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Poverty-Undernutrition Linkages

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Of the many contributions made by Indian scholars to development theory and policy, none has perhaps been as influential as the issue of definition and measurement of poverty. In recent years, however, the methodology that has been evolved and refined over the years has come in for some criticism from various quarters within the country. This is of course entirely desirable, since further improvements can only come from such a dialectical process. This paper is a small contribution to the debate, and its aims are modest. It seeks to address the main criticisms of the extant methodology, essentially from an economist's perspective. It also attempts to bring out a few issues, which call for further research.

POVERTY MEASUREMENT

Since there are some fairly common misconceptions in the popular understanding of poverty measurement in India, it may be useful to start with a brief description of the definition of poverty used and the nature of the criticisms being levelled against it. The Indian poverty lines are based explicitly on estimates of the normative nutritional requirement of the average person in the rural and urban areas of the country separately¹. These national norms, which are 2400 KCal/day and 2100 KCal/day for rural and urban areas respectively, are not arbitrary figures, but have been derived from age-sex-occupation specific nutritional norms by using the demographic data from the 1971 Census.

Therefore, it is quite possible for the actual calorie consumption to deviate substantially from these base-year national norms as a result of variations in the age-sex-occupation structure of the population over time, without necessarily violating the nutritional requirements.

In deriving the poverty lines, it was recognised that human existence needed more than just food, and provision for other goods and services was also required to be made. Since there are no a-priori norms for these, and in order to avoid arbitrariness, it was felt that the actual expenditure of households should form the basis for estimating the necessary expenditure on these goods and services. In order to do so, the National Sample Survey (NSS) Household Consumption Expenditure data for 1973-74 was used. The procedure employed was to calculate the average calorie intake of every expenditure class, identify the lowest expenditure class which consumed the calorie norm, and use the per capita total expenditure of that class as the poverty line. Thus, the Indian poverty line captures not only the normative calorie intake, but also the expenditure on all other goods and services that were deemed necessary by households themselves in 1973-74¹. It is, therefore, the most comprehensive definition of poverty available anywhere in the world. The poverty lines, defined as the basket of goods and services, have not been changed subsequently in order to preserve inter-temporal comparability, but

the rupee value of the lines is regularly updated in order to reflect price increases that have taken place over the years.

The next stage of sophistication was the recognition that in a country as large and diverse as India, and with fragmented markets, prices of the same commodity or service could vary substantially from region to region. Therefore, a common national poverty line would tend to underestimate (overestimate) poverty in regions with higher (lower) prices than the national average. In order to address this problem, the consumption basket comprising the national poverty line was re-estimated for each state by using state-specific price relatives. The importance of this adjustment can be gauged from the fact that the poverty lines for the states with the highest prices are 43 per cent and 57 per cent higher for rural and urban areas, respectively than those of the states with the lowest prices. Such correction for inter-regional price variations is not done anywhere else, and its importance is obvious.

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LINES OF CRITICISM

There are two main lines of criticism of the poverty line, which are in some ways inter-related. The first is that even though the poverty line ensured the consumption of the normative calorie intake in 1973-74, it no longer does so. In other words, it is asserted that the rupee value of the poverty line at current prices is insufficient for meeting the normative nutritional requirement after the other essential expenditures are taken into account. The second criticism is more fundamental. It questions the very use of calorie intake as a measure of nutritional adequacy, and argues that such a unidimensional measure may lead to more harm than good, both in terms of measurement of poverty and in design of poverty alleviation interventions.

CALORIE INTAKE OF THE POVERTY-LINE CLASS

The statement that the current value of the poverty line does not permit the poverty-line class to consume the calorific norm is a serious

one, and suggests that the periodic price corrections that have been carried out to update the poverty lines are inadequate and indeed may be even inappropriate. Consequently, it may well be the case that the poverty estimates made in subsequent years understate the true incidence of poverty in the country. If this is true, it provides a compelling case for re-estimating the poverty lines.

The NSS Household Consumption Expenditure data for 1999-2000 appears to provide conclusive evidence that this charge has substance, and needs to be taken seriously. The basic data is presented in Table 1. As can be seen, the actual calorie intake of the poverty-line class in every state and in both rural and urban areas is significantly below the calorie norm (except in urban Orissa). The situation is by and large worse in rural areas than in the urban, with the average shortfall from the norms being about 25 per cent and 15 per cent respectively. These are large enough deviations to be a cause of concern. Unless it can be convincingly shown

that lack of income is not the primary cause of the observed non-consumption of the calorie norm, the poverty lines could have to be raised by about 15 per cent for rural areas and 10 per cent for urban.

There are two lines of argument, which have been advanced for not changing the poverty lines at this stage. The first relates to the age-sex-occupation distribution of the population in 1999-2000 as compared to 1973-74, when the calorie norms were determined. As has been mentioned earlier, if there are significant changes in this distribution, or if the degree of physical labour required in each occupational category has reduced, the actual calorie requirement can undergo substantial downward revision. Thus, the data on current calorie consumption may only be reflecting a lower calorie requirement, which then gets reflected in expenditures on food. Unfortunately, this argument does not really hold water. Although it is true that both the population structure and the intensity of labour effort have changed for the population as a whole, there is no evidence to show that such is the case for the population around the poverty line. Both the size and structure and the occupational categories of the below poverty-line (BPL) households remains more or less similar to what they were in the early 1970s. The development in the economy that has taken place in the intervening years is reflected primarily in the reduction in poverty incidence and in the standard of living of the non-BPL or above poverty-line (APL) households.

The second line of argument is that the consumption basket of the poor has changed in favour of non food consumption, and therefore the reduced calorie intake reflects a change of taste rather than an insufficiency of income. This argument too fails on both empirical and theoretical grounds. As far as the empirical evidence is concerned, it may be noted that the share of food in total expenditures of the poverty-line class in 1973-74 was 81 per cent and 72 per cent in rural and urban areas, respectively. The corresponding figures are around 65 per cent and 59 per cent in 1999-2000. Thus, the reduction in the share of food is 16 per cent and 13 per cent as compared to the shortfalls in calorie intake of 25 per cent and 15 per cent. Therefore, even if the poverty-line classes were to spend the earlier

TABLE 1: Food Consumption of the Poverty-Line Class (1999-2000)

STATE	RURAL				URBAN			
	Calories per day	% of Norm (2400 Cal/d)	Food Exp. per month (Rs.)	% of Total Exp	Calories per day	% of Norm (2100 Cal/d)	Food Exp. per month (Rs.)	% of Total Exp
Andhra Pradesh	1662	69%	183.28	70%	1792	85%	279.09	61%
Assam	1767	74%	253.98	70%	1478	70%	222.17	65%
Bihar	1977	82%	219.65	66%	1952	93%	254.83	67%
Gujarat	1684	70%	213.73	67%	1617	77%	281.73	59%
Haryana	1745	73%	219.20	60%	1457	69%	208.27	50%
Himachal Pradesh	1942	81%	227.16	62%	N/A	N/A	233.99	56%
Karnataka	1646	69%	199.42	64%	1841	88%	318.05	62%
Kerala	1389	58%	226.31	60%	1602	76%	299.75	63%
Madhya Pradesh	1888	79%	199.24	64%	1961	93%	264.35	55%
Maharashtra	1780	74%	196.83	62%	1773	84%	299.84	56%
Orissa	2117	88%	221.50	68%	2450	117%	285.24	60%
Punjab	1712	71%	221.29	61%	1590	76%	226.74	58%
Rajasthan	2003	83%	228.33	66%	1986	95%	272.93	59%
Tamil Nadu	1543	64%	208.68	68%	1624	77%	275.74	58%
Uttar Pradesh	1990	83%	195.04	58%	1796	86%	233.71	56%
West Bengal	1935	81%	253.83	72%	1771	84%	258.49	63%

Source: Reference 2

fraction of their expenditure on food, they would yet fall short of the calorie norms, especially in rural areas.

At the theoretical level, this particular argument needs to assume that people can voluntarily forego even a minimum level of food for higher non-food consumption. While this is entirely possible at higher levels of income, it appears most unlikely for the poverty-line class, who are in any case at a subsistence level. What is much more likely is that the cost of meeting the minimum non-food requirements has increased to such an extent that the earlier proportion of expenditure no longer suffices and a larger proportion has to be applied to meet the requirements, thereby leading to a decrease in the income left available for food. In other words, non-food items have become more 'essential' than food in a particular sense. If this indeed be the case, it forms a strong argument for reviewing the poverty lines or, at the very least, the methodology for price escalation.

There is, however, one other line of argument which can be taken in defence of the existing poverty lines. The original poverty lines were no doubt developed on the basis of the calorie norms, but were specified as currency metrics, which were to be subsequently updated by appropriate price indices. Thus, the objective was to protect the capability for consuming the calorie norms, not the calorie norms themselves. Over time, changes in various factors, such as the age-sex-occupation structure, tastes and preferences, relative prices of different goods and services etc., would certainly lead to alterations in the actual consumption basket. But if it can be shown that there exists a feasible basket of food products which would allow the poverty-line class to meet the calorie norm from its actual expenditure on food, then the validity of the poverty line gets established. In other words, the compulsions that drive increases in non-food expenditures as mentioned earlier are accepted as inevitable, and only the composition of the food basket is re-examined from the perspective of meeting the calorie norms.

Clearly, the critical issue in such an exercise is the definition of the feasible food basket which would yield the requisite calorie intake. The term 'feasible' in this context should refer to a basket which could potentially be

consumed by the poverty-line class of each state, and which would take into account the cultural preferences of that state. It would, therefore, obviously not be correct to define an arbitrary basket of high calorie-low price food items, which may simply not be acceptable to people. A simple and conceptually attractive way to get around this problem is to examine the actual food consumption behaviour of different expenditure classes in each state and in rural and urban areas separately to find a suitable basket, if any. The advantage of this methodology is that it addresses both the cultural and dietary preference issue (since it is state-specific) and also the problem of price correction (since all classes will have access to the same sources of food). As a first step, the food consumption of three broad classes have been examined – the average of the BPL class, the poverty-line class and the average of the APL class. For each class, the number of calories obtained per rupee spent on food has been computed and the data are presented in Table 2.

As can be seen from Table 2, the actual cost per calorie consumed varies widely between the three broad classes considered in every state and in both the rural and urban areas. The

difference between the average for all BPL and the poverty-line class is of particular interest. It suggests that in each state there does exist a food basket which is actually consumed by a large class of people and which yields much higher calories per rupee spent on food. It then only needs to be shown that if the poverty-line class were to consume this particular basket, it would be able to meet the calorie norms with its actual expenditure on food. This essentially involves multiplying the food expenditure per month data given in Table 1 by the calories per rupee of the BPL class given in Table 2, and converting the product to a daily basis. The results of this exercise are presented in Table 3. It may be seen that the potential calorie intake of the poverty-line class is very close to, or even exceeding, the normative values in most cases. Therefore, it is quite clear that the observed shortfall in calorie intake is not so much the result of a lack of income or purchasing power, but of the choice of a food basket which yields lower calories per rupee spent than is actually feasible. This, to our mind, strongly indicates that, by and large, the poverty lines do not need to be revised on the count that they violate the calorie consumption norm.

TABLE 2: Class-wise Cost of Food Baskets (1999-2000)

(Calories/Re)

STATE	RURAL			URBAN		
	BPL	PL	APL	BPL	PL	APL
Andhra Pradesh	397	272	213	264	193	153
Assam	267	209	177	200	200	143
Bihar	308	270	223	307	230	167
Gujarat	308	236	173	220	172	133
Haryana	316	239	182	220	210	153
Himachal Pradesh	358	256	186	292	N/A	140
Karnataka	347	248	195	253	174	132
Kerala	193	184	143	201	160	124
Madhya Pradesh	389	284	234	268	223	172
Maharashtra	355	271	205	245	177	123
Orissa	340	287	231	286	258	165
Punjab	307	232	181	289	210	153
Rajasthan	396	263	212	282	218	162
Tamil Nadu	318	222	169	223	177	128
Uttar Pradesh	349	306	241	260	231	168
West Bengal	311	229	189	242	206	134

BPL: Below Poverty-Line PL: Poverty-Line APL: Above Poverty-Line

Source: Reference 2

RELEVANCE OF THE CALORIE NORM

The second criticism of the poverty line, mainly from nutritionists, is that a purely calorie-based measure of food adequacy is simply wrong from a nutritional point of view. It is rightly asserted that the mere consumption of an adequate number of calories may not ensure sufficient intake of other nutrients, such as proteins, fats and micro-nutrients, which are just as essential for human health. Thus, it is entirely possible that a person may be consuming the requisite number of calories, but she/he could still be seriously malnourished. A more balanced food basket, albeit with a lesser number of calories, could possibly, therefore, yield superior health outcomes than an excessively calorie-rich diet. Indeed, a number of nutritionists have suggested that the calorie norms underlying the Indian poverty lines are excessive, and that it may have been better to have had specified a lower calorie norm and insisted on a minimum consumption of other nutrients, especially proteins.

This criticism raises a number of issues which require careful consideration. First of all, it raises the possibility that the calorie intake based identification of the poverty-line class may have led to an underestimation of the poverty line on nutritional grounds in 1973-74 itself. Clearly, any judgement on this would need to be based on a detailed evaluation of the food basket consumed by the poverty-line class in 1973-74 in order to determine whether or not it constituted a reasonably balanced, although minimal, diet. Such an exercise is beyond the technical expertise of the author and, therefore, the scope of this paper. However, the data presented in Table 2 strongly suggests that such a possibility cannot be ruled out. A striking feature of this data is that it clearly brings out the fact that the calorie intensity of the food basket is inversely related to the expenditure on food. Thus, it is entirely possible that in identifying the *lowest* expenditure class which consumed the calorie norm as the poverty-line class, an error may have been committed in the sense that it zeroed in on a group who were too poor to consume a more balanced diet. For this argument to hold, however, it has to be shown that there does exist a higher expenditure class which consumes at least as many calories

TABLE 3: Potential Calorie Intake of Poverty-line Class

STATE	RURAL		URBAN	
	Calories per day	Percentage of Norm (2400 Cal/d)	Calories per day	Percentage of Norm (2100 Cal/d)
Andhra Pradesh	2424	101%	2457	117%
Assam	2258	94%	1481	71%
Bihar	2252	94%	2605	124%
Gujarat	2197	92%	2069	99%
Haryana	2311	96%	1526	73%
Himachal Pradesh	2714	113%	2277	108%
Karnataka	2304	96%	2682	128%
Kerala	1456	61%	2004	95%
Madhya Pradesh	2584	108%	2360	112%
Maharashtra	2326	97%	2451	117%
Orissa	2507	104%	2720	130%
Punjab	2266	94%	2183	104%
Rajasthan	3016	126%	2561	122%
Tamil Nadu	2215	92%	2050	98%
Uttar Pradesh	2266	94%	2027	97%
West Bengal	2633	110%	2089	99%

as the poverty-line class. The data in this regard is shown in Table 4.

As can be seen, in 1999-2000 at least, calorie consumption does increase with food expenditure around the poverty line. This, taken with the

observation that cost per calorie also increases over the same range (which may be taken as a measure of a better quality food basket), suggests that there may well have been a higher expenditure class that consumed the

TABLE 4: Class-wise Calorie Consumption (1999-2000)

STATE	(Calories/day)					
	RURAL			URBAN		
	BPL	PL	APL	BPL	PL	APL
Andhra Pradesh	1406	1662	2097	1643	1792	2201
Assam	1585	1767	2136	1286	1478	2246
Bihar	1769	1977	2401	1690	1952	2407
Gujarat	1468	1684	2065	1517	1617	2158
Haryana	1523	1745	2539	1242	1457	2275
Himachal Pradesh	1982	1942	2495	1351	N/A	2718
Karnataka	1442	1646	2151	1573	1841	2206
Kerala	1100	1389	2073	1376	1602	2152
Madhya Pradesh	1649	1888	2305	1732	1961	2382
Maharashtra	1584	1780	2145	1684	1773	2169
Orissa	1792	2117	2421	2013	2450	2511
Punjab	1506	1712	2440	1572	1590	2235
Rajasthan	1755	2003	2532	1774	1986	2474
Tamil Nadu	1307	1543	1960	1464	1624	2191
Uttar Pradesh	1839	1990	2548	1653	1796	2344
West Bengal	1664	1935	2296	1621	1771	2224

BPL: Below Poverty-Line

PL: Poverty-Line

APL: Above Poverty-Line

Source: Reference 2

normative calories with at least the minimum intake of other nutrients, which perhaps should have been identified as the 'real' poverty-line class. On the other hand, the data also suggests that the focus on calorie consumption as a measure of nutritional adequacy does conform to people's behaviour, no matter how inappropriate it may be from a nutritional point of view. The fact that poor people systematically *choose* to maximize calorie consumption, as evidenced by the inverse relationship between calorie intensity and expenditure, is an indicator of rationality which cannot be easily wished away. Since the choice of food baskets is probably determined more by culture and dietary preferences rather than by any scientific knowledge of nutrition, there always exists the possibility that the class which actually consumes the minimum non-calorie nutritional norms cannot be described as poor by any other criteria.

However, consumption behaviour appears to have been changing over time across practically all expenditure classes. The recent data is summarized in Table 5. The most interesting point to note is that the average calorie consumption has declined for each of these three broad classes in both rural and urban areas between 1993-94 and 1999-2000. The only exception is the urban APL class, which has recorded an increase. The pace of decrease during this period does not appear to be out of line with the longer-run trend beginning from 1973-74. In other words, the shift away from a high calorie diet is a phenomenon which is not confined to just a limited group, but is applicable in a much wider context. The measures of dispersion also tend to suggest that this trend certainly applies to the rural areas in most states, but there may be departures in the urban areas since dispersions have increased significantly in all classes.

Since there is no reason to believe that the average real expenditures of the poor have declined over this period, it is clear that the poverty lines based on calorie norms allow a fair degree of flexibility in the choice of food baskets. This is consistent with the view of some nutritionists that the calorie norms used in India are over-specified. Further support is provided by the observation from Table 4 that the southern states as a class exhibit lower average calorie intake

TABLE 5: Summary Statistics on Class-wise Calorie Consumption

	(Calories/day)					
	RURAL			URBAN		
	BPL	PL	APL	BPL	PL	APL
1993-94						
Mean	1684	1922	2392	1668	1861	2279
Std. deviation	171	227	216	144	167	114
Coeff. of Variation	10.2%	11.8%	9.0%	8.6%	9.0%	5.0%
1999-2000						
Mean	1586	1799	2288	1580	1779	2306
Std. deviation	214	193	198	194	250	158
Coeff. of Variation	13.5%	10.7%	8.7%	12.3%	14.0%	6.8%

BPL: Below Poverty-Line

PL: Poverty-Line

APL: Above Poverty-Line

Source: Reference 2 & 3

among the poor than the rest of the country, and they also consistently display better health indicators. Thus, the link between calorie intake and health outcomes is not obvious at all, and requires further research. Nevertheless, it appears that the calorie norms used in the Indian poverty lines are, if anything, biased upwards, and thereby provide ample space for variations in taste, food habits and nutritional awareness.

There is, however, another important implication of the data presented in the above tables. The fact that the poverty-line class had actually consumed the calorie norm in 1973-74 and has stopped doing so in 1999-2000, despite it being within their means, implies a voluntary change in food habits which needs to be reflected upon with some care. Clearly, something has happened during this period due to which the poor have actually reduced their calorie intake in favour of what may be termed as 'higher quality' food. It is tempting to infer that this is indicative of a shift towards a nutritionally more balanced diet, but that may be pushing the point. 'Higher quality', as reflected in a higher cost per calorie, can mean either nutritionally superior or aspirationally superior, or some combination of the two. There is nothing in the data presented which enables an appraisal of the direction of the shift. Further research by nutritionists is necessary to establish whether the poverty-line class is today consuming a nutritionally superior basket of food than earlier, or is it the case that the trade-off between calories and 'quality' has led to an actual deterioration of their nutritional status.

Nevertheless, the fact that a *voluntary* shift has occurred appears uncontested. The data also tends to suggest that the per capita consumption of cereals has decreased in absolute terms, especially in recent years. These two observations taken together then demand that the Indian food security and poverty alleviation strategies be reconsidered. By and large, these strategies have been based primarily on the provision of cheap, and even free, cereals to the poor and vulnerable classes. There are a host of such interventions which cover a full range of life-cycle vulnerabilities affecting the poor. The Targeted Public Distribution System (TPDS) provides heavily subsidized cereals to the entire BPL class; the Antyodaya Anna Yojana (AAY) targets the absolute destitutes; the Integrated Child Development Scheme (ICDS), young children and mothers; the Mid-day Meal Scheme (MMS), the school-going children; the various food-for-work (FFW) programmes, the working poor; and the Annapurna scheme, the aged. Despite whatever leakages that take place in these schemes, it appears more than likely that the average cost of cereals for the poor has declined over the years, at least in relative terms. In such a situation, the observed decline in the per capita cereal consumption suggests that cereals may be or, more correctly, may have become inferior goods *even for the poor*. Had they been normal goods, per capita cereal consumption should have increased at least to some extent, although perhaps not proportionately.

If this is indeed the case, the utility of further expansion of subsidized cereals needs to be questioned.