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# NUTRITIONAL INEQUALITY IN INDIA

Rajaram Dasgupta

Centre for Development Studies
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Just as per capita income or percapital consumer expenditure or their distribution is considered indicators of welfare situation of a society, per capita consumption of 'nutrition' and its distribution between different regions and classes of population may be taken as another indicator of the welfare position. As 'nutrition' is not consumed directly, we reckon it in terms of its level or amount of intake. 'Nutrition' is not a single factor, but a vector of which calorie, protein, fat, vitamins, minerals etc. are the components. All of these components in certain amount are found to be medically necessary for normal human being. One is not generally a substitute of the other. It is equally difficult to say which component of the vector is more important or which is less important. But it is generally agreed that calorie and protein are the two most important components of 'nutrition'. Nutrition experts, economic planners and agricultural scientists are therefore usually concerned with protein-calorie deficiency or imbalance.

Quite a substantial amount of empirical work has been done in India on such welfare indicators as per capita income or expenditure and on the extent of inequality and poverty (1). But not much work has been done on the behaviour of intake of 'nutrition'. In the early 60's the Mahalnobis committee on income distribution showed that the inequality in the distribution of consumption of cereals in India was

less than the inequality in the pattern of consumer expenditure. This was till far from an analysis of nutrition. Sukhatme's is the pioneering attempt in this direction. Contrary to the prevailing opinion he pointed out that the problem of protein deficiency in India was much less severe than that of calorie deficiency. In one of his works (2), he prepared a 2x2 contingency table on the basis of data for Madras and Bihar, and showed that calorie deficient people were more in number. Chatterjee, et al. (3) analysed NSS (13th round) data for India and found that 60 per cent of the rural population was below the all India average intake in respect of calorie and all other nutrients except vitamin C for which the proportion was 40 percent. They also obtained Lorens ratio as a measure of inequality in the distribution of each of the nutrients.

The aim of this paper is to study the average intake of calorie and protein, and the nature of their distribution in different states. An associated problem tackled is the assessment of the per consumer unit availability of these nutrients and disparity thereof among different states. The following section prepares the conceptual background to the actual measurement problems. Section 3, 4 and 5 are devoted to the analysis of data and results, and conclusions have been given in section 6.

2. Per capita intake of calorie or protein does not say much about the real nutritional situation of a society. More pertinent questions to ask are: who is consuming how much? how many people are

undernourished? What is the extent of inequality in nutrition? No sooner than these questions are raised, one immediately faces the choice of a suitable index of, say, undernutrition or inequality in nutrition. Such statistical measures as co-efficient of variation, variance of logerithmic distribution and Lorenz ratio, each with some limitations are used for this purpose. But it is difficult to say which one of these is a better indicator. Some even doubt whether any of these is valid measure at all. A review of debtate is available in Sen (4). Sen (4) has further formulated a measure of poverty, an analogue of which we think can be used as a measure of undernutrition. As Sen's formulation is for individual data, Bhatty (5) for estimation of poverty has modified that for the use of grouped data. If we take intake calorie as the index of nutrition, the index of undernutrition denoted by 'U' or the analogy of Sen's (4) poverty index P modified by Bhatty (5) can be written as following.

$$U = \frac{2}{Z\left(q+\frac{1}{n}\right)} \sum_{i=1}^{L} wi\ (z-\bar{y}i)\ \left(q-\bar{w}i+\left(\tfrac{1}{2}\right)wi+\frac{1}{2n}\right)$$

Where $\bar{y}i$ = per capita calorie intake of ith class,

$z$ = minimum level of calorie requirements,

$wi$ = the proportion of population in ith class,

$\bar{w}i$ = cumulative proportion of population upto and including the ith class,

$L$ = the number of classes below the level of z

$q$ = proportion of people below the level of z

$n$ = population size

There is no agreement on the specific value of Z. Differences arise because medical science does not provide us any unique minimum dose of caloric, below which people can not survive. Gopalan et al.(6) maintain ".... unfortunately, experience has shown that human beings can adapt themselves at a low level of vitality, and with their powers impaired, to an insufficient ration without realising that they are underfed". But just survival of human beings is not the issue. That is why, Gopalan et.al.(6) write, "the nutrition worker in setting up standard of food requirements ignores, and justifiably too, the remarkable faculty of the body to adapt themselves to mild degree of starvation. He aims at not mere survival but positive health with all the faculties at a higher levels of working efficiency". In nutritional analysis therefore that dose should be taken as the minimum requirement below which people may very well survive but not with positive health and satisfactory efficiency which are essential to any society. This minimum requirement varies by age, sex, intensity of work etc. Nutritional experts (6) have prescribed nutritional minimum allowances for people of different age, sex and type of work. On the basis of these allowances, and percentage of population in each age group, the national minimum requirement of per capita calorie comes out to be 2356 kcal per day. The corresponding value of minimum requirement for protein works out to be 44gm. per capita per day. Since National Sample Survey (NSS) figures are available in terms of intake per consumer unit, minimum requirement interms of per capita too has to be converted interms of requirement per consumer unit. When transformed,

our minimum requirements of calorie and protein become 2800 kcal and 54 gms. per consumer unit per day respectively. In our above formulation Z is therefore equal to 2800. Since 'U' covers only one section of the population, for comparison of nutritional status of two states, 'U' should not be taken as a sufficient indicator. So in order to cover people above the poverty line a measure similar to 'U' to be called index of calorie sufficiency, 'S' can be written as

$$S = \frac{2}{Z(q^1+1_{n'})} \sum_{i=1}^{M} w_i^1 (\bar{y}_i - z) (q^{1-} - w_i^1 + w_{i2}^1 + 1n1)$$

Where

$q^1$ = Proportion of consumers above minimum level of calorie
= the number of classes above minimum level z i.e. 2800 kcal per consumer unit per day,

$W_i^1$ = the proportion of consumers in ith calorie class, (above z level),

$\bar{W}_i^1$ =Cumulative proportion upto and including ith class, (cumulation starts only in the group just above the level of z).

$\bar{Y}^1_i$ = calorie intake per consumer unit per day in ith class,

$n^1$ = total consumers,

$z$ = minimum level of calorie requirement per consumer unit per day.

It must be noted that 'U' too has to be computed on the basis of per consumer unit per day.

Now on the basis of 'S' and 'U' the nutritional position of states may be compared and ranked as follows:-

For any two states:

(A) If $U_1 \succ U_2$ and $S_2 \succcurlyeq S_1$

or $S_2 \succ S_1$ and $U_1 \succcurlyeq U_2$,

state (2) is better calorie nourished than the state (1), and their ranking is completely ordered,

(B) If $U_1 \succ U_2$ and $S_1 \succ S_2$, no definite conclusion about their ranking can be drawn, and states are thus partially ordered by each of the conditions.

3. National Institute of Nutrition (NIN) has been collecting data on intake for last few years, but their data is not very much satisfactory for wide range of statistical analysis. National Sample Survey Organisation (NSSO) generally does not tabulate data on intake of nutrition. Recently, however at the request of FAO, intakes of calorie and protein per consumer unit by expenditure and calorie classes have been tabulated in NSS Report Number 238 (26th round data for 1971-72). Table 1 gives the per consumer unit intake of calorie and protein for different states in rural and urban areas. What is evident is that in almost all the states in urban areas, and more than half of the states in rural areas calorie intake per consumer unit is below the level of 2800 calories. This signifies that even the availability is not sufficient so that even if inequality in distribution be corrected all will not have enough of calorie.

Table 1: CONSUMPTION OF NUTRITION PER CONSUMER UNIT PER DAY

| S.No. | State/Union Territory | Rural | | Urban | |
|---|---|---|---|---|---|
| | | Protein (gm.) | Calorie (K.cal) | Protien (gm.) | Calorie (K.cal) |
| 1. | Delhi | 99 | 3040 | 78 | 2572 |
| 2. | Himachal Pradesh | 98 | 3190 | 82 | 2823 |
| 3. | Tripura | 80 | 3027 | 78 | 2857 |
| 4. | Pondichery | 66 | 2321 | 68 | 2410 |
| 5. | Tamil Nadu | 66 | 2394 | 58 | 2239 |
| 6. | Mysore | 77 | 2839 | 67 | 2372 |
| 7. | Kerala | 50 | 2023 | 56 | 2103 |
| 8. | Andhra Pradesh | 73 | 2666 | 68 | 2617 |
| 9. | Uttar Pradesh | 102 | 3198 | 84 | 2616 |
| 10. | Punjab | 111 | 3711 | 85 | 2806 |
| 11. | Jammu & Kashmir | 100 | 3490 | 76 | 2772 |
| 12. | Haryana | 115 | 3652 | 89 | 2789 |
| 13. | Manipur | 79 | 3109 | 77 | 2948 |
| 14. | Goa | 68.8 | 2350 | 74.6 | 2614 |
| 15. | Meghalaya | 75 | 2577 | 73 | 2623 |
| 16. | West Bengal | 63 | 2311 | 70 | 2431 |
| 17. | Orissa | 66 | 2533 | 73 | 2737 |
| 18. | Maharashtra | 78 | 2567 | 77 | 2502 |
| 19. | Rajasthan | 102.3 | 3213 | 92.3 | 3006 |
| 20. | Madhya Pradesh | 128.9 | 3756 | 84.3 | 2850 |
| 21. | Gujrat | 82.2 | 2822 | 75.5 | 2625 |
| 22. | Bihar | 83 | 2732 | 83 | 2763 |
| 23. | Assam | 69 | 2665 | 71 | 2616 |
| 24. | Chandigarh | -- | - | 82 | 2826 |
| 25. | Nagaland | -- | - | 81 | 2626 |
| | All India : | 76 | 2724 | 75 | 2539 |

Source: NSS report number 238/1-11.

(Calorie and Protein content of food items consumed per diem per consumer unit).

Requirement of 2800 calories per consumer unit may seem to be in higher side compared to the reference level of 2400 calories per consumer unit per day used in NIN report (7). But requirement in terms of per consumer unit will vary depending upon the choice of standard unit. If a child of one year be taken as unit requirement will be 1200 calorie per consumer unit, but if a man doing heavy work be taken as standard unit requirement will be 3900 calorie per consumer unit per day. If former be the standard, most of the people will be taken as more than one standard unit, so that average intake per consumer unit will be less. Reverse will be the case if latter be the standard. NIN (7) has taken a man with sedentary work as a standard unit so that requirement per consumer unit is 2400 calories. But in NSS (8) calculation an adult person of age group 20-39 doing moderate work has been taken as unit. So for NSS tabulations 2800 calorie per consumer unit per day is the requirement.

Informations of Table 1 are however aggregative, and do not tell much about the actual nutritional intake. Even if average intake is more than the requirement, it does not by any means ensure that no body is undernourished. In Table 2, we have therefore estimated percentage of consumer units having intake less than 2800 calories. A glance at the table makes it clear that substantially large number of people are living below the prescribed level of calorie. In the language of nutrition these people, do not even fill their stomach fully. In other words, 56 percent consumers in rural India and 71 percent consumers in urban India suffer from undernutrition that is

Table 2: Percentage of consumers below level 2800 Kcal.

| S.No. | State/Union territory | Rural | Urban |
|---|---|---|---|
| 1. | Delhi | 50.78 | 71.05 |
| 2. | Himachal Pradesh | 42.41 | 66.81 |
| 3. | Tripura | 60.33 | 60.42 |
| 4. | Pondichery | 77.01 | 73.01 |
| 5. | Tamil Nadu | 73.68 | 82.76 |
| 6. | Mysore | 61.58 | 77.70 |
| 7. | Kerala | 73.35 | 80.79 |
| 8. | Andhra Pradesh | 65.98 | 71.12 |
| 9. | Uttar Pradesh | 43.73 | 70.05 |
| 10. | Punjab | 29.06 | 62.46 |
| 11. | Jammu & Kashmir | 23.53 | 64.00 |
| 12. | Haryana | 30.05 | 64.14 |
| 13. | Manipur | 48.26 | 53.52 |
| 14. | Goa | 74.87 | 70.37 |
| 15. | Meghalaya | 81.39 | 68.63 |
| 16. | West Bengal | 76.43 | 79.21 |
| 17. | Orissa | 66.04 | 62.94 |
| 18. | Maharashtra | 68.57 | 74.07 |
| 19. | Rajasthan | 45.22 | 57.26 |
| 20. | Madhya Pradesh | 42.33 | 64.43 |
| 21. | Gujrat | 59.10 | 69.99 |
| 22. | Bihar | 58.09 | 61.75 |
| 23. | Assam | 65.01 | 69.57 |
| 24. | Chandigarh | -- | 60.71 |
| 25. | Nagaland | -- | 66.33 |
| | All India | 56.39 | 71.01 |

calorie defficiency. If we look at state figures we find that undernutrition measured by this kind of head-count raio is least in Punjab and maximum in Meghalaya so far as rural areas are considered. For urban areas it is least in Manipur and highest in Tamilnadu. Both the tables, however suggest that nutritional situation is better in rural areas compared to that in urban areas.

4. Inequality is another indicator to compare welfare status of two distributions --two states for our purpose. We have therefore estimated Gini co efficients for nutritional distributions of different states. In one case population has been grouped according to calorie intake classes, and in the other case according to consumer expenditure classes. The Gini-coefficient in respective casses is denoted by G1 and G2. Although G1 and G2 do not rank all states in exactly the same fashion, yet they do it very closely (Table 3, 4). Rank correlations between these two measures are 0.81 and 0.87 for rural and urban areas respectively. Theoretically G1 will be greater than or equal to G2 as Loreutz curve of G1 will either be tangential or below of G2. G1 however, in our case is always greater than G2. It shows that nowhere consumer expenditure is the only determinant of calorie and protein intake. The latter perhaps depends on social, cultural and other noneconomic factors also. If we focus our attention on either G1 or G2 it appears that nutritional inequality is more in rural than in urban areas.

It is worthwhile examining what is the nature of inequality

**Table 3:** Gini Co-efficient values (Rural).

| S. No. | State/Union Territory | Nutrition groupwise | | Expenditure groupwise | | Calorie inequality | | Consumer Expenditure inequality |
|---|---|---|---|---|---|---|---|---|
| | | Calorie inequality $G_1$ | Protein inequality | Calorie inequality $G_2$ | Protein inequality | Lower $G_L$ | Higher $G_H$ | $G_3$ |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| 1. | Delhi | .1599 | .1542 | .0913 | .0851 | .0506 | .1322 | .2252 |
| 2. | Himachal Pradesh | .1867 | .1785 | .1255 | .1131 | .0526 | .1544 | .2433 |
| 3. | Tripura | .2119 | .2238 | .1512 | .1767 | .0947 | .1775 | .2544 |
| 4. | Pondichery | .2405 | .2511 | .1490 | .1438 | .1100 | .1853 | .2676 |
| 5. | Tamil Nadu | .2388 | .2721 | .1825 | .2041 | .1150 | .1666 | .2605 |
| 6. | Mysore | .2235 | .2064 | .1693 | .1692 | .1068 | .1658 | .2766 |
| 7. | Kerala | .2650 | .2595 | .2053 | .2204 | .1357 | .1689 | .3248 |
| 8. | Andhra Pradesh | .2227 | .2283 | .1619 | .1607 | .1001 | .1602 | .2688 |
| 9. | Uttar Pradesh | .1850 | .1801 | .1369 | .1269 | .0946 | .1368 | .2873 |
| 10. | Punjab | .1978 | .1827 | .1784 | .1632 | .0609 | .1604 | .2801 |
| 11. | Jammu & Kashmir | .1298 | .1220 | .0979 | .0720 | .0887 | .1110 | .2322 |
| 12. | Haryana | .1940 | .1866 | .1617 | .1606 | .0590 | .1562 | .2759 |
| 13. | Manipur | .1718 | .1650 | .0813 | .0932 | .0541 | .1450 | .1809 |
| 14. | Goa | .2025 | .2632 | .1315 | .1795 | .1267 | .1376 | .2438 |
| 15. | Meghalaya | .1442 | .1698 | .1177 | .1477 | .0648 | .1067 | -- |
| 16. | West Bengal | .1765 | .1608 | .1483 | .1386 | .1079 | .1015 | .2579 |
| 17. | Orissa | .2015 | .2026 | .1686 | .1761 | .1103 | .1309 | .2818 |
| 18. | Maharashtra | .1823 | .1800 | .1423 | .1348 | .0936 | .1258 | .2459 |
| 19. | Rajasthan | .1916 | .1801 | .1671 | .1473 | .0722 | .1613 | .3213 |
| 20. | Madhya Pradesh | .2403 | .3247 | .1952 | .2173 | .1081 | .1738 | .3085 |
| 21. | Gujrat | .2180 | .2103 | .1722 | .1576 | .1338 | .1370 | .2663 |
| 22. | Bihar | .2178 | .2228 | .2054 | .2037 | .1209 | .1396 | .2648 |
| 23. | Assam | .1515 | .1511 | .1150 | .1217 | .0824 | .1062 | .1726 |
| | All India | .2169 | .2389 | .1646 | .1618 | .1105 | .1515 | .2831 |

Table 4: GINI CO-EFFICIENT VALUES (URBAN)

| S. No. | State/Union territory | Nutrition groupwise | | Expenditure groupwise | | Calorie inequality | | Consumer Expenditure inequality |
|---|---|---|---|---|---|---|---|---|
| | | Calorie inequality | Protien inequality | Calorie inequality | Protein inequality | Lower | Higher | |
| | | $G_1$ | | $G_2$ | | $G_L$ | $G_H$ | $G_3$ |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| 1. | Tripura | .1746 | .1713 | .1208 | .1165 | .0613 | .1426 | .2591 |
| 2. | Pondichery | .2229 | .2386 | .1875 | .2028 | .1286 | .1[illegible]8 | .3124 |
| 3. | Tamil Nadu | .2150 | .2286 | .1615 | .1794 | .1259 | .1383 | .3272 |
| 4. | Mysore | .1773 | .2096 | .1183 | .1567 | .1005 | .1034 | .3157 |
| 5. | Kerala | .2485 | .2720 | .2167 | .1249 | .1428 | .1291 | .3911 |
| 6. | Andhra Pradesh | .2059 | .2180 | .1234 | .1294 | .0951 | .1644 | .2999 |
| 7. | Delhi | .1816 | .1764 | .1218 | .1038 | .0924 | .1202 | .-- |
| 8. | Chandigarh | .2008 | .1893 | .1321 | .1222 | .0699 | .1401 | .3931 |
| 9. | Uttar Pradesh | .1649 | .1538 | .1005 | .0789 | .0841 | .1124 | .3227 |
| 10. | Punjab | .1[illegible]95 | .1718 | .1433 | .1221 | .0879 | .1344 | .2845 |
| 11. | Jammu & Kashmir | .1241 | .1154 | .0838 | .0812 | .0498 | .0956 | .2613 |
| 12. | Himachal Pradesh | .1629 | .1614 | .1151 | .1137 | .0642 | .1268 | .2700 |
| 13. | Haryana | .2045 | .2058 | .1537 | .1377 | .1011 | .1446 | .3047 |
| 14. | Maharashtra | .1858 | .1884 | .1150 | .1136 | .0961 | .1228 | .3252 |
| 15. | Goa | .1614 | .1991 | .0949 | .1285 | .0739 | .1113 | .3132 |
| 16. | Rajasthan | .1982 | .1856 | .1054 | .0838 | .0868 | .1573 | .3346 |
| 17. | Madhya Pradesh | .2082 | .1830 | .1408 | .1009 | .0893 | .1654 | .3302 |
| 18. | Gujrat | .1938 | .1839 | .1434 | .1201 | .0854 | .1352 | .2651 |
| 19. | Manipur | .1399 | .1365 | .0695 | .0805 | .0465 | .1101 | .2090 |
| 20. | Nagaland | .1485 | .1601 | .1143 | .1307 | .1050 | .0886 | .2203 |
| 21. | Meghalaya | .1683 | .1697 | .0957 | .1118 | .1021 | .1091 | .-- |
| 22. | West Bengal | .1515 | .1464 | .1137 | .1124 | .0909 | .0938 | .-- |
| 23. | Orissa | .1684 | .1724 | .1147 | .1279 | .0870 | .1145 | .3083 |
| 24. | Bihar | .1754 | .1759 | .1254 | .1186 | .0943 | .1163 | .3273 |
| 25. | Assam | .1417 | .1622 | .0884 | .1103 | .0738 | .0940 | .2329 |
| | All India | .1869 | .1946 | .1291 | .1257 | .1009 | .1280 | .3265 |

within consumer groups above and below a certain level - say 2400 calorie per consumer unit per day. Accordingly Gini co-efficients for both such groups have been calculated. For the lower groups it is denoted by $G_L$ and for the higher groups by $G_H$ . The value are given in column 6 and 7 of Tables 3 & 4. It is seen that except for West Bengal (rural) and Kerala & Nagaland (Urban), $G_L$ is everywhere less than $G_H$ indicating that inequality is larger among the prosperous groups than among the poor. The reason for this may be that there is a floor of calorie intake below which people do not survive, and since there is a ceiling of 2400 calories, variation in lower group is smaller compared to that in higher group where scope of variation is larger since there is no upper limit (and even it is there, it is high) of calorie intake. This interestingly indicates that Gini-coefficient is not a valid measurement of welfare situation as whatever inequality there may exist, every individual of higher group consumes more calorie than any of the lower group.

We have also attempted to estimate interregional inequality that is the inequality among the states and union territories. It is however not the inequality of per consumer unit intake of calorie or protein, but the inequality of per consumer unit availability of calorie or protein. To compute Gini coefficient, regions have been arranged in ascending order of per consumer unit availability of calorie (or protein), and population (converted to consumer units) has been taken from census report of 1971. From a comparison of Table 5 with tables 3 & 4, it is clear that inter-regional inequality of availability is less than inequality of nutritional intake within states.

Table 5: Inter regional Inequality

| | Calorie | Protein |
|---|---|---|
| Rural | .081 | .131 |
| Urban | .046 | .072 |

Finally, one would like to see how inequality of consumer expenditure compares with the nutritional inequality. For this purpose, under the assumption that the distribution of consumer expenditure during 26th round survey was same compared to that prevailing during the period of 25th round survey, Gini coefficient ($G_3$) of percapita consumer expenditure based on 25th round data are given in column 8 of Tables 3 & 4. It points out that distribution of intake of calorie or protein is more egalatarian than that of consumer expenditure. The rank correlation between calorie inequality $G_1$ and $G_3$ is 0.62 in rural areas and 0.65 in urban areas, supporting implicitly our earlier point that neither consumer expenditure is solely responsible for calorie intake nor the inequality in calorie intake is only because of inequality in expenditure level. Such factors as social and cultural practices, educational and nutritional knowledge, production (food) pattern etc. other than expenditure level affect the level of intake and its distribution. Like Dutta (9) we also observe that in most of the cases consumer expenditure inequality is more in urban areas than in rural areas, whereas the position of nutritional inequality as mentioned earlier is just opposite. This implicitly points out that expenditure elasticity of nutrition or in other words food increases across expenditure classes in rural areas whereas it either decreases or remains constant in urban areas.

Till now we have been concerned with either head-count ratio or nutritional inequality only, and in the course of our analysis we have disproved that nutritional inequality reflects the nutritional status of a society. We have therefore made an attempt to calculate 'U' and 'S' which take account of (i) the proportion of consumers below or above the prescribed level of calorie intake, (ii) the quantity by which consumer's intake falls short of prescribed level or is more than that, and (iii) inequality in respective distributions. Accordingly states have been ranked by 'U' and 'S' measures in Table 6, and by criteria A of complete ordering (discussed in section 2) in Table 7. It will be noted that although nutritional inequality is more in rural areas, nutritional status described either by 'U' or 'S' is better in rural areas whereas Dutta (9) has shown that absolute poverty (in terms of consumer expenditure) is more in rural areas. This can only be explained by the fact that larger share of expenditure in rural areas compared to in urban areas (both poor and non poor group) is spent on food especially calorie yielding food like cereals and cereals substitutes. Rank correlations between calorie intake and either U or S are quite high (of the order 0.9 with proper sign) indicating that nutritional status is better where undernutrition (U) is less or calorie sufficiency (S) is more. If all states and union territories are divided into two equal groups, an unique distinction is observed both in rural and urban areas. In the group consisting of all southern, most of the western and some of the eastern states,

Table 6: INDEX OF UNDERNUTRITION AND INDEX OF CALORIE SUFFICIENCY.*

| S.No. | State/Union territory | RURAL | | URBAN | |
|---|---|---|---|---|---|
| | | U | S | U | S |
| 1. | Tripura | .1038 (14) | .0306 (13) | .0979(22) | .0241(5) |
| 2. | Pondichery | .2484 (2 ) | .0083 (22) | .2323(3) | .0112(18) |
| 3. | Tamil Nadu | .2285 (3) | .0141 (20) | .2999(2) | .0045(24) |
| 4. | Mysore | .1322 (11) | .0318 (12) | .2299(4) | .0065(22) |
| 5. | Kerala | .2493 (1) | .0167 (17) | .3304(1) | .0062(23) |
| 6. | Andhra Pradesh | .1603 (7) | .0225 (15) | .1744(8) | .0095(20) |
| 7. | Delhi | .0634 (15) | .0410 (9) | .1761 (7) | .0118(16) |
| 8. | Chandigarh | -- | -- | .1246(17) | .0308(2) |
| 9. | Uttar Pradesh | .0573 (17) | .0710 (6) | .1559(10) | .0115(17) |
| 10. | Punjab | .0223 (22) | .1989 (1) | .1213(20) | .0239(6) |
| 11. | Jammu & Kashmir | .0109 (23) | .1110 (4) | .0938(24) | .0134(12) |
| 12. | Himachal Pradesh | .0451 (20) | .0697 (7) | .1174(21) | .0201 (9) |
| 13. | Haryana | .0247 (21) | .1437 (2) | .1409(13) | .0254(4) |
| 14. | Maharashtra | .1566 (8) | .0151(18) | .1987(6) | .0095(21) |
| 15. | Goa | .2123 (5) | .0116 (21) | .1542(12) | .0119(15) |
| 16. | Rajasthan | .0519 (18) | .0721 (5) | .0965(23) | .0358(1) |
| 17. | Madhya Pradesh | .0610 (16) | .1434 (3) | .1325(16) | .0217(7) |
| 18. | Gujrat | .1345 (10) | .0345 (11) | .1709(9) | .0147(11) |
| 19. | Manipur | .0505 (19) | .0584(8) | .0670(25) | .0301(3) |
| 20. | Nagaland | -- | -- | .1381(15) | .0128(14) |
| 21. | Meghalaya | .1373 (9) | .0013 (23) | .1547(11) | .0133(13) |
| 22. | West Bengal | .2188 (4) | .0274 (14) | .2084(5) | .0041(25) |
| 23. | Orissa | .1620 (6) | .0182 (16) | .1239(18) | .0192(10) |
| 24. | Bihar | .1297 (12) | .0356 (10) | .1229(19) | .0217(8) |
| 25. | Assam | .1229 (13) | .0144 (19) | .1407(14) | .0096(19) |
| | All India | .1129 | .0413 | .1763 | .0114 |

*-- Figures within brackets are ranks.

Table 7: Ranking of states by complete ordering and their S & U measures.

| | Rural | | | Urban | | |
|---|---|---|---|---|---|---|
| S. No. | State/Union territory | U | S | S. No. | State/Union territory | U | S |
| 1. | Punjab | .0223 | .1989 | 1. | Manipur | .0670 | .0301 |
| 2. | Haryana | .0247 | .1437 | 2. | Tripura | .0979 | .0241 |
| 3. | Himachal Pradesh | .0451 | .0697 | 3. | Himachal Pradesh | .1174 | .0201 |
| 4. | Manipur | .0505 | .0584 | 4. | Orissa | .1239 | .0192 |
| 5. | Delhi | .0634 | .0410 | 5. | Nagaland | .1381 | .0128 |
| 6. | Bihar | .1297 | .0356 | 6. | Assam | .1407 | .0096 |
| 7. | Mysore | .1322 | .0318 | 7. | Andhra Pradesh | .1744 | .0095 |
| 8. | Andhra Pradesh | .1603 | .0225 | 8. | Maharashtra | .1987 | .0095 |
| 9. | Orissa | .1620 | .0182 | 9. | Mysore | .2299 | .0065 |
| 10. | Tamil Nadu | .2285 | .0141 | 10. | Tamil Nadu | .2999 | .0045 |
| 11. | Pondicherry | .2484 | .0083 | | | | |

the nutritional situation is worse than in the other group consisting of all northern states, most of eastern states and some of the western states. Generally, 'S' is less where 'U' is more. But only eleven rural areas and ten urban areas could be completely ordered (Table 7). For other states, only partial ordering was possible, and no definite inference could be drawn.

To conclude, we have in this paper relied on calorie for investigating the nutritional status and inequality of India. Several measures such as intake per consumer unit, inequality indices $G_1$, $G_2$, $G_L$ and $G_H$, other indices like 'U' and 'S' have been taken as indicators for comparison. All do not give same results. Different measures reflect different aspects of nutritional situation. We have found thus that although nutritional inequality is more in rural than in urban areas, nutritional status is better in rural areas than in urban areas. We also find a sort of nutritional demarcational between geographical north and south. The problem, as it has been observed, is not only of distribution, but of availability itself. In order to meet the problems, the production of nutrition itself through food production has to be raised. Secondly, a food production pattern has to be found which given other constraints, can make available realtively greater nutritional benefits to the poorer section of the population. This may in turn have to be backed up with nutritional educationa.

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