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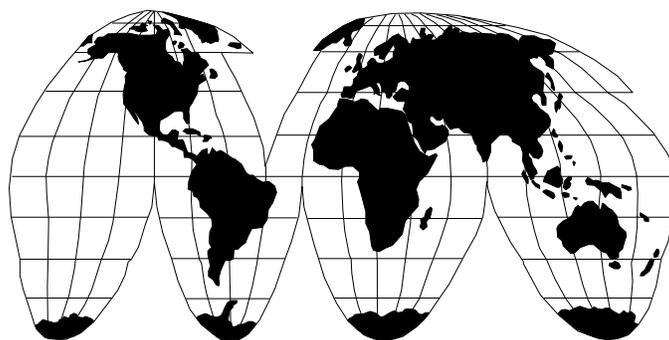
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# Poverty and Undernutrition in South Asia

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## Introduction

In 1993 nearly half a billion people, accounting for 43% of the population of South Asia were poor who consumed less than \$2 a day (UNDP, 1997; Table 2.1). Although South Asia's share in the population of the world was about 22%, it accounted for nearly 40% of the world's poor. Indicators of health, nutrition and poverty are given in Tables 1A and 1B. Except for Sri Lanka, which historically has had a record of extraordinary achievement for a country of its level of income, these indicators for other countries are pretty dismal.

It is natural to expect that poverty, undernutrition and poor health status are closely related. In South Asia as elsewhere national poverty lines in terms of real minimum consumption expenditure per head are based on estimates of the level of expenditure at which the consumption basket is adequate to meet the minimum nutritional requirements (basically energy content of food in kilocalories per day). 'International' poverty lines, such as one or two dollars a day are meant to facilitate international comparisons as well as regional and global aggregations of consumption or income based poverty. There are a number of serious conceptual and measurement problems in interpreting poverty measures derived from such national poverty lines as measures of undernutrition. I will discuss them in the next section.

Common measures of health status of the population as a whole, and of children in particular, are various indicators of morbidity and mortality (or survival) such as life expectancy at birth, infant and child mortality, adult mortality and maternal mortality. Measures of nutritional status include the extent of stunting and wastage among children and incidence of low birth weight babies. Once again there are serious measurement problems with these indicators as well and I will draw attention to them in the next section.

Table 1B clearly shows that the incidence of poverty in rural areas is substantially higher than in urban areas of South Asia. Since an overwhelming majority of the people, ranging from 65% in Pakistan to 86% in Nepal live in rural areas, it is evident that South Asian poverty is primarily rural, although the absolute numbers of urban poor are staggering. Most of the rural poor are either landless wage labourers and artisans, or own and operate small land holdings. Thus, they own few other assets besides their own potential labour power. Dasgupta (1997) argues that this potential labour power is "not necessarily an asset ... the reason is that if over an extended period of time, a person is to convert potential labour into actual labour power in any specified, physiologically admissible amount, he requires, among other things, nutrition of a corresponding quality and magnitude over that period. But, an assetless person with no support would be capable of meeting this requirement only if he were able to obtain appropriate employment" (Dasgupta, 1997, p. 6). Dasgupta views his model as providing a link between nutritional status and capacity for work and an analytical foundation for the concept of efficiency wage. He claims that it explains how involuntary unemployment of unskilled workers could arise in poor countries and above all, provides not only an unfortunate mechanism in which some poor households get entrapped in poverty but also

**Table 1. Poverty and Malnutrition: South Asia****A. Health and Nutrition**

	Life Expectancy at birth 1996		Infant Mortality Rate(%) 1996	Prevalence of Child Malnutrition (% of children under 5) 1990-96	Low Birth Weight Babies (%) 1989-1995
	Male	Female			
Bangladesh	57	59	77	68	34
Bhutan	53*		107	38	
India	62	63	65	66	33
Maldives	64*	64	49	39	
Nepal	57	57	85	49	26
Pakistan	62	65	88	40	
Sri Lanka	71	75	15	38	25

**B. Poverty**

	GNP per caput (Atlas) \$ 1996	GNP per caput (PPP) \$ 1996	Proportion of Population Below			
			National Poverty Line			International Poverty Line \$1 a day %
			Rural %	Urban %	National %	
Bangladesh	260	1,010	39.8 (95-96)	14.3 (95-96)	35.6 (95-96)	
Bhutan	390					
India	380	1,580	36.7 (94)	30.5 (94)	35.0 (94)	52.5 (92)
Maldives	1,080	3,140				
Nepal	210	1,090	44.0 (95-96)	23.0 (95-96)	42.0 (95-96)	50.3 (95)
Pakistan	480	1,600	36.9 (91)	28.0 (95-96)	34.0 (95-96)	11.6 (91)
Sri Lanka	740	2,290	45.5 5-86)	26.8 (85-86)	40.6 (85-86)	4.0 (90)

Notes: \*refers to entire population.

Although Afghanistan is part of South Asia, no data are available for that country.

Sources: World Bank, 1998 World Development Indicators, Washington, D.C.: IBRD/World Bank, 1998; Tables 1.1, 1.2, 2.7, 2.16.

World Bank, 1998 World Bank Atlas, Washington, D.C.: IBRD/World Bank, 1998.

a causal link from poverty to inequality in addition to the conventional one running from inequality to poverty. I will return to these issues in the next section.

A focus on consumption-based, or more precisely food-consumption-based poverty measures naturally lead to an analysis of the food sector in general, and issues of food security in particular. The role of public interventions (market and non-market) in the production, consumption, distribution and foreign trade (including foreign aid) of food is one of the more important policy issues. The third section is devoted to the food sector.

The fourth section addresses the interaction among economic development, growth and poverty as well as specific policies for poverty alleviation. After a brief review of the correlates of poverty and undernutrition in South Asia, it goes on to discuss overall development strategies. The final section offers a few concluding remarks.

## **Poverty and Undernutrition: Concepts, Measures and Data**

### *Poverty*

#### Poverty: Concepts

The definition of poverty calls for a method to distinguish a poor individual from a non-poor one. The widely used method is one of classifying an individual as poor if he or she does not meet a norm or set of norms. However, it is not simple, either conceptually or empirically, to define a set of norms. Even if one were to agree that the minimum amount of food, clothing and shelter needed to sustain life should constitute a universal set of norms, these minima are neither unambiguously defined nor easily quantified. Even the minimum energy from food needed to sustain the basic bodily functions of an individual of a given age, sex, height, weight and engaged in a well defined activity is not a constant. In any case, from Adam Smith on, many economists have argued that there are no universal poverty norms but only ones that are space, time and society specific. Regardless of the norms chosen, there is the further issue whether an individual who has the resources to meet the set norms but fails to do so either by choice or because of ignorance or inefficiency in the allocation of resources should be deemed poor. A rights approach to poverty would focus only on the right to the resources to meet the norms and not on whether the resources are in fact utilized to meet them. Also it is arguable whether a vector of norms should be specified or one should adopt a welfarist perspective and use the welfare attained by an individual (as judged by the individual) as the basis for judging whether she is poor.

Besides somehow determining the poverty status of an individual, one needs to address the issue of aggregation, that is, the procedure followed to derive a poverty measure that aggregates the member-specific poverty status over all members of a given population. In addressing it one has to recognize that an individual is often a member of several socio-economic groups ranging from his or her immediate family at one end to more and more inclusive groups at the other. Whether or not an individual is deemed poor may depend on the extent to which she can draw upon, and in turn is obliged to supplement, the resources of others in each of the groups of which she is a member. To the extent one's own resources vary over time with the stage in one's life cycle or are subject to

random shocks, being a member of a family and other networks enables one to smooth consumption over time and insure it.

The fact that there may be a life cycle and a random component to the resources available to an individual or a household at a point in time makes it important to distinguish between transient and chronic poverty. As the causes of two types of poverty differ, so are the policies to alleviate them. Clearly an individual who is poor because his harvest has failed due to adverse weather (but whose normal harvest would have placed him comfortably out of poverty) is temporarily poor. He may or may not need any private or public assistance, depending on whether he had access to insurance against such risks. But one whose land holding is too small to provide an adequate harvest even in ideal weather is chronically or permanently poor. He certainly would need such assistance to escape poverty. The former, if he needs any assistance at all, would need temporary income support while the latter would need permanent income support or equivalent asset transfers.

### Poverty: Aggregate Measures

Once a poverty norm or indicator at the level of some unit (e.g. household) has been defined and the corresponding population (e.g. all households living in Bangladesh in 1990) identified, one aggregates poverty status of individual units into that for the population as a whole. This aggregation problem is analogous to that involved in aggregating individual welfare indicators into a social welfare indicator. It is natural that the axiomatic approach used in the analysis of the latter problem has been extended in the literature to poverty measures. Among the more important axioms or properties desired of procedures of aggregation are: (i) monotonicity, i.e. reduction in the poverty indicator (e.g. food consumption or income) of an individual classified as poor leads to an increase in aggregate poverty, (ii) (transfer) a change that reduces the indicator for a poor unit while at the same time increasing the indicator for a less poor or non-poor unit by the same amount leads to an increase in aggregate poverty, (iii) (transfer sensitivity) for an aggregator satisfying the transfer axiom and for a transfer from a poor to another less poor unit, the increase in aggregate poverty is smaller the larger the value of the poverty indicator for the person from whom the transfer is being made.

There are four widely used poverty aggregates. Denoting by  $y_i$  the chosen scalar poverty indicator for a unit,  $z$  the poverty threshold,  $N$  the number of units in the population, and for convenience ordering the units  $i$  according to increasing value  $y_i$ , the four indices are defined as follows:

(1) Head-Count Ratio,  $H \equiv N_p/N$ , where  $N_p$  is the number of poor in the population, i.e. those  $i$  with  $y_i$  less than the poverty threshold  $z$ . This is the most commonly used index and equals the proportion of the poor in the population.

(2) Poverty-Gap Index,

$$G \equiv \frac{1}{N_p z} \sum_{i=1}^{N_p} (z - y_i) = 1 - \frac{1}{N_p} \sum_{i=1}^{N_p} \left( \frac{y_i}{z} \right).$$

This measures the average gap between the threshold and the indicator values of the poor, expressed as a proportion of the threshold. An alternative definition is to take the average gap over the entire population of N units treating the gap for the non-poor zero. Under this definition, poverty gap is GH.

(3) Sen Index  $S \equiv H[G + (1-G)g]$  where g is the Gini coefficient of the distribution of  $y_i$  among the poor.

(4) Foster-Greer-Thorbecke Index,

$$F(\alpha) = \frac{1}{N} \sum_{i=1}^{N_p} (z - y_i/z)^\alpha \text{ for } \alpha \geq 0.$$

The four indices are related:  $F(0) = H$  and  $F(1) = GH$ , the value that the Sen index takes if  $g = 0$ , i.e. if all the poor have the same  $y$ . Except H, the others (with  $\alpha > 0$  in the case of  $F(\alpha)$ ) are distributionally sensitive in that they increase if some unit with a  $y$  below the threshold is made poorer. H does not satisfy any of the three axioms, while G satisfies the monotonicity axiom but not the transfer sensitivity axiom. It satisfies the transfer axiom if the unit receiving the transfer is not poor, i.e. has a  $y$  exceeding the threshold.  $F(\alpha)$  satisfies the monotonicity axiom for all  $\alpha > 2$ , the transfer axiom for all  $\alpha > 1$  and the transfer sensitivity axiom for all  $\alpha > z$ . Another desirable property of  $F(\alpha)$  is its decomposability: thus if a population of N units is divided into M mutually exclusive and collectively exhaustive subgroups with the number of units in jth subgroup being  $N_j$  then the  $F(\alpha)$  of the subgroups, i.e.

$$F(\alpha) = \sum_{j=1}^M (N_j/N) F_j(\alpha).$$

This property is particularly useful when the sub-groups have well-defined socio-economic characteristics (e.g. place of residence such as rural, urban, state, region, sex and so on).

### Poverty Estimates: Data Problems

Once decisions are made regarding the choice of a poverty measure, whether or not to take into account differences in age and sex through the use of some form of equivalence scales, the choice of a poverty line, and a way of adjusting the chosen poverty line to reflect differences in prices, overtime and across space, estimates of the extent poverty can be made.

The estimates of poverty reported in Table 1 are derived from surveys of household expenditure using a national or international poverty line. It is often the case that the survey-based estimate of aggregate household consumption expenditures differs substantially from the estimate derived from national income accounts. The difference often remains substantial even after adjustments are made for the fact that unincorporated enterprises are part of the household sector in national accounts though not in surveys. Adjusting for this difference by scaling-up the survey-based estimate of per capita aggregate consumption expenditure to equal that from national accounts which is higher, and

using the household distribution data from the survey leads to lower estimates of the incidence of poverty as compared to using the survey data without scaling.<sup>1</sup> Also the particular price index used to inflate (or deflate as appropriate) the poverty line in base year prices to arrive at the same poverty line at current year's prices can also significantly affect the estimates of poverty. Besides, it is not necessarily the case that the choice of price deflator or scaling of survey-based aggregation consumption expenditure only affect the levels and not the time trends in estimated poverty incidence. Both can be affected.

The size and composition (in terms of age and sex) of the household clearly matter in assessing the poverty status of a household. For example, two households with the same aggregate consumption expenditure and the same size are obviously not the same from the perspective of their poverty status, if the composition of the two in terms of the number of adults and children is not the same. Equivalence scales (i.e. coefficients to scale individuals of different age and sex to a common reference individual of a specified age and sex) if available, could be used to convert households of different sizes and age-sex compositions into households with corresponding number of reference individuals. Then given a poverty line for the consumption of the reference individual, a household can be classified as poor only if its consumption expenditure per reference individual is below the chosen poverty line. But, since estimating equivalence scales is in itself an exercise of some complexity (as well as a degree of arbitrariness) such scales are not often used. Instead age-sex differences are usually ignored and actual, rather than equivalence-adjusted, household size is used to arrive at household consumption expenditure per capita for comparison with a poverty line.

Non-response is often a serious problem in household surveys of developing countries and such non-response is unlikely to be randomly distributed across different expenditure classes. Other problems include varying reference periods (day, week, month, year) used in canvassing consumption expenditure. Recall biases could also depend on the reference period. Adjustment for seasonal effects, if different households are canvassed in different seasons, is not often done. Since surveys from different countries often differ in their designs as well as in the extent of the biases and errors of measurement, international comparisons and aggregations of incidence of poverty are hazardous.

Lastly, poverty measures (particularly the headcount) are often highly sensitive to the choice of poverty line. To cite just one example, if an international poverty line of US\$2 is used instead of US\$1, the headcount measure of poverty rise from 52.5% to 88.8% in India and from 11.6% to 57.0% in Pakistan (World Bank, 1998, Table 2-7).

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<sup>1</sup> Bardhan (1974) found that scaling-up survey based mean consumption expenditure by 12% to account for its difference with national accounts based estimate reduced the estimated incidence of rural poverty in India in 1968-69 from 54% to 43% of the rural population.

## *Undernutrition*

### Concepts

A widely used concept to reflect the nutritional status of an individual is the adequacy of energy and protein intakes. An individual is said to be undernourished if his energy or protein intake is below what is required for good health. The finding that those who had adequate energy from their food intakes also met their protein requirements led to the abandonment of protein deficiency as a separate concept in favour of a single energy deficiency. Two other concepts, used to reflect the nutritional status of children, are stunting and wastage.

A better understanding of the concept of energy requirement can be had by taking a process approach to energy balance. Such an approach views energy intakes, expenditures and energy balance for an individual as a vector stochastic process. First, analytical and policy interest lies in the health and well-being of each individual over a life time and not just at an arbitrary point in time. Second, it is unrealistic to assume that intakes or expenditures are deterministic: after all, even if we ignore everything else, avoidance of monotonicity in diets may induce an individual to vary in an unpredictable way the composition, and hence the energy content, of his diet from day to day. Since many of the components of this stochastic process are subject to the choice of the individual, the evolution of the stochastic process will depend on such choices as well as any other exogenous shocks to the system and not only on the metabolic processes involved. To take a mundane example of an exogenous shock, usually cold or hot weather may affect one's intake of food. As such, it is conceivable that, depending on the exogenous shocks and choices actually made, the system may or may not be stable and, if the stochastic process converges the (joint) distribution to which it converges need not be unique.

Once again, it is natural to ask whether the metabolic processes have a tendency to maintain the system along a stable path towards convergence if the processes relating to choice and exogenous variables satisfy such a property. A system with such a tendency is said to be homeostatic. Suppose the system exhibits homeostasis and is in stochastic equilibrium but the processes relating to a subset of exogenous variables is altered at some point from one stable convergent set to another. Then if the processes relating to the choice variables can be suitably altered and the metabolic processes also adjust if necessary to steer the system towards another stochastic equilibrium, then the system is said to exhibit adaptation. Thus homeostasis relates only to the metabolic processes, while adaptation involves in addition choice variables in an essential way.

Homeostasis and adaptation can be illustrated by applying laws of thermodynamics which dictate that the sum of inflows of energy into the process from all sources must equal exactly the sum of all outflows, the flows being defined as rates of energy per unit of time, e.g. kilocalories per day, megajoules per day etc. In applying this identity to energy balance in human beings, inflows are essentially two, energy content of food intake and the energy withdrawn from stores within the body. Energy outflows or expenditures consist of (i) energy expended by metabolic processes, including energy needs for system (blood circulation, respiration, etc.) maintenance and growth (if relevant), (ii) energy expended on activities relating to one's occupation or profession, exercises or other physical activities aimed at maintaining good health, recreation etc, (iii) energy added to bodily stores and (iv) energy content of bodily wastes, including dissipated heat not included in other flows.

Clearly, for flow accounting what matters is the rate of net addition (positive or negative) to bodily stores per unit of time so that we can transfer from the inflow side of the identity the energy withdrawal from stores to the outflow side and treat the net addition (positive or negative) formally as an outflow.

Consider the hypothetical case of an individual whose energy expenditure on activities remains constant. The energy needs for metabolic processes are a function of age, sex and body weight and the intake itself. If we ignore the variation due to aging and neglect energy content of wastes, then for an individual who is in energy balance while maintaining body weight, his constant energy intake equals the sum of energy needed for activities and metabolic processes. As long as the body mass and the levels of activities which are being maintained are satisfactory, the process has a satisfactory outcome. Then his intake could be defined as the (hypothetical) energy requirement of the individual under discussion. Of course the issue of stability does not arise since neither the inflow nor outflow vary over time.

In order to pose the stability problem in a simple, yet meaningful way let us proceed by stages of increasing realism and complexity. First, assume that the intake process and activity process are exogenous and stationary and that the other processes are endogenous so that they adjust to maintain energy balance. Clearly adjustments that indefinitely increase or decrease body mass, are not meaningful. As such, one would like to ensure that the process of net additions to body mass is stationary with mean zero. Thus, the stability of the system in enabling the individual to maintain good health and perform exogenously specified activities with exogenously given intakes depends on whether the endogenous metabolic processes can adjust to maintain net additions to body mass stationary at mean zero. Clearly, the variance of the exogenous processes together with the adjustment 'capability' of the endogenous processes will determine whether the system is stable in the above sense. This suggests that one can define the system to be homeostatic and the variances of the exogenous processes to be within its homeostatic range, if the system is stable, i.e. the endogenous processes adjust to keep the individual in energy balance (in a stationary stochastic equilibrium) with no drift in his body mass while enabling him to perform the exogenously specified activities given the exogenously specified intake.

Adaptation, as contrasted with homeostasis, can be defined for the above model as follows: suppose a system which has been in stationary stochastic equilibrium is shocked at some point. Then adaptation is the process of achieving a new stationary stochastic equilibrium.

It is evident that analogous to the limits on process variances within which homeostasis applies, there are likely to be limits, this time on the changes in means of the relevant process, applicable to adaptation. Put another way, stationary stochastic equilibrium may be infeasible, for instance, if mean body mass to be maintained at such an equilibrium is too high or too low. That is to say, even if one reduces all energy expenditures other than for the functions of metabolic processes to zero, one may not be able to maintain too high a body mass. Equally too low a body mass may be inconsistent with survival.

From the point of view of the health and well-being of an individual throughout her life, the entire time path of the relevant indicators of health and nutrition would be relevant. However, in conformity with common practice and for the sake of analytical simplicity, the long-term nutritional

status, or in the above context the steady state distribution of the relevant processes, will be used to assess the nutritional status of an individual. Thus unsatisfactory nutritional status will arise if the steady joint distribution of the relevant processes is deemed unsatisfactory in some well-defined sense. Clearly with nutritional status identified with long-term consequences, if the system does not exhibit homeostasis, the question of evaluating the nutritional status does not arise. If nutritional stress, as exhibited by disruption of homeostasis, is not reversed, the nutritional status of the individual is ill-defined. Thus the presence of nutritional stress at a point in time raises the presumption of impairment of nutritional status. On the other hand, the absence of nutritional stress does not preclude the possibility that the individual is moving towards an unsatisfactory nutritional status. That is, even though the individual is presumably moving towards a stable equilibrium, the equilibrium itself may be unsatisfactory.

Dasgupta's model is based on two critical assumptions: "(a) maintenance requirement is a large fraction of total energy expenditure, and (b) at levels of energy intake somewhat in excess of maintenance requirement [i.e. energy needed for metabolic processes] there are diminishing gains in productivity from further increases in consumption" (Dasgupta 1997, p. 27). These two assumptions lead to a rate of intake, say  $x$ , at which productivity per unit of intake is maximized. In a private ownership agricultural economy which is in the aggregate very poor and has a highly unequal distribution of land, the landless worker is assumed to either work in agriculture or live off the commons but he cannot do both. But the food energy available from commons is assumed to be below  $x$ . If the aggregate land endowment and its distribution are such that the landless cannot all be employed at a wage, which if entirely spent on food intake would yield an intake above  $x$ , then some of the landless would be unemployed. Thus, "There is no wage rate for landless folk at which the demand for labour power can equal its supply. So the labour market in the model imposes rations, and a fraction of the landless find employment in the agricultural sector, while the remaining fraction live off the commons" (Dasgupta 1997, p. 29).

In this model any attempt by the unemployed at undercutting the employed by offering to work at a wage lower than that of the employed would fail. Dasgupta himself admits, "A crucial assumption of the model -- is that nutrition intake is all-important to the typical landless worker ... otherwise the unemployed landless person could undercut those who are unemployed -- in short, it is taken that there is no slack in the household budget; the worker does not indulge in non-essential consumption." Although Dasgupta claims that the reason that this crucial assumption finds ambiguous empirical support is in part because empirical studies have not been faithful to economic theory, I do not find this assertion persuasive. I have elsewhere (Srinivasan 1994) discussed the Dasgupta Model and its empirics in some detail. I do not find it satisfactory as a theoretical model that captures the essentials of undernutrition - poverty syndrome in poor countries. I will not repeat my criticism here.

Conventional definition of a stunted (resp. wasting) child is one having a height (resp. weight) below two standard deviations of the median value for a reference population of children of the same age (resp. height). The reference population is usually the population of children of the United States whose heights and weights have been tabulated by the U.S. National Center for Health Statistics (NCHS), rather than of children of the country whose nutritional status is being evaluated. Clearly, stunting or wastage in relation to an advanced country reference population is not necessarily the relevant concept for a poor country. Besides, moderate stunting need not have deleterious functional

consequences - in other words, being relatively short need not necessarily be a disadvantage for leading a healthy and productive life. Wastage is a more appropriate measure of malnutrition. The proportion of children that are wasting is usually much less than those that are stunted. For example, in 1994-1995, almost 63% of rural Indian children were classified as stunted using U.S. NCHS standards, whereas only 17% were classified as wasting. (Sadhana et al 1997, p. 12). In fact an extremely small proportion of Indian children had heights that exceeded the median height of U.S. children of comparable age.

### Undernutrition Measures

In contrast with the process approach described above, most of the literature on measurement of the extent and severity of undernutrition ignores homeostasis (and hence, intra-individual variation in intakes) altogether by implicitly assuming in essence that energy inflows and outflows are kept unchanged at their long-term mean. For instance, a joint FAO/WHO/UNU expert committee defined the energy requirement of an individual as "the level of energy intake from food that will balance energy expenditure when the individual has a body size and composition, and level of physical activity, consistent with long-term good health; and that will allow for the maintenance of economically necessary and socially desirable physical activity" and states that "all requirement estimates refer to needs persisting over moderate periods of time. The corresponding intakes may be referred to as "habitual" or "usual" to distinguish them from intakes on a particular day" (FAO/WHO/UNU (1985), p. 12). Since most procedures of estimation of energy-related undernutrition compare an estimated intake of an individual for a day, week or month with a requirement estimate derived from WHO (1985) or its antecedents, which, as quoted above, refer to a much longer period, such procedures have to assume that the estimated intake is a good estimate of the long-term average, even if it is based on a single day's data! Even if one were to assume that averaging over a week or a month is adequate to provide a good estimate of the long-term average and this equals the long-term requirement needed for maintenance of good health etc., there is still the question of whether the variance in daily intakes is within a homeostatic range. To put the point dramatically, an alternating feasting and fasting regime together may yield an average intake equaling requirements as defined by FAO/WHO/UNU (1985), but clearly there is no presumption that it is healthy!

Once intra-individual variation in intakes associated with homeostasis is recognized, it is clear that observed intakes for whatever period (sufficiently short) can differ from long-term requirements without either creating stress or invoking the process of long-term adaptation, as long as the intake process is stationary with its mean equal to the long-term requirement and has a variance that is within the homeostatic range. Only when the observed intake is outside the range of homeostasis, there will be presumption of nutritional stress. And unless it can be inferred from the short period data that the long-term mean of the intake process differs from requirement, there is no presumption that adaptation is taking place either.

### Undernutrition: Data Base and Measurement Errors

The data base most often used for estimating the extent of undernutrition consists of a distribution of energy intakes for some specified period, such as a day, week, month or even a whole year. The intake may refer to individuals, but more often it is likely to be the average intake per

person in a household or per consumption unit where each person in a household is weighted differently according to age and sex in arriving at the total number of consumption units. The weights may have little to do with the metabolic processes involved and in any case aggregation may not make sense in this context. The distribution may be based on household survey data on actual intake of cooked food at one extreme or to expenditure on various food items on the other. Alternatively as in FAO's world food survey (FAO (1985)) it may be a synthetic distribution whose parameters are either exogenously specified or indirectly estimated from aggregate data. Given the distribution function  $F(x)$  of intakes  $x$  and a cut-off point  $R$  dividing adequate from inadequate intakes, the proportion of the relevant population (individuals or households) with inadequate intake is then estimated as  $F(R)$ . In some studies  $R$  is set as the average energy requirement of the population, the average being computed from WHO norms using the usually available information on the distribution of population according to age and sex and (largely untested) assumptions about activity. Usually no account is taken of variation in actual body mass of individuals within each age-sex-activity cell in computing this average.

There are serious problems associated with aggregating or averaging intake requirements of members of a household. This is because that in addition to the processes of homeostasis and adaptation at the individual level, at the household level some adjustment in activity and food allocation to changes in aggregate food availability is likely to take place to reduce any adverse impact of such changes.

A few remarks are in order on the errors of measurement in data sets used for estimating the extent of undernutrition. The sensitivity of the estimates to the errors, depending on the method used with respect to averaging the energy intake of a population, can be substantial. For instance, consider the crudest method of classifying persons as undernourished if their energy intakes are below the average requirement for the population. If intakes are distributed normally with a mean of 2700 kcals per day and standard deviation of 200, the proportion deemed undernourished will be 50% if the average requirement is also 2700. If, because of measurement error, the true mean intake is 2650 (an error of about 2%) with no error in the standard deviation, the true proportion deemed undernourished will be 60% instead of 50%, an error of 20%. Since very often intake data are put together from food balance sheets and estimates of population, both being subject to significant measurement error, the resulting estimates of proportion of undernourishment are subject to substantial error, even if we accept the methodology of estimation of undernourishment.<sup>2</sup>

Consider, for example, the data in Table 2 on energy intakes derived from a sample survey of households in rural India in 1971-72. The average energy intake per consumer unit varied from 1493 kilo calories ( k cal) per day in the poorest class to 6193 k cal per day in the richest. If we

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<sup>2</sup> In a very interesting study Bhattacharya et al. (1991) found that almost all the 62 households of their sample had less energy intake than their conventionally calculated energy requirement, the deficit varying from 3% to over 70%. They rightly argue, "These figures raise considerable doubts in our mind about the significance of calorie norms. The members of the households investigated did not give the impression of lacking the physical capacity to work. If one can carry out arduous physical labour with calorie deficiency of 30% or even 50% one wonders what significance to attach to the recommended norms" (Bhattacharya et al., 1991, p. 374).

take 1500 k cal as the bare minimum for survival, nearly 6% of the sample households had average intakes below this level and 75% of these households belonged to the two poorest classes and 83% to the poorest three classes. At the other extreme, nearly 19% of sample households had intake exceeding 4000 k cal of which 51% came from the richest three classes. If there is anything to the theory of energy requirement and if these data are taken at face value, 6% of rural households in India are at the verge of death and nearly 20% were pushing towards serious problems of obesity! There is no independent evidence whatsoever to corroborate this. Indeed crude death rate in 1984 for India as a whole was only 12 per thousand of population.

**Table 2. India: National Sample Survey, 26th Round (1971-72): Rural Households**

Monthly expenditure per capita (Rs)	Average energy intake per day per consumer unit (k cal)	Number of Households		
		Total	With intakes <u>below</u> 1500 k cal per day per consumer unit	With intake <u>above</u> 4000 k cal per day per consumer unit
0-15	1493	444	267	5
15-21	1957	1207	218	16
21-24	2287	813	55	19
24-28	2431	1174	45	37
28-34	2734	1748	33	112
34-43	3127	2028	16	281
43-55	3513	1655	5	433
55-75	4016	1318	5	578
95-100	4574	598	5	341
100+	6181	482	2	337
All Classes	2724	11468	651	2159

Source: National Sample Survey (1976), Tables 0.0R - 0.10R.

A part of the explanation for this puzzle lies in measurement errors. Although the enumerators were instructed to record the value of food consumed by each household rather than the value of food produced by the household, there are reasons to believe that this instruction was not observed. For example, meals provided by employers as part of wages and consumed by agricultural workers were sometimes recorded as consumption of the employer households and not as that of the employee households, thereby overstating their consumption and understating the consumption of the worker households. Another example is the food served on ceremonial occasions, such as marriages, funerals, religious functions, etc.<sup>3</sup> These are recorded in the consumption of the 'host' household, although many invites also partake of the meals. Here again it is likely that this overstates the consumption of richer households as they are more likely to spend lavishly on feasts. But poor

<sup>3</sup> Bhattacharya et al. (1991) found that even in poor households there is considerable entertaining so that there is a considerable amount of eating in the household by non-household members and eating elsewhere by members of the household.

also spend on ritual feasts. Interestingly, five households in the poorest class had intakes exceeding 4000 kcals and two in the richest intakes below 1500 kcals which is consistent with the former hosting a feast and latter partaking of a feast hosted by some other household! If agricultural workers (who are fed by employers while at work) belong to the poorest classes and the land-owning employer households (who feed their employees at work) belong to the richest classes, the figures reported in Table 2 are plausible.

The error in recorded consumption as compared to true consumption will obviously bias the estimated extent of undernutrition. There are other possibilities of measurement error arising from differential wastage of food across income classes (it is likely that poor waste less than the rich), errors in conversion to energy intake using Atwater conversion factors etc. It is not possible to determine how widespread measurement errors are and whether they are quantitatively significant without undertaking a specially designed study.

It is not the case that consumption survey data from developing countries are the only ones subject to serious measurement error. Bhalla (1980) analyzed data from Health and Nutrition Evaluation Survey of over 20,000 individuals in the United States during the period 1971-74. The intake data related to one day and were obtained through recall. The data showed that 67% of US males and 80% of US females had intakes below recommended daily requirements! In a society where obesity rather than undernutrition is the more serious problem, these figures do not make sense. This demonstrates the weakness of the methodology and the data base. Clearly, either intake data have a downward bias, or requirements are overstated, or both.

Most births in South Asia do not take place in hospitals or attended by midwives who weigh babies at birth. As such the data on incidence of low birth weight babies are unlikely to be representative of the population. Data on childhood malnutrition i.e. stunting and wasting, are often based on small samples which may not be representative of the population of children.

## **Poverty and the Food Sector**

### *Government Interventions in the Food Sector*

Although the concept of poverty goes beyond not having enough food to eat, clearly having to survive with inadequate food consumption is undoubtedly a strong evidence of poverty. It is not surprising that the functioning of the food sector, that is the system consisting of markets and private and public non-market institutions, that are involved in the production, trade and distribution of food affects the extent and depth of poverty.

Taking food production first, South Asian countries have succeeded in raising their output significantly so as to be largely self sufficient in the aggregate, although at relatively low levels of consumption per capita. Food output has grown, cereal yields have increased and the share of food imports in total merchandise imports have remained stable or fallen (World Bank, 1998 Tables 3.3, 4.4 and 4.5). However, given the inequality in the distribution of consumption expenditure, aggregate self-sufficiency marks a substantial extent of food insecurity.

Governments all over the world intervene in markets for agricultural outputs and inputs and South Asia is no exception. South Asian governments have subsidized inputs (e.g. irrigation water, fertilizers, electricity and other fuel, credit) controlled prices and restricted internal as well as external trade in agricultural commodities. For example, India is as yet to integrate its agricultural sector with world markets even though economic liberalization since 1991 have largely integrated (except for consumer goods) the manufacturing sector with world markets. It will take me too far (and many pages!) to discuss these myriad government interventions and their impact (or lack thereof!). Instead I will focus on those interventions that are ostensibly for alleviating poverty and increasing food security of the poor. These include subsidized public distribution of food grains and other essential commodities, various food-for-work and other employment oriented programmes, food-for-education, food-for-health programmes and food-aid from external donors. Although food aid per se is not strictly a recipient government instituted programme, it is often a significant source of supply of food as well as a major driving force behind some of the other programmes instituted by recipient governments.

### *The Public Distribution System and Food-For-Work Projects*

A number of aspects of the public distribution systems (PDS) in South Asia have been extensively studied. First of all, not all PDS's are targeted programmes in the sense of being directed at a particular subset of the population (i.e. the poor). Second, whether or not they are targeted, questions arise of their effectiveness in reaching the poor and cost-benefit ratios, i.e. how many dollars it costs to transfer one dollar to the intended beneficiary. Third, when other programmes besides PDS's are also in place, all of them meant to transfer resources to the poor at least in part, how do various programmes compare in terms of effectiveness of reach and cost-benefit ratios?

India's PDS originated in the early 50's. Its primary objective then was to protect urban consumers against inflation in the prices of staple food. Its coverage initially was confined to urban areas and a few food deficit states. To acquire the food grains for the PDS, government purchased from producers (or processors such as rice mills) at a price (procurement price) below the prevailing market price. In early years, food aid under US PL 480 was a major source of food for the PDS. Urban ration card holders were provided a specified amount of grain at the so called 'issue price' which was set above procurement price to cover transportation and storage costs. The coverage of PDS has since been extended to rural areas in some states. The PDS is currently being perceived to be the main safety net to protect the poor from food-price inflation.

The PDS was untargeted until 1997 when the government introduced targeting by distinguishing two separate distribution channels. The first distributes wheat and rice to poor households (those whose overall consumption expenditure is deemed to be below the official poverty line) at about half the issue price. The other channel is for distribution to (at issue price) households above the priority line. It is too soon to evaluate the effect of this change.

The PDS has been a costly programme and the subsidies involved (Table 3) have been substantial. The central government alone spent over 0.5% of GDP on food subsidies. Radhakrishna and Subbarao (1997) conclude:

"The access of the poor to PDS is still very limited. The access is particularly weak - almost nil - in the states with the highest incidence and severity of poverty.

The per capita income gain to the poor from all (food and non-food) consumer subsidies was no more than ... 2.7% of their per capita expenditure in rural areas ... [and] in urban areas it was slightly higher at 3.2%.

The impact of PDS on poverty and nutritional status was minimal. For the country as a whole, without PDS poverty would have increased by 2 percentage points, the adverse impact would have been extremely small at 0.3% points in rural areas of the states with the highest incidence of poverty.

In comparison with other antipoverty programs, PDS turns out to be the costliest. PDS delivered ... nutrients at three times the cost incurred under the direct nutrition programme of Integrated Child Development Services. In term of cost per rupee of income transferred ... the national PDS -- [is] much less cost efficient than employment and nutrition programme" (Redhkrishna and Subbarao, 1997, pp x, xi).

**Table 3. Subsidies in Public Distribution of Cereals**

Year	Cost (Rs. per 100 kgs.)		Sales Realization Subsidy (Rs. per 100 kgs.)		(Percent of Cost)	
	<u>Wheat</u>	<u>Rice</u>	<u>Wheat</u>	<u>Rice</u>	<u>Wheat</u>	<u>Rice</u>
1991-92	391	497	252	366	36	26
1992-93	504	585	279	442	45	24
1993-94	532	665	356	500	33	25
1994-95	551	695	408	601	26	14
1995-96	564	747	416	610	26	18
1996-99*	616	811	423	623	31	30
1997-98*	719	921	374	592	48	36

Source: Government of India (1998), Table 5.10, p. 74.

The same study (p. 55) estimated the cost in rupees per rupee of income transfer of five anti-poverty programmes to have been as follows during 1988-90: PDS, 5.37; rice subsidy scheme of the state of Andhra Pradesh, 6.35; a national employment programme for the poor, 4.34; the employment guarantee scheme of the state of Maharashtra 3.1; and, Integrated Child Development Services, 1.8.

The picture is not very different in other countries of the region. Again Radhkrishna and Subbarao (1997) provide some estimates of leakage to non-poor and cost of transfer of some anti-poverty programmes. These are reproduced in Table 4.

**Table 4.**

<u>Country</u>	<u>Program</u>	<u>Targeting</u>	<u>Date</u>	<u>Leakage to:</u> Nonpoor as Percent of Total <u>Transfer</u> to the Poor	<u>Cost to:</u> transfer 1000-calories per day (1997 US\$)
Pakistan	Feeding	Self-Selection	1982	low	0.69
Bangladesh	Ration	Geographic	1991	74.0	2.11
Bangladesh	Food-for- Education	Individual Assessment	1991	31.0	
Bangladesh	Food-for- Work	Self Selection	1994	7.	

Source: Radhakrishna and Subbarao (1997), Tables 5.3 and 5.4, pp. 66-67.

A comparison of several programs in operation in Bangladesh during 1993-94 led to the following estimates (Radhakrishna and Subbarao, 1997, Table 5.4).

<u>Programme</u>	<u>Leakage</u>	<u>Cost/\$ of income transfer</u>
Rural Rationing	70%	6.55
Vulnerable Group Development	14%	1.68
Rural Maintenance Program	0%	1.32
Food-for-Work (CARE)	26%	2.81
Food-for-Work (WFP)	28%	2.06
Food-for Education	7%	1.59

It should be clear that whatever their other effects on the economy (positive or negative) strictly as poverty alleviation instruments, public distribution systems for food have neither been very efficient in reaching the poor nor have they been cost effective. Self-targeting schemes such as food-for-work and employment programs have for various reasons been more successful in avoiding leakages of benefits to the non-poor. However, they have not been cheap - they cost anywhere from \$1.32 to \$6.55 for transferring \$1 to the poor.

### *Food Aid*

Food aid can play a useful role in furthering development and poverty amelioration in situations in which the recipient country is generally following an appropriate development strategy and the aid is used either in support of distributive policies that are effectively targeted at the poor or in financing efficiently executed and effectively targeted investment projects. But the use of any aid, in the form of food or foreign exchange, in support of policy reform and adjustment has to be

carefully thought through so that it does not end up encouraging the very thing it wants to eliminate, namely, inappropriate policies. Of course, the effectiveness of the use of food aid can be enhanced substantially through proper design, the choice of commodities, and the flexibility with which recipients can exchange with each other commodities supplied by aid and their own output (Mellor and Ezekiel 1987; Hopkins 1987).

During the 1950s and the 1960s the United States and Canada were the major food aid donors, and most of the aid was received by the South Asian states of India, Pakistan, and Sri Lanka, and to a lesser extent other Asian states (the Republic of Korea and the Philippines). With the dramatic increase in food output in all of them and the accumulation of large food stocks in some in the 1990s (more than 31 million tons in India as of January 1998 as compared to a minimum buffer stock of 25 million tons according to Government of India, 1998, Table 5.8), it is tempting to conclude that purposely used food aid is a major factor in this turnaround. Such a conclusion is too facile, however. Certainly, food aid at concessional terms, particularly in years of unprecedented droughts, helped India avert what could have been major disasters. But regardless of the persuasion that aid donors may have applied, it is the availability since the mid-1960s of dwarf varieties of wheat and rice with high-yield responses to heavy doses of chemical fertilizers that largely explains the change. Some of the domestic policy distortions, such as zonal restrictions in the movement of food, have been removed even earlier. The new technology brought in its wake new distortions: fertilizer subsidies, irrigation subsidies, and price supports at levels that led to the accumulation of stock. The extent of their distortionary effects is hard to judge since the distortions in favor of agriculture were in part corrections for distortions in other sectors that penalized agriculture. Still, the availability of technology and the desire to exploit it induced these, albeit distortionary, producer incentives.

With Sub-Saharan Africa (SSA) replacing South Asia as the major recipient of food aid, it may be thought that in SSA also, food aid leverage can be used to turn the situation around. Extreme caution is warranted before any such conclusion is drawn. First of all, the domestic policy distortions with respect to agriculture in SSA appear, according to some studies, to be far more serious and pervasive than they were in South Asia. South Asia has never experienced a decline in the trend of growth of food or agricultural output, let alone a negative trend. Although severe droughts in the Sahel and other regions are partly responsible, the declining trend in SSA output is a reflection largely of policy failures. Most important, in South Asia, a research infrastructure existed that could rapidly breed rice and wheat varieties to suit local conditions once the dwarf genes became available, and an extension service for spreading the knowledge about new varieties could be assembled. None of these conditions exist in SSA to the same extent, not to mention the differences in soil, climate, and factor endowments between SSA and South Asia. One should not be unduly optimistic about the quick success of food aid conditional on policy reform. It remains to be seen whether policy-reform conditioned food aid will prove to be a cure.

Within South Asia, food aid continues to be a significant factor in the food economy of Bangladesh. A comprehensive quantitative analysis of food security issues in Bangladesh by Ninno and Dorosh (1998) concludes "that barring unforeseen changes in technology or very large increase in the price of wheat relative to rice, Bangladesh will likely remain a net importer of wheat in the medium run. Thus, moderate levels of food aid can substitute for commercial imports without adversely affecting producer price incentives" (Ninno and Dorosh, 1998, p. 20). While pointing out that aid-in-kind such as food aid is inferior to lump sum income transfers through cash aid, they

recognize the reality that "food aid has more political support in donor countries (farm lobbies and public approval for donations of food) than does other aid. The implication is that cuts in food aid would likely mean cuts in total public resource flows to Bangladesh, to the detriment of the country's poor" (ibid, p. 20).

## **Economic Growth and Poverty**

### *Correlates of Poverty in South Asia*

The correlates of poverty are of some interest as they may suggest ways for alleviating poverty. However, in interpreting correlates, one must not confuse correlation with causation. The following is a brief summary of the correlates of rural poverty, as documented in Quibria and Srinivasan (1994).

Bangladesh: In Bangladesh in 1987-1988, the extremely poor (i.e. those, according to their own admission, who cannot meet their minimum consumption needs throughout the year) owned less than half as much land on average as did the non-poor (1.02 versus 2.15 acres). Only a quarter of the land of the poor was irrigated in contrast to more than a third for the non-poor. The poor devoted 31 percent of their land to modern rice varieties (versus 45 percent by the non-poor). Extremely poor households were slightly smaller in size (5.4 versus 5.8 household members) but with a larger share of children under the age of 10 (35 percent versus 24 percent), fewer males above sixteen (24 percent versus 31 percent) and a larger child-women ratio (79 percent versus 57 percent) as compared with the non-poor. There were more illiterates (80 percent versus 47 percent) and fewer with higher education (10 percent versus 25 percent) among literates in extremely poor households compared to the non-poor. The poor depended on agriculture for roughly two thirds of their income in contrast with 58 percent for the non-poor, and 30 percent of their agriculture income was from wage labour in contrast to 13 percent for the non-poor. Over 72 percent of the functionally landless (i.e., those owning less than half an acre of land) and two-thirds of non-cultivator and pure tenant households were poor. In contrast, only 32 percent of those who owned more than 7.5 acres of land and about half of owners or owner-cum-tenants were poor.

Extreme and moderately poor (i.e. those who cannot meet their consumption need in some (not all) months of the year) have a lower male labour force participation rate of 41%-49% versus 57% for non-poor households. Urban poor have a higher participation rate than rural poor because of higher female participation. Only 5% to 9% of females are workers in moderate and extremely poor rural households, while the corresponding figure is 32% in urban areas. In both rural and urban areas, there are more female headed households among the extremely poor as compared to the non-poor. Rural migrants among the urban poor are more likely to be recent migrants, engaged as day labourers in construction and are more likely to have experienced a deterioration in living standards in the recent past, and less likely to have children between ages 6-11 in school as compared to earlier migrants and non-poor. Majority of the urban poor have regular connections with the villages from which they emigrated and a large proportion (45%) of slum dwellers obtained their jobs through kinship and social networks after migration.

India: More than half of poor rural households in India were wage-labour households and a little over 30 percent were self-employed in agricultural occupations. The socially disadvantaged and discriminated groups, consisting of the so-called scheduled castes and tribes, accounted for more than a third of the rural poor in 1983 even though they accounted for less than 12 percent of the rural population. Over 70 percent of heads of poor households were illiterate and less than 3 percent of them had education above the secondary school level. Those households self-employed in agricultural occupations and in agricultural labour not only were an overwhelming majority (78 percent) among poor households, but also accounted for three-fourths of person-days of unemployment in 1982. Households cultivating no land or less than one hundredth of an acre of land had an incidence of poverty of over 40 percent, while those cultivating more than 10 acres had an incidence of under 15 percent.

Surveys conducted by the National Institute of Urban Affairs in the slum and squatter settlements show that the poor households on average are larger in size, i.e. 5.9 versus the non-poor at 5.2. Approximately 60% of the poor households have between 5 and 7 members, with very large (above 7) or very small (under 3) households being uncommon. Poor households also have a larger proportion of adult females and children. The labour force participation rate among the poor is about 4% higher than among the non-poor. However, this is due to greater participation by females and children than by males. Majority of the poor are self-employed or engaged in casual labour in a variety of occupations, work long hours (over 70% of the workers put in more than 12 hours a day). Unemployment among poor households is low, but it is higher for the more educated than for illiterates.

Sri Lanka: In Sri Lanka, about 28 percent of all households surveyed in 1987 had insufficient food expenditures to meet 90 percent of the recommended energy requirement, the proportion being highest (33 percent) in rural areas, least (12 percent) in urban areas and about 14 percent in the estate sector. Roughly half of the poor households had more than 5 members. For 19 percent of all poor households, the main income earners were farmers. Sixty-four percent of the poor (rural and urban) had education up to grade 5 or less, 14 percent being totally illiterate with no schooling. The corresponding figures for the entire sample of households were 47 percent and 2 percent respectively. The incidence of poverty at 38 percent was somewhat higher among the rural unemployed as compared to the 33 percent incidence among the employed. The rate of unemployment among the poor was only slightly larger among the poor as compared to the entire sample (6.9 percent versus 5.8 percent). The incidence of poverty was substantially higher in households with main earners having non-professional occupations other than clerical and service work (including sales). Of the main income earners in poor households, 54 percent were in the agricultural sector, of which 20 percent were cultivators and 26 percent were agricultural workers. A large majority of poor farmers were those with holdings less than one acre, although in areas with adequate rainfall and opportunities to grow and market high value crops, such as vegetables and fruits, even a holding of 0.25 acre can generate enough income for a household to be out of poverty. Thus, apart from land scarcity, the productivity of land under its present pattern of use was a major contributory factor to the poverty of farm households. The lack of adequate housing and civic amenities, such as water and sanitation, were more general features of rural poverty.

Ratnayake (1993) finds that the urban poor comprise, among others, the recent migrants, those who failed to successfully enter into the urban markets, employees in poorly paid industries,

casual and seasonal workers and unemployed educated youths. In urban areas, given the non-existence of an extended family network, single parent households, street children and the old are increasingly among the poor. Most of the urban poor are recent migrants from rural areas and are in the process of adapting to the labour production markets. Incidence of poverty is over 30% among households of over 6 in size (the highest incidence being 46% among households with six members), and less than 20% in households of size 3 or less (the least incidence being 11% in single member households). More than 50% of the urban poor live in households of size 6 or more. More than half of the main income earners among the poor are likely to have no schooling or schooling only up to grade 4.

In summary, though there are some inter-country differences, the incidence of poverty is greater in rural areas, though generally declining over time. The rural poor, in comparison with the rural non-poor, tend to be characterized by greater dependence on agriculture, either as small cultivators, tenants or agricultural workers. Rural poor households are more likely to be larger in size, have more children and a higher dependency ratio and to be headed by individuals who are either illiterate or have little formal education than rural non-poor households. The farmers among the poor are more likely to cultivate a smaller area of land and devote a smaller proportion of it to high yielding modern crop varieties. Rural areas in general and their poor residents in particular are likely to have less access to safe drinking water, toilets and sanitary facilities, health care, and education.

There are substantial rural-urban differences in the incidence of poverty in all countries, with the incidence being lower in urban areas. Urban poor include a significant proportion of recent migrants from rural areas. They have less access to education, health and sanitation facilities as compared to the urban non-poor, though somewhat better served than the rural poor. They are likely to be disproportionately engaged in informal production and the service sector.

#### Access to Cultivable Land, Technology and Inputs

A large majority of the rural poor in South Asia are those who farm small-holdings, sharecroppers and tenants, and landless agricultural labourers. It is also the case that the number of landless agricultural labourers in South Asia has been increasing in recent decades. Poverty alleviation policies such as land and tenancy reform have attempted redistribution of land ownership, reduction of rents and crop shares paid to the landlords by tenants as well as increasing the security of tenure, and legislating minimum wages to be paid to and the improvement of the condition of employment of the agricultural workers. The effectiveness of implementation of these policies and their success in alleviation of poverty where implemented have varied.

While land and tenancy reforms attempted to ensure a more equitable distribution of land, given the low ratio of arable land to rural population in South Asia, a completely equal distribution of land among rural households would have resulted in extremely small and unviable holdings. As it happened, except perhaps in Pakistan, a large proportion of cultivators operated holdings which were small or marginal in total size besides being fragmented into several, even smaller fragments. It is conceivable that such fragmentation has a positive aspect in that it achieves risk reduction through geographical diversification. However, it is likely that by inhibiting lumpy investment in irrigation, increasing unproductive expenditure of the cultivator's time in traveling from fragment to fragment and wasteful use of land in fragment boundaries, the negative aspects of fragmentation far

outweigh the positive. Attempts to consolidate fragmented holdings through legislation have had limited success.

Turning now to factors that influence the productivity and returns from cultivation, the most important is the introduction of fertilizer responsive high-yielding varieties (HYV) of (mostly cereal) crops in the late sixties. Although HYV technology was scale neutral in that it could be profitably adopted by large, small and marginal farmers as well as tenants were they to have access to irrigation, fertilizers, pesticides, credit etc, and able to sell their output, on similar terms, the fact that medium and large farmers had far better access and more favourable terms certainly blunted its poverty alleviating potential. However, the fears expressed in the early days of the introduction of the HYV technology that it will further enrich the richer segment and impoverish the rural population fortunately proved to be unfounded. I. J. Singh's (1990) careful analysis of the South Asian experience leads him to conclude that although small farmers initially lagged behind large farmers in the adoption of HYV's, they quickly caught up and matched their gains in productivity.

The major inputs (other than land and labour) in agriculture and livestock operations are animal feed, draught power, water, fertilizers and pesticides. Access to short-term credit for working capital needed for the purchase of inputs and long-term credit for investment in livestock, agricultural equipment, including pumpsets, tubewells, livestock, including draught animals, could be important, particularly in the cultivation of irrigation-fertilizer-pesticide incentive HYV's. Public investment in and the efficiency of functioning of large-scale irrigation systems, agricultural research and extension, transport and communication, rural electrification and roads significantly influence agricultural productivity.

Since small and marginal farmers form a significant proportion of the rural poor in South Asia, their access to marketed and publicly provided agricultural inputs would be important for their getting the maximum returns from their agriculture and livestock activities. In India, fertilizers (until recently), irrigation water, electricity and agricultural credit are heavily subsidized. Leaving aside the question whether some of these subsidies accrue to the farmers (for example, the fertilizer subsidy in India is in fact an offset to the high cost of domestically produced fertilizer relative to imports and hence should be viewed as a subsidy to domestic fertilizer industry rather than a subsidy to farmers), it is widely believed that small and marginal farmers do not get their proportionate share in these subsidies. Also, the fact that the operating losses of irrigation and electricity systems are financed out of the general budget means that the resources available to the public sector for other social consumption and for investment (including investment in irrigation, power etc.) are reduced. This in turn means that the share of the poor in social consumption and the additional supply of goods and services arising out of public investment are reduced as well.

India vastly expanded institutional credit to rural areas through cooperatives and branches of the nationalized commercial banks. Bell (1990) finds, after looking at three major surveys of the rural credit market, that even in the eighties, the moneylender was still a major source of credit. According to the World Bank, only 27% of India's farmers used cooperative credit and two-thirds of term credit went to large farmers. Besides, as the government admits, "Despite a substantial increase in overall agricultural credit, the problem of mounting overdues has slowed credit expansion. Overdues have been around 40-42 percent during the last 3-4 years" (Government of India, *Economic Survey* 1991-92). The situation in Pakistan seems similar. Quereshi and Shah (1992) find that in 1985 institutional

loans constituted only 7.45 percent of all loans for farmers cultivating less than 5 acres, while it was 61.3% for those cultivating more than 50 acres. The average loan per household in the former category consisting of 38% of all farms was Rs. 6983 and accounted for 5% of institutional loans. The latter category consisting of 2.4% of all farms on an average got Rs. 41202 per household and accounted for 14% of all institutional loans. The financial and administrative cost of every Rs. 100 disbursed by the Agricultural Development Bank of Pakistan was Rs. 33 and only 59% of the cumulative dues had been recovered in 1990-91.

An innovative approach to extending credit to the poor is that of the well-known Grameen Bank of Bangladesh.

In summary, it would appear that among those who cultivate land, poverty arises more from an unequal distribution of operational holdings rather than from lack of access to new technology, irrigation, fertilizers, etc. on the part of small farmers and tenants. Tenants and sharecroppers do not appear to lag behind owner-cultivators in the adoption of new technology or the intensity of input use, although lack of access to credit is a problem in this regard. Sharecropping seems to have survived attempts to abolish it through legislation. Its incidence varies across countries and across corps.

### Poverty and Human Resources

The only asset most of the poor in South Asia have is their labour. Trends in returns to labour and growth in demand for labour influence trends in poverty. On the one hand, trends in population growth and changes in the age structure determine the growth of the population of working age. Their decisions to participate in the labour force, acquire education and skills, the extent to which the participants are employed and the income those employed earn from their labour are all affected by the process of development and by public policies.

Self-employment appears to be the dominant mode of employment in rural areas in all countries. Urban poor are engaged in informal activities largely in the service sectors. In all countries except Sri Lanka, open unemployment was not significant except perhaps for the relatively well educated and in agriculturally slack seasons. However, underemployment was a major problem. All countries have one or more rural employment programs, some of which have poverty alleviation as one of their objectives. Among the latter are the food-for-work programs. A common feature of many of the employment programs that they tend to be poorly designed and poorly implemented, do not involve the intended beneficiaries in their planning and suffer from significant leakages of their benefits to the non-poor, although the severity of these problems varies across countries. However, the potential for poverty alleviation of programs that are suitably designed with the participation of poor beneficiaries and well implemented is substantial. Nevertheless, such programs could only be safety-nets and the long-term solution for rural unemployment and underemployment lies in the adoption of a development strategy and economy-wide policies that do not penalize labour-use and generate rapidly growing and more productive employment opportunities outside of agriculture. Except in Pakistan where there is evidence of significant increases in real wages, in other countries growth of real wages, if any, has not been substantial. However, because of the dominance of self employment, trends in wage rates may not capture trends in real incomes even for the poor.

The quality of human resources reflects investments in health, nutrition and education. It has long been recognized that improvements in health, education and nutrition of the poor were important not only in their own right but also to promote growth in incomes, including incomes of the poor. Recent developments in the theory and empirics of aggregate growth also reinforce the importance earlier given to human capital in the growth process.

While the health and nutritional status of the rural households including poor households has been improving in all, there are substantial differences across countries. At one end of the spectrum is Sri Lanka where there is no significant bias against rural areas and females in the access to and the quality of health and nutritional services, although the poor do suffer from nutritional gaps relative to the non-poor and the post-1977 reform of the food subsidy program may have worsened this situation. In Bangladesh, India and Pakistan there are substantial rural-urban and male-female differences: the rural poor receive far less than their proportionate share of public expenditures on health and nutrition and there are far fewer health care facilities in rural areas and their quality is far worse than those in urban areas. With respect to education, particularly higher education, the rural poor (and in particular poor females) are at a disadvantage in all countries, except Sri Lanka.

### Economy-Wide Policies and Poverty

Economy-wide and sectoral policies are likely to have a significant impact on the level and trends in poverty, in many cases even to a greater extent and possibly in opposite directions than the policies directly addressed to the alleviation of poverty. These include: the broad development strategy, macro-economic policies (fiscal and monetary), foreign trade and exchange rate policies, policies toward production sectors (e.g., agriculture) from which the poor derive their income and in which they are employed and finally income transfer policies. It should be emphasized once again that these as well as direct poverty alleviation policies interact with the market and non-market exchanges that the poor have with the non-poor and the state. These interactions are often complex and not likely to be necessarily stable over time or space. Above all, firm knowledge based on solid empirical evidence about these interactions does not exist for most countries. Under the circumstances, policy analyses and conclusions have to be based more on intuition, judgment and familiarity with the culture, history and socio-economic and political institutions of the countries than on narrow economic analysis.

Until recently the development strategies of all the countries emphasized import substitution and industrialization. However, the intensity and extent to which it was pursued varied across countries with India being at an extreme with its goal of self-sufficiency across the board and at all costs. Sri Lanka combined its import substitution in industry and agriculture with a thorough going social welfare program. The chosen development strategy was implemented in each country with its own combination of a number of economy-wide policy instruments including overvalued exchange rates, fiscal deficits that were monetized, operation of plantations, industrial and financial enterprises in the public sector etc. and sectoral policies that included widely varying tariffs, import quotas, selective credit allocations and loan. At the same time, a variety of subsidies were employed to mitigate the distortionary effects of the policy regime on particular socio-economic groups and on activities such as exporting as well as reward and encourage such groups or activities. Although the range of the instruments used and the severity of the distortions created varied between countries over time (for example, the strategy of import substitution and the use of distortionary instruments

were both adopted to a moderate degree in Thailand prior to the eighties and to an extreme degree in India), there is no doubt the cost of import substitution and distortions was high overall. The poor paid an undue share of the cost by being denied the opportunities that a faster growth based on outward orientation would have generated.

### *Poverty and Growth*

It should be evident from the discussion of correlates of poverty that, barring politically unacceptable radical redistribution of non-labour assets, particularly land, to the poor, for poverty to be eliminated permanently, policy attention has to be focused on augmenting the demand for labour and on improving the productivity of labour through investment in human capital, broadly conceived to include education, skill formation, health and nutrition. This is not to say that until poverty is eliminated, hopefully in less than a generation, safety-net policies to insulate the poor against temporary adverse shocks are not needed - only that such policies have to be designed so as to avoid leakage to the non-poor and their cost of transferring incomes to the poor (directly or in kind) is kept to the minimum. Any leakage or excess cost of a safety-net policy would only insulate the poor against temporary adverse shocks at the possible cost of postponing, if not aborting, the process of investments needed for permanent elimination of poverty.

Turning to increasing the demand for labour, the only asset that poor have, it goes without saying that policies that have the effect of encouraging the use of relatively scarce non-labour resources such as capital in production have to be phased out. Also, abandoning costly and inefficient import substitution and encouraging the efficient production for the world market of labour-intensive products is essential.

The most effective strategy for rapidly eliminating poverty is one that accelerates economic growth while ensuring that the fruits of growth are widely shared. The available evidence from East Asia as well as South Asia supports this finding. The East Asian evidence is well known. Let me turn to evidence from India.

Data from India's National Sample Survey provides poverty estimates, annually except for the years 1979-82 and 1984-85. Economic growth (annual average rate of growth of GNP) averaged at about the infamous Hindu rate of growth 3.5% per year during the period 1950-51 to 1973-74. Subsequently GNP growth averaged slightly over 5% per year until a macroeconomic crisis in 1991 forced the government to institute radical economic reforms. After a year of recovery, GNP growth has averaged at over 6.5% per year since the reform.

World Bank (1997) concluded that "First, the period from the early 1950s to the mid 1970s was characterized by fluctuations in poverty with no clear trend in either direction. The average head-count index was 53% in 1951-55, about the same as the average over 1970-74 ... Second from, 1971 to 1986-87 poverty entered a phase of steady decline ... Finally after 1986-87 poverty appears to have entered a new phase of fluctuation, although around a level considerably lower than that which prevailed in the 1970's " (World Bank 1977, pp 2-3). The same report decomposes the change in poverty measures into contributions due to growth and redistribution. It finds that overall growth accounted for the lion's share of poverty reduction, 80% of the decline in the head cost index over a 40 year period [since mid fifties] and almost 100% since 1970" (World Bank 1997, p. 17). A

comparison of trends in GNP growth and poverty suggests that the period of substantial reduction in poverty coincided with the period of sustained and rapid growth.

Demery and Walton (1998) estimate the rate of growth required to reduce existing poverty levels by a half in the twenty-five year period 1990-2015 for various countries and regions. Two international poverty lines \$1 and \$2 per day are used in estimating the incidence of poverty. They also project real per capita GDP (and consumption) growth for the period 1997-2000 using the cross-country regression of Sachs and Warner (1995). They find that for halving the proportion of 43.1% of the South Asian population living below the \$1 poverty line in 1993 in twenty-five years, the required growth in South Asian per capita consumption has to be 1.4% per year. By comparison the actual growth was 1.9% per year during 1991-95 and the projected growth for 1997-20 was 3.5% per year. Thus the targeted poverty reduction is feasible. However, if a poverty line of \$2 per day is used, the required growth rate jumps to 5% per year which is not feasible to achieve given current policy.

## **Conclusions**

I can be brief. Although there are serious conceptual and measurement problems as well as inadequacies of data in quantifying the extent of poverty and undernutrition, they are unlikely to overturn the finding that most of the world's poor and undernourished live in South Asia and within South Asia, a large majority of the poor live in rural areas. The rural poor are mostly landless labourers, marginal farmers or artisans.

South Asian governments have intervened in agricultural markets, particularly food markets. They have also instituted several anti-poverty programmes such as subsidized public distribution of food and employment generation projects linked to food. The available empirical evidence suggests that the efficiency of these programmes in reaching the poor is low and many are costly in that they spend far more resources in transferring than the resources transferred to the poor.

The only approach to the eradication of poverty within a reasonable time is to adopt development strategies that accelerate growth, keeping in mind that the character of growth, not merely the rate of growth, determines whether or not the poor benefit from growth. Thus, what is needed is a growth strategy that focuses on human capital accumulation, that is investment in education and health, while ensuring the efficiency of investment in human and physical capital is maximized by promoting competition within the economy and above all, with the rest of the world through liberal foreign trade and investment regimes.

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