and n is the total population.

The fact that poverty calculations are based on a sample of households, or a subset of the population, carries implications. Samples are designed to reproduce the whole population, but they can never be as exact as information that covers everybody in the country. They carry a margin of error, as do poverty rates calculated from these sample surveys. When monitoring the incidence of poverty over time, it is crucial to remember that the figures are based on samples. Instead of considering one figure, confidence intervals should better be used. Table 41 below provides the 95% confidence intervals for the poverty incidence estimates (P_0).

Table 41. Confidence interval for headcount poverty estimates

	Estimate	Standard Error	95% confidence interval
National	31.7%	2.30%	[27.1% - 36.3%]
Urban	4.2%	0.68%	[2.9% - 5.6%]
Rural	38.3%	2.78%	[32.7% - 43.8%]

Poverty Gap Index (P_1) and Income Gap Ratio

For one individual, the depth of poverty is the proportion by which that individual is below the poverty line (it has a value of 0 for all individuals above the poverty line).

The poverty gap index is the average depth of poverty for the population. This is the sum of the depth of poverty of each individual, divided by the total number of individuals in the population. This gives a good indication of the depth of poverty, in that it depends on the distances of the poor below the poverty line.

$$P_1 = \frac{1}{n} \sum_{i=1}^q \frac{(z - y_i)}{z}$$

Also, this index multiplied to the product of total population and the poverty line (in one year) may be thought of representing the total

cost of poverty reduction assuming perfect poverty targeting.

The poverty gap index can also be written as

$$P_1 = H * (z - y^p / z)$$

where $(z - y^p / z)$ is referred to as the “income gap ratio” (mean depth of poverty as a proportion of the poverty line).

The income gap ratio is not a good poverty measure. To see why, suppose that someone just below the poverty line is made sufficiently better off to escape poverty. The mean of the remaining poor will fall, and so the income gap ratio will increase. And yet one of the poor has become better off, and none are worse off; one would be loathe to say that there is not less poverty, and yet that is what the income gap ratio would suggest. This problem doesn't arise if the income gap ratio is multiplied by the head count index to yield P_1 .

The poverty gap index doesn't tell us how the poverty is distributed among individuals; it may not convincingly capture differences in the severity of poverty. The poverty gap will be unaffected by a transfer from a poor person to someone who is less poor.

The Poverty Severity Index (P_2) gives a weight to the poverty gap (more weight to very poor than to less poor).

It is the average value of the square of depth of poverty for each individual. Poorest people contribute relatively more to the index.

$$P_2 = \frac{1}{n} \sum_{i=1}^q \left(\frac{(z - y_i)}{z} \right)^2$$

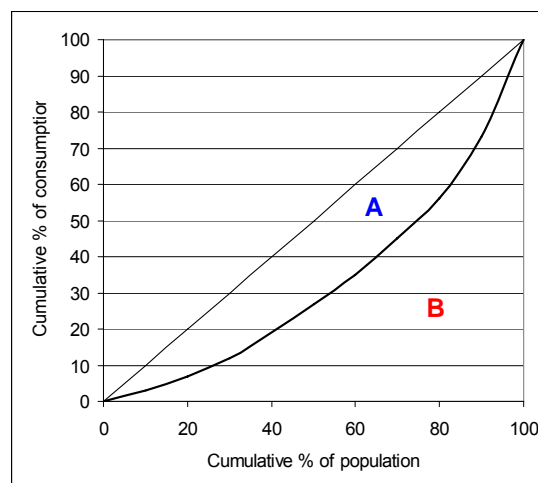
While this measure has clear advantages for some purposes, such as comparing policies which are aiming to reach the poorest, it is not easy to interpret. For poverty comparisons, however, the key point is that a ranking of dates, places or policies in terms of P_2 should reflect well their ranking in terms of the severity of poverty. It is the ability of the measure to order distributions in a better way than the alternatives that makes it useful, not the precise numbers obtained.

Technical Note 6

Computing inequality indicators

Gini Coefficient

Graphically, the Gini coefficient can be easily represented by different areas of the *Lorenz curve*, a cumulative frequency curve that compares the distribution of a specific variable such as per capita expenditure with the uniform distribution that represents equality. To construct the Gini coefficient, graph the cumulative percentage of households (from poor to rich) on the horizontal axis and the cumulative percentage of consumption-expenditure on the vertical axis. This gives the Lorenz curve as shown below. The diagonal line represents perfect equality. The Gini coefficient is calculated as the area A divided by the sum of areas A and B, where A and B are as shown on the graph. If $A=0$ the Gini coefficient becomes 0 which means perfect equality, whereas if $B=0$ the Gini coefficient becomes 1 which means complete inequality.



The Gini coefficient of inequality varies between 0, or complete equality of expenditures, to 1, or complete inequality (one person has all the expenditure, all others have none).

The Gini coefficient calculated for individual-level per capita consumption is given by

$$\gamma = \frac{N+1}{N-1} - \frac{2}{N(N-1)x_w} \sum_{h=1}^H w_h n_h x_h [\rho_h + 0.5(n_h - 1)]$$

where N is the total population (extrapolated), x_w is the mean per capita consumption, w_h is the household sample weight, n_h is the size of household h , x_h is the per capita consumption of household h , and ρ_h is the rank of the first person in household h (prior to computing the Gini coefficient, households must be ranked by descending order of their per capita consumption. The first person in the best-off household is then given rank 1. For the next households, the rank is given by $\rho_{h+1} = \rho_h + n_h w_h$). (Deaton, 1997)

Atkinson

Another class of inequality measures was proposed by Atkinson. The Atkinson class of indices is defined as:

$$A_\varepsilon = 1 - \left[\frac{1}{N} \sum_{i=1}^N \left(\frac{y_i}{y} \right)^{1-\varepsilon} \right]^{1/(1-\varepsilon)}$$

for some weighting parameter ε (which measures aversion to inequality). Note that some of the theoretical properties of the Atkinson class of indices are similar to those of the extended Gini Index.

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