# Reading between the Poverty Lines

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The proposed Rangarajan method on measurement of poverty in India borrows elements from three earlier methods – those of Alagh, Lakdawala and Tendulkar. An important departure in the Rangarajan method is to compute the poverty line commodity basket by combining items from two fractile groups to address the relatively higher expenses for some essential non-food items. This, while being statistically plausible, poses a behavioural dilemma, as there will be no fractile group that will satisfy both. As an alternative, we suggest dual poverty lines where the first is computed on the basis of average calorie, protein and fat requirements which are region- and state-specific and the second uses the combined median fractile group after adjusting the distribution with price differentials.

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A poverty line refers to the income where one is able to afford the necessities of life (Rowntree 1902). Implicit in this is a basket of commodities and services that comprise the necessities and their prices.

The Expert Group to Review the Methodology for Measurement of Poverty with C Rangarajan as chair (Government of India 2014; hereafter Rangarajan method/report) in its report recommended that the monthly per capita poverty lines in 2011-12 be Rs 972 and Rs 1,407 for rural and urban India respectively. This has led to a popular outcry against the appropriateness of these lines, which on a per capita daily basis translates to Rs 32 (rural) and Rs 47 (urban).

The current exercise proposes to raise some methodological observations. We will try to restrict the reiteration of concerns already mentioned by Ray and Sinha (2014) and in an Editorial (2014) of this weekly. We will also use the opportunity to comment on some of their observations, but, before that, a brief outline of the Rangarajan method.

### Rangarajan Method

The Rangarajan method borrows elements from the three earlier efforts (Government of India 1979, 1993 and 2009; hereafter Alagh report/method, Lakdawala report/method, and Tendulkar report/method, respectively). As in the Alagh method, it uses the age-sexactivity specific recommended dietary allowance for Indians in 2010 as suggested by the Indian Council of Medical Research (ICMR 2009) and superimposes it on their respective population shares for 2011. This, for rural and urban regions, translates to an average calorie requirement of 2,155 kcal and 2,090 kcal, respectively, an average protein requirement of 48 grams and 50 grams, respectively, and average fat requirement of 28 grams and 26 grams, respectively. From a purchasing power perspective based on the consumption expenditure survey of 2011-12, all these are possible at a monthly per capita food expenditure of Rs 554 (sixth fractile group, 25-30%) for rural India and Rs 656 (fourth fractile group, 15-20%) for urban India. This return to a calorie-anchored commodity basket does away with the approach of starting with a poverty ratio and then arriving at a commodity basket, as in the Tendulkar method (Pathak and Mishra 2014).

A novelty of the Rangarajan method is the use of expenditure in the median fractile class (45-50%) as the norm for four essential non-food items, viz, education, clothing, shelter (rent) and mobility (conveyance). This turns out to be Rs 141 for rural India and Rs 407 for urban India.

All other non-food items are behaviourally determined from expenditure in the fractile group identified with average calorie, protein and fat requirements. This turns out to be Rs 277 (rural) and Rs 344 (urban).

Adding the above three gives monthly per capita poverty lines of Rs 972 and Rs 1,407 for rural and urban, respectively. Like the Lakdawala method, the Rangarajan method uses the Fisher price index on the all-India poverty line basket to state-specific poverty line baskets to obtain the state-specific poverty lines for rural and urban whereas like the Tendulkar method, the prices and quantities are from the household level survey data, as suggested by Deaton (2008). The population below the poverty lines give us the rural and urban state-specific poverty ratios and their weighted average gives the all-India poverty ratios.

It is for the first time that the poverty computations in India are based on the modified mixed recall period (MMRP) consumption expenditure survey. Under this, to reduce error, data for 2009-10 and 2011-12 were collected on the basis of weekly recall for some high frequency food items. annual recall for five low

frequency items and monthly recall for all other items. While this is a positive thing from a data quality perspective, it does away with comparable poverty estimates prior to 2009-10.

The Rangarajan report has indicated that any poverty measure is always somewhat judgmental, and, hence, the normative basis behind its calculation may not be agreeable to all. Nevertheless, there are some methodological observations which I elaborate below.

### **Behavioural Dilemma**

In the Rangarajan method, the poverty line commodity basket is from two fractile groups. One set is behaviourally determined from a fractile group associated with the average calorie, protein and fat requirements that is obtained when the recommended dietary allowance is superimposed on the age-sexactivity specific composition of the population while the other set of four essential non-food items is based on a relative norm - the behaviour of the median fractile group. It implies that both the sets are behaviourally determined, but constrained by different expenditure patterns. Thus, one is left thinking of how to emulate both.

Coming out of the behavioural delusion, one is also left to wonder what constitutes essential non-food items. Or, rather why items like health and sanitation should not be included (an aspect eloquently articulated by P V Sukhatme in the Lakdawala report, 1993: 46-49). In addition, the Tendulkar report had categorically remarked that the assumptions by the Lakdawala report that health and education ought to be provided by the state is no more appropriate. Similar concerns were also raised by Dev and Ravi (2008).

The state-specific differences in the four essential non-food items are also behaviourally determined, but not linked to an independent commodity basket. Hence, it may not be appropriate to consider that they are from the same commodity basket, unless we are referring to a commodity basket that is meshed between the two fractile groups. With two different criteria, as we will elaborate below, the Rangarajan report

could have suggested two different poverty lines and linked them to two different commodity baskets.

### **Computational Clarifications**

Given the state-specific variations in prices, one implicitly assumes that the all-India poverty lines are weighted averages. However, this is not obvious from the computation of the poverty line commodity basket. In particular, the quantities associated with the basket at the all-India level do not seem to be weighted averages of the quantities from the statespecific commodity baskets. The problem is further compounded because the actual poverty lines proposed in the Rangarajan method lie between the two reference fractile groups. It is not clear how these concerns have been addressed in the Rangarajan report. At the minimum, as also pointed out by Deaton and Drèze (2014), additional information detailing the calculations would facilitate greater public scrutiny.

The Fisher's index would be sensitive to the weights. Or, in other words, the state-specific poverty lines would depend on the prices and quantities associated with the aggregate all-India poverty line commodity basket. In addition, the Fisher's index would also be sensitive to the population multiplier used. For instance, the estimated population that was a basis for the sample design before the Census of 2011 would differ from the projected population for the survey period computed after the Census of 2011. Some clarity on what has been used is needed.

The sensitivity of poverty lines to the use of alternative price indices is also reflected in Ray and Sinha (2014) when they adjust for quality and use a Laspeyre's index. One is not able to fathom the advantages of an alternative price index when they begin with the all-India poverty lines provided by the Rangarajan method, which are not weighted averages. In addition, their qualityadjusted poverty lines for 15 states also seem to further aggravate, at least for Bihar, the problem identified in the EPW Editorial (2014) that the poverty ratio in the urban region is higher than in the rural region for some states. This could be because of demographic differences or relatively better access to food in rural areas or inherent in the assumption of a common commodity basket or for some other reason. But that needs further inquiry.

### **State-specific Requirements**

The assumption of a common commodity basket for all states may not be required if one uses the 2010 recommended dietary allowances suggested by the ICMR for each state separately. Such an approach was indicated in a note by S Guhan in the Lakdawala report (Government of India 1993: 50-52). The Lakdawala report articulated that this could be a future exercise, but was of the view that different commodity baskets may not make the poverty ratios comparable. In a different context, the need for different commodity baskets for different requirements or vulnerabilities has been articulated by Kuklys (2005).

Without getting into the pros and cons, another argument in favour of separate poverty lines for different requirements is that it is being already done for rural and urban India and it has not come in the way of making a comparison. In fact, the Rangarajan report compares both rural and urban all-India poverty lines that are identified with different commodity baskets with the purchasing power parity (PPP) in dollar terms. The Rangarajan report also points out that the proportion of poor at the combined all-India level declined from 38.2% in 2009-10 to 29.5% in 2011-12. As an aside, an understanding of changes in poverty could benefit from a decomposition that separates the impacts on account of growth, inequality and population (Mishra 2014).

In line with Guhan's suggestion, which has been done by Datta (2014) for 1973-74, we propose to do an exercise computing state-specific average calorie, protein and fat requirements. This approach will be similar to that in the Rangarajan report. However, some clarifications are in order.

To begin with, like the Rangarajan report, we use the recommended dietary allowances suggested by ICMR (2009) and superimpose them on age-sex-activity-specific

population composition. The age and sex composition as also the composition of workers and non-workers in the 15-59 age group are taken from the Census of India 2011. The workers in the 15-59 age group are further divided into

Survey Office 2014). In particular, the NIC category of agriculture, mining and construction are identified with hard labour activity, manufacturing is identified with moderate activity and the rest are identified as sedentary activity.

Table 1: Average Calorie, Protein and Fat Requirements across States for Rural and Urban India

States	Rural			Urban		
	Calorie (Kcal)	Protein (Grams)	Fat (Grams)	Calorie (Kcal)	Protein (Grams)	Fat (Grams)
Andhra Pradesh	2,403	50.8	29.5	2,100	51.0	26.0
Arunachal Pradesh	2,324	47.8	30.0	2,118	49.8	26.9
Assam	2,246	48.4	28.9	2,090	51.4	25.7
Bihar	2,195	46.5	29.2	2,043	48.6	26.5
Chhattisgarh	2,431	48.8	30.7	2,144	50.3	26.8
Goa	2,128	51.8	25.8	2,092	51.8	25.4
Gujarat	2,353	49.3	29.7	2,101	50.8	26.1
Haryana	2,273	49.6	28.8	2,087	50.4	26.1
Himachal Pradesh	2,392	50.7	29.3	2,141	51.8	26.1
Jammu and Kashmir	2,204	47.8	28.7	2,113	50.6	26.3
Jharkhand	2,300	47.3	29.9	2,084	49.8	26.4
Karnataka	2,379	50.5	29.4	2,106	51.0	26.0
Kerala	2,204	51.3	27.0	2,102	51.4	25.7
Madhya Pradesh	2,373	48.2	30.4	2,103	50.2	26.4
Maharashtra	2,398	50.2	29.7	2,092	51.1	25.8
Manipur	2,311	49.3	29.2	2,135	50.3	26.8
Meghalaya	2,228	46.1	29.6	2,055	49.8	26.1
Mizoram	2,356	47.6	30.3	2,136	50.0	26.8
Nagaland	2,375	48.2	30.3	2,098	49.7	26.6
New Delhi	2,012	49.7	25.6	2,051	50.6	25.6
Odisha	2,324	49.8	29.2	2,119	51.2	26.1
Punjab	2,263	50.9	28.1	2,101	51.2	25.9
Rajasthan	2,355	48.0	30.2	2,095	49.8	26.5
Sikkim	2,431	50.7	30.1	2,079	51.5	25.5
Tamil Nadu	2,363	51.2	28.9	2,134	51.6	26.0
Tripura	2,310	49.7	29.0	2,106	51.8	25.6
Uttar Pradesh	2,218	47.8	29.0	2,087	49.6	26.6
Uttarakhand	2,270	49.1	28.8	2,084	50.4	26.1
West Bengal	2,271	50.0	28.6	2,103	51.7	25.6
Andaman and Nicobar islands	2,257	51.2	27.9	2,131	51.6	26.1
Chandigarh	2,037	49.8	25.8	2,076	51.1	25.7
Dadra and Nagar Haveli	2,270	48.4	29.3	2,165	50.3	27.1
Daman and Diu	2,156	50.2	27.1	2,193	52.4	26.5
Lakshadweep	2,141	50.1	26.9	2,173	51.2	26.8
Puducherry	2,200	50.9	27.1	2,113	51.4	25.9
India	2,300	48.9	29.3	2,098	50.7	26.1

Note and Source: The average requirements are computed by superimposing recommended dietary allowances for Indians in 2010 (Indian Council of Medical Research 2009) on age-sex-activity composition. Age and sex as also workers and non-workers in the 15-59 age group are from the Census of India, 2011 (Tables C-13 and B-1 respectively). For activity, we use workers distribution based on the National Industrial Classification (NIC) 2008 in the employment unemployment schedule of National Sample Survey 2011-12 (National Sample Survey Office 2014: Statement 5.11.1) and impose it on the 15-59 age group of workers in Census 2011. In particular, the NIC category of agriculture, mining and construction are identified with hard labour activity, manufacturing is identified with moderate activity and the rest are identified as sedentary activity. The all-India shares across hard, moderate and sedentary activities are weighted averages from states and are sub-group consistent. In addition, assuming that the number of births in one year will be similar to the previous year, we take 50% of the less than one year population to denote pregnant women in the second and third trimesters. Further, we also assume that 90% of the less than one year population to have lactating mothers. The pregnant and lactating women are distributed across hard, moderate and sedentary activities as per their respective shares in the NIC-based distribution indicated above.

those in hard, moderate and sedentary activities. This is done by making use of the distribution for the entire workforce based on the National Industrial Classification (NIC) 2008 (National Sample

This categorisation is slightly different from that in the Alagh report because of a limitation with the reported data at our disposal. Further, we also need to mention that our shares across hard, moderate and sedentary activities at the all-India level are the weighted averages of the state-specific values to ensure subgroup consistency.

A departure from the Rangarajan report is that in our computations we also incorporate pregnant and lactating women. For pregnancies, we assume that they may not differ much between two consecutive years, and, hence, consider 50% of the first year population as an approximation for the number of pregnancies in their second and third trimesters. Similarly, we consider 90% of the first year population as an approximation for lactating mothers. In fact, the National Family Health Survey 2005-06 does indicate that more than 95% of those in their first year (0-11 months) were breast-fed (International Institute for Population Sciences) and Macro International 2007). These last two categories of women are distributed across hard, moderate and sedentary activities as per their respective shares in the NIC-based workers distribution indicated above.

Our computations of average calorie, protein and fat requirements are given in Table 1. At the all-India level, we get an average calorie requirement of 2,300 kcal and 2,098 kcal, respectively, average protein requirement of 49 grams and 51 grams, respectively, and average fat requirement of 29 grams and 26 grams, respectively. These values are slightly higher than the Rangarajan report, particularly for calories in rural India. The differences would largely be on account of the procedures. Nevertheless, we are close to their estimates and this gives credence to our region and state-specific average requirements.

### **Dual Poverty Lines**

We suggest dual poverty lines. For the first poverty line, we also suggest that the region and state-specific average requirements may be considered as a basis to compute the region and state-specific poverty line commodity baskets from the fractile group in which they are associated with. The usage of appropriate population multipliers will help in computing the per capita quantities and prices for these region and state-specific

fractile groups. A weighted average across all these region and state-specific fractile groups can be used as an all-India base in the computation of a Fisher's price (or some other) index. Differences from the all-India base with the region and state-specific per capita quantities and prices associated with their respective poverty line commodity baskets will help in computing the region and state-specific poverty lines. One could compute aggregate all-India rural. urban and combined poverty lines that would be weighted averages.

Now, one can use the ratio of the weighted average all-India combined poverty line to the region and statespecific poverty lines for adjusting the distribution of monthly per capita consumption expenditure given in the unit level household survey data. The adjusted distribution is now comparable across regions and states and can be used to obtain a second poverty line associated with the median fractile group or with some other norm.

A second poverty line that is higher than the average requirement will also address an important concern of Sukhatme (1965) that average requirements would not address inter and intra-household inequalities or that there are considerations beyond food that need to be addressed. His comment in the Lakdawala report (Government of India 1993: 46) suggests "that when poverty line is defined as a level equal to the norm we unwittingly harm the interests of the backward castes".

On the dual poverty lines, we benefited from two unpublished papers. One is a preliminary idea by Nathan (2014) that suggests different normative criteria for two lines - a line of sustenance and a line of affluence – and argues that the public policy intervention should have a greater focus on those below the line of sustenance, but it cannot entirely ignore those who have not reached the line of affluence. Drawing on Krishna's (2010) stages of progress, Kumar's (2014) intensive fieldwork in the tribal block of Kesla in Madhva Pradesh leads to the formulation of a poverty cut-off line and a prosperity cut-off line that he links to an understanding of chronic and transient poverty.

### **Beyond the Poverty Line**

There is a popular misconception that the Rangarajan method to measure poverty line is benchmarked to a calorie norm as in Dandekar and Rath (1971). This is not correct. All it does is use the age-sex-activity specific recommended dietary allowance for Indians in 2010 by ICMR and superimpose it on their respective population shares to arrive at an average requirements. It then proceeds with the assumption that the fractile group associated with this average requirement will give us a commodity basket (excluding four essential nonfood items) associated with the poverty line. Thus, it will have no relationship with the actual calorie, protein and fat deprivation at the household level.

An alternative way of understanding necessities of life takes us to Engel curves (Chai and Moneta 2010). It would refer to those commodities whose expenditure elasticities are less than unity. Kumar et al (2008) have attempted a shortfall from the Engel curves to estimate deprivation without a poverty line. This, however, will still not explain the puzzle of declining cereal and calorie consumption in India not being commensurate with nutritional deprivation observed from other indicators (Deaton and Drèze

Having said that, it must be borne in mind that there are many non-economic

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dimensions that are important. There is an increasing understanding that poverty is multidimensional (Alkire and Foster 2011), but its application as part of the annual Human Development Reports since 2010 has been confined to measurable dimensions in income, health and education. There are other sociopolitical concerns that could link poverty to powerlessness, alienation and exclusion. In future, region and state-specific measurement of poverty in India could benefit from a broader understanding and the National Sample Survey Office (NSSO) should design appropriate surveys to facilitate this.

The notion of multidimensionality could also be in methods that would take us beyond Alkire and Foster (2011) and to be effective from a public policy perspective it could include an understanding of efforts and interventions among those who have moved out of poverty and how one could use the lessons from them to those who continue to be poor. In this regard, a civil society's interventions on enabling the power to empower themselves would be of interest (Mishra and Sengupta 2013).

If one keeps the above concerns aside, the Rangarajan method points out that in 2011-12 the proportion of poor is 30.9% in the rural region and 26.4% in the urban region. This is a substantial proportion and ought to be a matter of serious concern from a public policy perspective. Efforts should be made to identify the poor while not excluding the vulnerable who could be on or somewhat above the poverty line or dimensions that are not measured. This also calls for transparency and accountability at the implementation stage (Rao 2010).

### **Conclusions**

The Rangarajan report/method on measurement of poverty draws from the earlier official methodologies. An addition in the Rangarajan report is to arrive at the poverty line commodity basket by combining items from two fractile groups. This, while statistically plausible, poses a behavioural dilemma, as none of the two reference fractile groups will satisfy both. Keeping that aside, the question of why health and sanitation

are not considered as essential non-food items is an open question.

To move out of a behavioural dilemma, we also propose the consideration of dual poverty lines. In this, the first poverty line should be computed on the basis of average calorie, protein and fat requirements that is region and state-specific and the second one uses the combined median fractile group after adjusting the distribution of consumption expenditure with price differentials.

It is an irony that while Rowntree's poverty line led to the emergence of the welfare state in the United Kingdom in the early 20th century, the measurement of poverty in India in the 21st century has to be constrained by the fact that the state is not the prime provider of some essential services like education and health. Given these concerns, in future, a move towards measurement o fmultidimensional poverty would be worthwhile. The notion of multidimensionality should be general and should take us beyond disciplinary boundaries combining research and action.

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