A case for provincialising Calorie Norms in India:

Special Reference to Kerala

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Discourse on poverty, once at the epicentre of debate in Indian academia, is now pushed to margins despite India's distinction of the having largest number of poor in the world (Katayama & Wadhwa 2019). One of the key reasons for this is the lack of availability of data for such a debate. NSSO's National representative consumption survey, the main input for poverty debate India, conducted during 2017-18 has not yet been made public. Our interest in this subject also rose from the fact that latest committee on measurement of poverty has calculated rural Kerala's poverty to be mere 7.3 per cent in 2011-12 which seems quite low compared to what everyday experience of living in Kerala would reveal.

Most committee's or working groups so far have unsuccessfully tried to anchor poverty line in minimum nutritional requirement of Indian population. Invariably nutritional requirement or minimum calorie norm has been defined at national level. This article raises a fundamental criticism to the entire class of poverty measures that has been proposed so far in Indian context. Our criticism emanates from the fact that calorie requirements itself may be different for different states as has been revealed by burgeoning literature on calorie puzzle debate in India kick started by Deaton and Dreze (2009).

This aspect of regional diversity in calorie needs, to our knowledge, has never been given due attention by official committees or working groups appointed for measuring poverty. If nutritional requirement indeed is the fundamental building block of poverty line, then this aspect needs a closer attention. The available literature supported by empirical evidence

indicate a puzzling feature in calorie consumption pattern of the Indian states, i.e., state with better nutritional outcome tend to have lower calorie intake. Epidemiological factors, mechanisation of economy and state health infrastructure play crucial role in determining calorie needs at population level in additional to individual factors such as physical height, gender and activity status. Duh and Spears (2017) in their investigation of calorie intake in India suggested that calorie intake requirements may be lower in regions having less infectious environments as it affects intestinal health of the population. Since energy absorption from food consumed can take place at greater efficiency on account of better intestinal health it is plausible that population living in less infectious environment may consume lower calories to achieve same amount of effective calorie intake. Eli & Li (2021) found increasing levels of mechanisation of the economy to be a significant factor explaining decline in average calorie intake of India. Obviously, level of mechanisation not only varies temporally but also across regions for a given period of time.

Therefore, it is not surprising to see those states performing well in nutritional indicators tend to have a lower per capita calorie intake suggesting that population in these states may actually have lower minimum calorie intake requirement. In other words, lower average calorie consumption in states like Kerala and Tamil Nadu is less not due to lack of purchasing power but more on account of better intestinal health of the population. However, when judged from a national minimum calorie intake requirement norm these states will invariably have a higher proportion of their population classified as undernourished. Therefore, based on calorie deficiency measured from national standards these states are likely to have higher incidence of poverty.

By keeping calorie requirement of a continental sized country with all kinds of diversity fixed at national level implies an inherent assumption that all regions at all times have identical calorie requirement which in turn is based on the assumption that all states have similar epidemiological environment and mechanisation of the economy and comparable levels of health infrastructure. This is a strong assumption that has been proposed in the Indian context so far. The purpose of this commentary is to expose the adverse implications of national calorie norm for arriving at poverty estimates at state level. Going forward we will see inconsistency and contradiction that entire class of poverty measure faces due to this strong assumption. We also demonstrate that such inconsistency and contradiction disappear the moment we use state base calorie norm.

In this article, in an effort to revisit the measurement debates on poverty, we critically examine the methodology adopted for the measurement of poverty by various committees and Rangarajan Committee in particular (Planning Commission 2014). The Rangarajan Committee proposed one formula for the measurement of poverty at national level but used price index to convert national poverty line into state poverty line as was done by Tendulkar Committee report.

Rangarajan Committee's National level formula, when implemented at the state level, throws inconsistent ranking and levels of poverty among Indian states. This is depicted by drawing a comparison between the higher and the lower income states, like Kerala and Tamil Nadu as against Bihar and Uttar Pradesh, respectively. The implications of the Rangarajan Committee's method of calculating the poverty line by putting forth a national money metric poverty line and then arriving at the state level poverty line by using price index has not been immune to criticisms. However, these criticisms mainly hinge upon three distinct components and aggregation issue for arriving at money metric poverty line and logical inconsistency of using them (Ray & Sinha 2014, Arora & Singh 2022, Mishra 2014).

Such an assumption is untenable particularly during post reform era. Many studies have highlighted divergent pattern of economic growth and development of regional economies within India (Ahluwalia 2000; Baddeley et al 2006; Sanga and Shaban 2017). As the state economies diverged, they plausibly also diverged in terms of epidemiological conditions, health infrastructure and mechanisation levels which affects the minimum calorie requirement of the population.

Rangarajan Committee took cognisance of the fact that calorie requirements may be different over time, but it continued with the assumption that calorie intake requirements are invariant across regions for a given period of time.

Guided by the 2010 calorie norms prescription of the ICMR (Indian Council for Medical Research), the Rangarajan Committee has attempted to be inclusive of the interstate price differential. They have made use of the consumption expenditure data collected using Modified Mixed Recall Period (MMRP) (NSS 68th round) and have not strayed too far from the methodology pursued by the Tendulkar Committee for arriving at the state specific poverty line. As per the data gathered by the survey, implicit prices for several commodities and commodity groups have been calculated using the reported quantity and value of

consumption. The inter-state price differential was accounted for through the application of the Fisher index, separately for rural and urban areas, thereby disaggregating the national poverty line into state-specific poverty lines. Use of price index to arrive at state level money metric poverty line implies an additional unrealistic assumption of invariance in composition of consumption expenditure with respect to time and space. For instance, Lakdawala Committee by allowing for price adjustment of 1973-74 money metric poverty line to arrive at poverty line for years after that, not only assumed invariance in calorie intake requirement either on regional or temporal basis but also assumed composition of expenditure between food and non-food items to remain intact at national average of 1973-74 level. It is well known that share of non-food expenditure has been on rise since then.

Rangarajan Committee computed the average requirements of calories to be 2155 kcal per person per day in rural areas and 2090 kcal in urban areas with stipulations for fat and protein intake within total calorie intake (Planning Commission, 2014. pp.57- 58). The national money metric poverty line was essentially derived as sum of three components. Component 1 is normative component and is computed as the mean of per capita food expenditure of the fractile[1] class that satisfies the calorie norm, component 2 is also a normative component which is computed as mean expenditure on essential non-food items such as clothing, rent, education and conveyance by the median fractile class. The third component is behaviourally determined because it is computed as mean of expenditure on remaining non-food items from the fractile class that satisfies the calorie norm. Finally, these three components are summed to arrive at money metric poverty line. Following these, new poverty line at national level was worked out to be at MPCE of Rs.972 in rural areas and Rs.1407 in urban areas in 2011-12. Prevalence of poverty is simply calculated as head count of those households that have their MPCE below the poverty line irrespective of their level of calorie consumption or non-food consumption.

In essence, this formula assumes perfect substitutability or full compensation between different components of the poverty line (Arora & Singh 2022). For instance, such money metric poverty line would not be able to differentiate between an average household and a household that is compelled to have very high non-food consumption due to its unusual circumstances and compromises on food expenditure.

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[1] Fractile refers to 20 divisions of equal proportion in the data based on MPCE ranking, therefore each class will have 5% of the total observation in the data. Fractile one is seen as the lowest economic class while fractile 20 is seen as the richest economic class.

Thus, despite Rangarajan Committee's effort to anchor the poverty estimation back to the calorie norms, the methodology continues to have flaws. Estimation of state level poverty lines using the national formula as explained above with national calorie norm portrays the inherent inconsistency of the methodology. This is illustrated in Table 1: Column 4-5. While poverty line of rural Kerala as per the Rangarajan Committee's original calculation is at Rs 1054 yielding poverty incidence of 7.3 per cent, however when we implement the national Rangarajan formula for calculating poverty line on rural Kerala using calorie norm of 2155 per capita per day calorie, we get a much higher poverty line of Rs 2087 translating to poverty incidence of 53 per cent. However, poverty line for Bihar calculated in this manner yield a lower poverty line of Rs 949 (37% poverty incidence). Similar contrast can be drawn for Tamil Nadu and Uttar Pradesh where Uttar Pradesh yields lower poverty incidence than Tamil Nadu.

Therefore, applying a pre-determined and constant calorie norm without adjusting for the regional differences in calorie intake requirements across states is bound to give such fallacious numbers.

To face the problem head on, attention must be given to the calorie consumption patterns and requirements that vary across different regions of the country due to reasons that could be attributed to the level of mechanisation of the economies, epidemiological conditions of states and status of development of health infrastructure across the states. A methodology that is able to incorporate differences in calorie intake across regions based on these factors will come near to providing a truer estimation of poverty at regional level.

A common calorie norm at national level would tend to under (or over) estimate poverty when applied to a state with higher (or lower) average calorie intake prevailing in that state than the national average. Indian states exhibit wide diversity from each other including in economic growth, human development, public health and disease environment. Lower calorie consumption of the states like Kerala and Tamil Nadu despite being economically richer can largely be explained on account of better public health system, disease-free environment and greater mechanisation of these economies. For example, Siddiqui et al. found that 10 per cent of the total variation in calorie intake in rural Indian can be attributed to state level differences in disease or epidemiological environment alone. Using Siddiqui et. al. (2019) we have computed state-adjusted calorie norms for rural areas based on additional (fewer) calories from national norms that may be warranted for particular states provided that the

state has worse (better) epidemiological environment than the national average. We have used these state-calorie norms to recompute the respective poverty lines and associated incidence rates as presented in Table 1: Column 3, 6.

When applying Lakdawala formula for 1973-74 with uniform calorie norm of 2155 kcal, poverty line for Kerala is Rs 2223 and corresponding incidence rate of poverty is 57 per cent. Astonishingly, Bihar tends to have lower poverty incidence. Similar is the case when we compare Tamil Nadu and Uttar Pradesh. Obviously, such an empirical observation is inconsistent and counterintuitive with our everyday perception of lived realities in these states. The sole reason behind such an inconsistent outcome is because average calorie intake in Bihar and Uttar Pradesh is way higher than average calorie intake in Kerala and Tamil Nadu, which is owing to worse epidemiological conditions in former set of states. Once we adjust additional (fewer) calories needed on account of such differences, rural Kerala and Tamil Nadu need 461 and 274 fewer calories than mandated by national average requirement i.e., 2155 calories, conversely Bihar and Uttar Pradesh need 190 and 175 additional calories respectively.

Table 1: Poverty line and corresponding incidence rates based different formulas for 2011-12

STATE	Poverty line as per Lakdawala formula		Poverty line as per Rangarajan formula		
	National Calorie Norm	State Adjusted calorie norm	Reported as per State Formula	National Formula with National Calorie	National Formula with State Adjusted
1	2	3	4	5	6
Kerala	2223.29 (57%)	1278.78 (17%)	1054.03 (7.3%)	2086.97 (53%)	1269.94 (17%)
Tamil Nadu	1567.37 (57%)	1281.78 (37%)	1081.94 (24.3%)	1477.89 (53%)	1269.94 (37%)
Bihar	949.01 (37%)	1142.50 (63%)	971.28 (40.1%)	949.01 (37%)	1142.50 (63%)
Uttar Pradesh	929.82 (43%)	1195.87 (67%)	889.82 (38.1%)	929.82 (43%)	1138.59 (63%)

Source: Computed from NSS CES, 2011-12; Planning Commission, 2014

Note: incidence of poverty is given within parenthesis (in %)

Upon adjusting for calorie needs at state level, poverty line for rural Kerala as per 1973-74 formula reduces from Rs 2223 to Rs 1278 leading to reducing the incidence of poverty by 40

percentage points i.e., 17 per cent. In contrast, Bihar's poverty line increase from Rs 948 to Rs 1142 leading a rise in poverty incidence by 26 percentage points i.e., 63 per cent (Table 1: Column 2-3). Similar reversals in poverty estimates due to adjustment of calorie needs at state level can be made for Tamil Nadu and Uttar Pradesh. These numbers seem to be consistent with lived realities of these states. We can also observe similar comparative empirical results from Column 5-6 of Table 1 with regards Rangarajan's national formula. For instance, poverty incidence in case of rural Kerala reduces from whopping 53 per cent to 17 per cent while in contrast Bihar's poverty level rises from 37 per cent to 63 per cent.

From these observations it is clear that until calorie needs are defined at regional level arriving at logically consistent poverty line or estimate would always be challenging task and there will always be an inherent assumption that will be untenable with reality. Adjusting for price differences at regional level or on temporal basis, as has been done so far, to arrive at poverty lines for specific population groups at regional level has been marred with controversies and logical inconsistencies that are difficult to defend.

Conclusion

The diversity among the Indian states has resulted in the development at varying levels leading few states like Kerala, Tamil Nadu to perform better in public health and human development indicators. Over the period the occupation structure of the population has transformed and the intensity of the labour efforts have changed for the whole population but very differently for different regions. Along with this, improvement in public health and an infectious free environment has contributed to the difference in calorie intake of the population. It was found that unlike Bihar and Uttar Pradesh, states of Kerala and Tamil Nadu require lower calorie consumption. This is not because of the lack of affordability but partly due to an infectious free environment. These differences have to be taken into account while estimating the poverty at state level.

As mentioned before, Rangarajan Committee has calculated the minimum nutritional requirement based on the dietary allowance recommended by ICMR at national level and even though the committee have adjusted for the state level price differentials to calculate the poverty lines, they failed to account for the difference in calorie intake level across the states.

There is also a need to reconsider using the expenditure of the median fractile for essential non-food items. In states like Bihar and Uttar Pradesh the median class itself comes under the

poverty line and estimating the poverty rate using the same class, results in underestimation of poverty and inaccurate numbers.

References

Ahluwalia, M. S. (2000). Economic performance of states in post-reforms period. *Economic and Political weekly*, 35(19), 1637-1648.

Arora, A., & Singh, S. P. (2022). Questioning the Poverty Line Aggregation Approach in India: Issues of Mismatches and Overlaps. *Poverty & Public Policy,* (Forthcoming).

Baddeley, M., McNay, K., & Cassen, R. (2006). Divergence in India: Income differentials at the state level, 1970–97. *The Journal of Development Studies*, *42*(6), 1000-1022.

Deaton, A., & Drèze, J. (2009). Food and nutrition in India: facts and interpretations. *Economic and political weekly*, 44(7), 42-65.

Duh, J., & Spears, D. (2017). Health and hunger: Disease, energy needs, and the Indian calorie consumption puzzle. *The Economic Journal*, *127*(606), 2378-2409.

Eli, S., & Li, N. (2021). Caloric intake and energy expenditures in India. *The World Bank Economic Review*, *35*(4), 1057-1075.

Katayama, Roy & Wadhwa, Divyanshi (2019). Half of the world's poor live in just 5 countries. World Bank Blogs, URL: https://blogs.worldbank.org/opendata/half-world-s-poor-live-just-5-countries

Mishra, S. (2014). Reading between the Poverty Lines. *Economic and Political Weekly*, 49(39), 123-127

Planning Commission. (2014). Report of the Expert Group to Review the Methodology for Measurement of Poverty.

Ray, R., & Sinha, K. (2014). Rangarajan Committee Report on Poverty Measurement Another Lost Opportunity. *Economic & Political Weekly*, *49*(32), 43-48.

Sanga, P., & Shaban, A. (2017). Regional divergence and inequalities in India. *Economic and Political Weekly*, *52*(1), 102-110.

Siddiqui, M. Z., Donato, R., & Jumrani, J. (2019). Looking past the Indian calorie debate: what is happening to nutrition transition in India. *The Journal of Development Studies*, *55*(11), 2440-2459.