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## CALORIE INTAKES OF FOOD COMPARISONS ACROSS STATES AND CLASSES*

In recent times, people everywhere are very much concerned about the food problem and every aspect of it is being exhaustively examined and discussed. One of the aspects is the question about the nutritional adequacy of food. Most of the nutritional experts have concluded in their analyses that in India the calorie deficiency becomes the main deficiency of the population to be taken care of. If it can be met by increasing the intakes, most of the incidence of protein deficiency could be taken care of.[1] Except a few, all have confined their analyses to national level in estimating the calorie deficiency. Strictly speaking, it is impossible to mention a single number as the average calorie requirement of the entire nation. Because, the calorie requirement depends on many factors including body structure, type of work performed and climate of the living place. Thus intra-individual variability should be taken into account in depicting the calorie requirement as well the calorie deficiency of the nation. However, it is difficult to look into intra-individual variability because of data constraint. Moreover, in almost all such studies the calorie requirement mentioned is a measure of

1. P. V. Sukhatme, "The Protein Gap," *Science To-day*, Vol. III, No. 7, 1969, pp. 9-14.

central tendency over a period of time, say a month and for a broad group of consumers so that some general conclusions are arrived at. These broad groups may be disaggregated into much smaller groups as per the data availability for further detailed analyses and conditions. Nevertheless, the disaggregation beyond a certain limit may not give anything precise to the planners. In this context it is worthwhile to mention that studies based on regional (Statewise) aspects show up their significance, because of the increasing accent on regional development in our national planning technique. In the wake of this, an attempt has been made (i) to estimate the per capita calorie intakes at the mean expenditure level of the consumers in various States, (ii) to establish the relationship between income distribution and calorie distribution and (iii) to enumerate the proportion of calorie deficient consumers in different States.[2] All the above three analyses have been carried out with rural-urban distinctions.

The data for the analysis are taken from both the National Sample Survey (NSS) Report on consumer expenditure on all and some selected items covering the period February, 1963 to January, 1964 (18th Round) and the Indian Council of Medical Research (ICMR) publications. The methodology for each of the three analyses referred above is described separately in the beginning of each section.

*Per Capita Calorie Intakes at Mean Expenditure Level*

To calculate the per capita calorie intakes at the mean expenditure level, the total food has been divided under six main heads, *viz.*, cereals and cereal substitutes, pulses, milk and its products, edible oils, meat, fish and eggs and other food items.[3] The unpublished 18th Round data on consumer expenditure on some selected items give the amount in seers of the above-said items at mean expenditure levels for all the States with rural-urban breakdown. At the outset, the amount in seers of the above-said items have been converted into grams. With the help of the ICMR calorie conversion table, the amount of calories given by the various categories of food has been calculated and they are summed up to find the total calorie intakes at the mean expenditure level.[4]

Tables I and II give the total calorie intakes by both the rural and urban sectors of the States. Deficiency in calorie intakes has been noted in the rural sectors of Kerala, West Bengal and in the urban sectors of Andhra Pradesh, Maharashtra, Karnataka and Tamil Nadu besides Kerala and West Bengal. This may be due to the different composition of the total food consumed in various States. In the wake of this suspicion, the total calories

2. The Nutrition Advisory Committee (NAC) of India suggests that any Indian consumer who receives less than 2,250 calories is called calorie-deficient.
3. Other food items included potato, banana, sugar, spices, *gur* and other vegetables on which data are available.
4. The ICMR conversion table gives the amount of calories given by every 100 gms. of various categories of food items.

TABLE I—CALORIE CONTENTS OF FOODSTUFFS: RURAL

| Sr. No. | Items/States | Andhra Pradesh | Assam | Bihar | Gujarat | Jammu & Kashmir | Kerala | Madhya Pradesh | Maha- rashtra |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 1. | Cereals | 1,960 (84·59) | 2,071 (82·67) | 2,132 (82·28) | 1,773 (68·17) | 2,554 (84·15) | 1,303 (71·67) | 2,359 (80·37) | 1,885 (78·54) |
| 2. | Pulses | 104 (4·49) | 113 (4·51) | 229 (8·85) | 187 (7·19) | 120 (3·95) | 51 (2·80) | 223 (7·60) | 181 (7·54) |
| 3. | Milk and milk products | 44 (1·90) | 52 (2·08) | 52 (2·00) | 196 (7·54) | 156 (5·14) | 25 (1·37) | 84 (2·86) | 66 (2·75) |
| 4. | Edible oils | 46 (1·98) | 51 (2·04) | 33 (1·27) | 78 (3·00) | 66 (2·17) | 104 (5·72) | 54 (1·84) | 44 (1·83) |
| 5. | Meat, fish and eggs | 23 (0·99) | 43 (1·72) | 11 (0·42) | 5 (0·19) | 23 (0·76) | 69 (3·80) | 6 (0·20) | 13 (0·54) |
| 6. | Other food | 140 (6·05) | 175 (6·98) | 134 (5·18) | 362 (13·91) | 116 (3·83) | 266 (14·64) | 209 (7·13) | 211 (8·80) |
| 7. | Total (at mean expen- diture level) | 2,317 | 2,505 | 2,591 | 2,601 | 3,035 | 1,818* | 2,935 | 2,400 |

| Sr. No. | Items/States | Mysore | Orissa | Punjab | Rajas- than | Tamil Nadu | Uttar Pradesh | West Bengal | All- India |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) |
| 1. | Cereals | 2,120 (77·01) | 2,087 (86·71) | 1,962 (59·74) | 2,614 (78·69) | 1,889 (82·67) | 2,092 (70·06) | 1,733 (82·17) | 2,034 (78·17) |
| 2. | Pulses | 185 (6·72) | 130 (5·40) | 142 (4·32) | 160 (4·82) | 111 (4·86) | 275 (9·21) | 99 (4·69) | 177 (6·80) |
| 3. | Milk and milk products | 85 (3·09) | 14 (0·58) | 372 (11·33) | 169 (5·09) | 30 (1·31) | 108 (3·62) | 52 (2·46) | 85 (3·27) |
| 4. | Edible oils | 46 (1·67) | 27 (1·12) | 65 (1·98) | 58 (1·75) | 56 (2·45) | 45 (1·51) | 53 (2·51) | 48 (1·84) |
| 5. | Meat, fish and eggs | 13 (0·47) | 23 (0·96) | 8 (0·24) | 4 (0·12) | 27 (1·18) | 15 (0·50) | 22 (1·04) | 17 (0·65) |
| 6. | Other food | 304 (11·04) | 126 (5·23) | 735 (22·39) | 317 (9·53) | 172 (7·53) | 451 (15·10) | 151 (7·17) | 241 (9·27) |
| 7. | Total (at mean expen- diture level) | 2,753 | 2,407 | 3,284 | 3,322 | 2,285 | 2,986 | 2,110* | 2,602 |

Figures in parentheses are the percentages to the total.
* Lower than the required level of 2,250 calories (ICMR).

TABLE II—CALORIE CONTENTS OF FOODSTUFFS : URBAN

| Sr. No. | Items/ States | Andhra Pradesh | Assam | Bihar | Gujarat | Jammu & Kashmir | Kerala | Madhya Pradesh | Maharashtra |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 1. | Cereals | 1,569 (71·06) | 1,631 (69·58) | 1,737 (74·20) | 1,355 (60·06) | 1,902 (80·63) | 1,217 (69·94) | 1,697 (70·10) | 1,368 (63·30) |
| 2. | Pulses | 165 (7·47) | 164 (7·00) | 229 (9·78) | 194 (8·60) | 63 (2·67) | 85 (4·88) | 242 (10·00) | 180 (8·33) |
| 3. | Milk and milk products | 69 (3·13) | 133 (5·67) | 118 (5·04) | 233 (10·34) | 175 (7·42) | 44 (2·53) | 148 (6·11) | 126 (5·83) |
| 4. | Edible oils | 85 (3·85) | 100 (4·27) | 73 (3·12) | 183 (8·11) | 79 (3·35) | 137 (7·87) | 91 (3·76) | 123 (5·69) |
| 5. | Meat, fish and eggs | 36 (1·63) | 66 (2·82) | 26 (1·11) | 11 (0·49) | 33 (1·40) | 56 (3·22) | 21 (0·87) | 30 (1·39) |
| 6. | Other food | 284 (12·86) | 250 (10·66) | 158 (6·75) | 280 (12·40) | 107 (4·52) | 201 (11·56) | 222 (9·16) | 334 (15·46) |
| 7. | Total (at mean expenditure level) | 2,208 | 2,344 | 2,341 | 2,256 | 2,359 | 1,740* | 2,421 | 2,161* |

| Sr. No. | Items/ States | Mysore | Orissa | Punjab | Rajasthan | Tamil Nadu | Uttar Pradesh | West Bengal | AllIndia |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) |
| 1. | Cereals | 1,540 (68·90) | 1,731 (75·75) | 1,416 (61·35) | 1,751 (68·80) | 1,471 (67·79) | 1,522 (67·52) | 1,433 (65·55) | 1,453 (68·18) |
| 2. | Pulses | 202 (9·04) | 171 (7·48) | 176 (7·63) | 191 (7·50) | 157 (7·23) | 210 (9·32) | 152 (6·95) | 181 (8·49) |
| 3. | Milk and milk products | 114 (5·10) | 86 (3·76) | 259 (11·22) | 259 (10·19) | 90 (4·15) | 169 (7·50) | 133 (6·08) | 149 (6·66) |
| 4. | Edible oils | 68 (3·04) | 70 (3·06) | 101 (4·38) | 75 (2·95) | 80 (3·69) | 83 (3·68) | 111 (5·08) | 97 (4·35) |
| 5. | Meat, fish and eggs | 24 (1·07) | 39 (1·71) | 12 (0·52) | 13 (0·51) | 36 (1·66) | 27 (1·20) | 50 (2·29) | 29 (1·30) |
| 6. | Other food | 287 (12·85) | 188 (8·24) | 344 (14·90) | 256 (10·05) | 336 (15·48) | 243 (10·78) | 307 (14·05) | 322 (14·42) |
| 7. | Total (at mean expenditure level) | 2,235* | 2,285 | 2,308 | 2,545 | 2,170* | 2,254 | 2,186* | 2,231 |

Figures in parentheses are the percentages to the total.
* Lower than the required level of 2,250 calories (ICMR).

have been decomposed into calories given by cereals, calories given by pulses, etc., for the rural and urban sectors of the States respectively (Tables I and II). It may be observed from the tables that nearly 70 to 85 per cent of calories are obtained from cereals in the rural areas whereas about 65 to 80 per cent of calories are derived from cereals in the urban areas. Pulses give the lowest proportion (2.80 per cent) of calories in Kerala and the highest proportion (9.21 per cent) in Uttar Pradesh as far as the rural sectors are concerned. As regards the urban sectors, the lowest and the highest proportions of calories derived from pulses are in Jammu & Kashmir and Madhya Pradesh respectively. The ratio of calories from milk and its products to total calories works out to be higher for Gujarat, Jammu & Kashmir, Punjab and Rajasthan while lower for Kerala and Orissa. The edible oils give the lowest amount of calories (1.12 per cent) in Orissa and (3.04 per cent) in Mysore in the rural and urban sectors respectively. They are at the highest level in Gujarat and Kerala. The importance of non-vegetarian food in yielding the calories is felt very much in both the sectors of Assam, Kerala, Tamil Nadu and West Bengal.

*Income Distribution and Calorie Distribution*

The sensitivity of purchases to changes in income[5] is commonly known as the income elasticity. On similar grounds, there exists a relationship between income and calories consumed, known as calorie elasticity. These elasticities have been utilized to study the impact of income distribution on calorie distribution. At the outset, the calorie elasticity has been derived by assuming the income or the expenditure elasticity.[6] As usual, the following functional relationship has been assumed to estimate the expenditure elasticity.

$$P_i Q_i = A. \bar{X}^{b_i} \qquad .. \qquad .. \qquad .. \qquad (1)$$

where $\bar{X}$ is the value of the total expenditure at mean level and $Q_i$ is the amount of consumption of the ith food item at the mean expenditure level.

In the equation (1) above, $b_i$ can be interpreted as (*i*) quantity elasticity or (*ii*) expenditure elasticity or (*iii*) calorie elasticity depending upon whether (*i*) $P_i = 1$ (*i.e.*, quantities consumed of the ith item being dependent variable) or (*ii*) $P_i =$ price of the ith food item or (*iii*) $P_i =$ calorific value of the ith commodity per standard unit respectively. Further, from the estimates of $b_i$ weighted aggregate elasticity for food can be worked out as follows :

$$\eta_c = \sum_{i=1}^{n} W_i b_i$$

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5. Total expenditure has been used as a proxy to income throughout the analysis.
6. The estimated expenditure elasticities for the same round of data have been taken from the author's bigger project on consumption.

where $W_i$ is the ratio of the calories derived from the ith food item to total calories from total food items at the mean expenditure level and $\eta_c$ can be termed as calorie elasticity.

Following the above formula, calorie elasticities for the rural and urban sectors of all the States have been worked out.    Table III contains these elasticities.

TABLE III—CALORIE ELASTICITIES

| Sr. No. | States | | | | | Rural | Urban |
|---------|--------|---|---|---|---|-------|-------|
| 1. | Andhra Pradesh .. | .. | .. | .. | .. | 0·6227 | 0·5357 |
| 2. | Assam | .. | .. | .. | .. | 0·6767 | 0·3116 |
| 3. | Bihar | .. | .. | .. | .. | 0·7585 | 0·4658 |
| 4. | Gujarat | .. | .. | .. | .. | 0·6689 | 0·4411 |
| 5. | Jammu & Kashmir | .. | .. | .. | .. | 0·7304 | 0·5661 |
| 6. | Kerala | .. | .. | .. | .. | 0·7381 | 0·7017 |
| 7. | Madhya Pradesh .. | .. | .. | .. | .. | 0·6204 | 0·4690 |
| 8. | Maharashtra | .. | .. | .. | .. | 0·6133 | 0·5089 |
| 9. | Mysore | .. | .. | .. | .. | 0·7186 | 0·4757 |
| 10. | Orissa | .. | .. | .. | .. | 0·7476 | 0·5660 |
| 11. | Punjab | .. | .. | .. | .. | 0·6735 | 0·4747 |
| 12. | Rajasthan | .. | .. | .. | .. | 0·6197 | 0·4015 |
| 13. | Tamil Nadu | .. | .. | .. | .. | 0·6432 | 0·5286 |
| 14. | Uttar Pradesh | .. | .. | .. | .. | 0·7094 | 0·4859 |
| 15. | West Bengal | .. | .. | .. | .. | 0·7120 | 0·4556 |
| 16. | All-India | .. | .. | .. | .. | 0·6872 | 0·4695 |

By using the above formulated calorie elasticity, the per capita calorie intake at different expenditure levels has been worked out and presented in Tables IV and V.    There seems to be a steep rise in the per capita calorie intake with the increase in the levels of total expenditure in all the States. At the bottom level of total expenditure, the worst affected consumers  in terms of calorie intake are from both the sectors of Kerala, Orissa and West Bengal.    They get lesser amount of calories than the consumers of other States at the same bottom level of total expenditure.

*Proportion of Calorie-Deficient Consumers*

The proportion of calorie-deficient consumers can be calculated by integrating the frequencies in the income (total expenditure) distribution from the origin to that point on the expenditure level for which the required number of calories (2,250) is worked out.    Table VI gives the location of the level of total expenditure at which the required 2,250 calories are reached. This has been worked out through interpolation on the basis of the 1963-64 price levels.    Rajasthan is the only State which expends the least amount

TABLE IV—CALORIE VALUES OF FOOD ITEMS CONSUMED BY EXPENDITURE CLASSWISE AND
STATEWISE : RURAL

| Sr. No. | Expenditure class/States | | Andhra Pradesh | Assam | Bihar | Gujarat | Jammu & Kashmir | Kerala | Madhya Pradesh | Maha-rashtra |
|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 1. | 0—8 | .. | 1,191 | — | 1,062 | 1,221 | — | 823 | 1,371 | 1,220 |
| 2. | 8—11 | .. | 1,502 | 1,330 | 1,440 | 1,489 | 1,460 | 1,070 | 1,700 | 1,406 |
| 3. | 11—13 | .. | 1,706 | 1,498 | 1,697 | 1,732 | 1,681 | 1,243 | 1,963 | 1,705 |
| 4. | 13—15 | .. | 1,825 | 1,632 | 1,899 | 1,917 | 1,842 | 1,370 | 2,160 | 1,838 |
| 5. | 15—18 | .. | 2,006 | 1,845 | 2,128 | 2,116 | 2,080 | 1,554 | 2,371 | 2,040 |
| 6. | 18—21 | .. | 2,224 | 2,034 | 2,442 | 2,361 | 2,333 | 1,749 | 2,630 | 2,258 |
| 7. | 21—24 | .. | 2,423 | 2,264 | 2,695 | 2,590 | 2,603 | 1,967 | 2,910 | 2,429 |
| 8. | 24—28 | .. | 2,668 | 2,461 | 3,002 | 2,842 | 2,884 | 2,169 | 3,115 | 2,660 |
| 9. | 28—34 | .. | 2,889 | 2,794 | 3,412 | 3,192 | 3,294 | 2,458 | 3,524 | 2,996 |
| 10. | 34—43 | .. | 3,392 | 3,292 | 4,050 | 3,709 | 3,819 | 2,911 | 4,007 | 3,382 |
| 11. | 43—55 | .. | 3,978 | 3,787 | 4,816 | 4,334 | 4,579 | 3,545 | 4,703 | 3,977 |
| 12. | 55—75 | .. | 4,783 | 4,402 | 5,879 | 5,379 | 5,444 | 4,155 | 5,485 | 4,819 |

| Sr. No. | Expenditure class/States | | Mysore | Orissa | Punjab | Rajas-than | Tamil Nadu | Uttar Pradesh | West Bengal | All-India |
|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) |
| 1. | 0—8 | .. | 1,329 | 1,094 | 1,218 | 1,628 | 1,068 | 1,407 | 923 | 1,179 |
| 2. | 8—11 | .. | 1,641 | 1,437 | 1,660 | 1,972 | 1,314 | 1,729 | 1,204 | 1,489 |
| 3. | 11—13 | .. | 1,932 | 1,684 | 1,864 | 2,225 | 1,514 | 2,018 | 1,382 | 1,724 |
| 4. | 13—15 | .. | 2,112 | 1,884 | 2,055 | 2,453 | 1,651 | 2,244 | 1,527 | 1,902 |
| 5. | 15—18 | .. | 2,364 | 2,141 | 2,291 | 2,703 | 1,825 | 2,481 | 1,718 | 2,118 |
| 6. | 18—21 | .. | 2,703 | 2,404 | 2,549 | 2,977 | 2,024 | 2,794 | 1,920 | 2,373 |
| 7. | 21—24 | .. | 2,939 | 2,640 | 2,784 | 3,252 | 2,229 | 3,117 | 2,115 | 2,615 |
| 8. | 24—28 | .. | 3,271 | 2,995 | 3,043 | 3,579 | 2,445 | 3,425 | 2,351 | 2,881 |
| 9. | 28—34 | .. | 3,783 | 3,373 | 3,438 | 3,947 | 2,777 | 3,871 | 2,673 | 3,252 |
| 10. | 34—43 | .. | 4,279 | 4,031 | 4,030 | 4,569 | 3,122 | 4,514 | 3,091 | 3,775 |
| 11. | 43—55 | .. | 5,161 | 4,967 | 4,924 | 5,267 | 3,703 | 5,364 | 3,634 | 4,470 |
| 12. | 55—75 | .. | 6,440 | 5,680 | 5,981 | 6,290 | 4,398 | 6,546 | 4,582 | 5,418 |

TABLE V—CALORIE VALUES OF FOOD ITEMS CONSUMED BY EXPENDITURE CLASSWISE AND
STATEWISE : URBAN

| Sr. No. | Expenditure class/States (1) | | Andhra Pradesh (2) | Assam (3) | Bihar (4) | Gujarat (5) | Jammu & Kashmir (6) | Kerala (7) | Madhya Pradesh (8) | Maha-rashtra (9) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. | 0—8 | .. | 1,127 | — | 1,213 | 1,133 | — | 701 | 1,341 | 934 |
| 2. | 8—11 | .. | 1,269 | 1,473 | 1,446 | 1,382 | 1,267 | 824 | 1,475 | 1,122 |
| 3. | 11—13 | .. | 1,432 | 1,575 | 1,547 | 1,508 | 1,418 | 1,003 | 1,622 | 1,244 |
| 4. | 13—15 | .. | 1,537 | 1,648 | 1,681 | 1,589 | 1,531 | 1,121 | 1,719 | 1,344 |
| 5. | 15—18 | .. | 1,670 | 1,730 | 1,798 | 1,685 | 1,655 | 1,229 | 1,855 | 1,439 |
| 6. | 18—21 | .. | 1,834 | 1,837 | 1,940 | 1,801 | 1,798 | 1,399 | 1,982 | 1,566 |
| 7. | 21—24 | .. | 1,959 | 1,903 | 2,066 | 1,906 | 1,957 | 1,532 | 2,122 | 1,700 |
| 8. | 24—28 | .. | 2,137 | 1,974 | 2,269 | 2,020 | 2,137 | 1,663 | 2,270 | 1,827 |
| 9. | 28—34 | .. | 2,313 | 2,082 | 2,403 | 2,168 | 2,336 | 1,890 | 2,446 | 1,980 |
| 10. | 34—43 | .. | 2,605 | 2,256 | 2,601 | 2,389 | 2,657 | 2,294 | 2,744 | 2,177 |
| 11. | 43—55 | .. | 3,029 | 2,358 | 2,906 | 2,674 | 3,044 | 2,642 | 3,030 | 2,506 |
| 12. | 55—75 | .. | 3,481 | 2,605 | 3,378 | 3,028 | 3,600 | 3,339 | 3,531 | 2,846 |

| Sr. No. | Expenditure class/States (1) | | Mysore (10) | Orissa (11) | Punjab (12) | Rajas-than (13) | Tamil Nadu (14) | Uttar Pradesh (15) | West Bengal (16) | All-India (17) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. | 0—8 | .. | 1,280 | 1,008 | — | 1,426 | 1,122 | 1,134 | — | 1,065 |
| 2. | 8—11 | .. | 1,391 | 1,181 | 1,333 | 1,627 | 1,132 | 1,354 | 1,214 | 1,227 |
| 3. | 11—13 | .. | 1,555 | 1,353 | 1,410 | 1,742 | 1,342 | 1,491 | 1,271 | 1,352 |
| 4. | 13—15 | .. | 1,711 | 1,470 | 1,539 | 1,840 | 1,445 | 1,606 | 1,368 | 1,452 |
| 5. | 15—18 | .. | 1,802 | 1,619 | 1,666 | 1,968 | 1,558 | 1,732 | 1,457 | 1,557 |
| 6. | 18—21 | .. | 1,957 | 1,717 | 1,774 | 2,091 | 1,692 | 1,868 | 1,559 | 1,679 |
| 7. | 21—24 | .. | 2,089 | 1,861 | 1,910 | 2,297 | 1,825 | 1,998 | 1,671 | 1,791 |
| 8. | 24—28 | .. | 2,226 | 2,039 | 2,008 | 2,349 | 1,961 | 2,139 | 1,788 | 1,912 |
| 9. | 28—34 | .. | 2,416 | 2,251 | 2,204 | 2,480 | 2,160 | 2,314 | 1,925 | 2,069 |
| 10. | 34—43 | .. | 2,660 | 2,529 | 2,409 | 2,724 | 2,423 | 2,548 | 2,091 | 2,278 |
| 11. | 43—55 | .. | 3,070 | 2,855 | 2,681 | 3,045 | 2,729 | 2,924 | 2,333 | 2,569 |
| 12. | 55—75 | .. | 3,604 | 3,381 | 3,096 | 3,411 | 3,247 | 3,299 | 2,686 | 2,944 |

to get the 2,250 calories. It is interesting to note that among the rural sectors, Kerala seems to get the required calories at an expenditure level which is more than double that of Rajasthan. Now, the proportion of calorie-deficient consumers has been calculated by the following formula, which has been described earlier in this section.

$$P = \int_0^{\overline{E}} \wedge (E) \, d(E)$$

Now $\quad \overline{C} = f(\overline{E})$

i.e., $\quad \overline{C} = A. \overline{E}^{b_i}$

$\therefore \quad \overline{E} = \left(\dfrac{\overline{C}}{A}\right)^{1/b_i}$

$$\left(\dfrac{\overline{C}}{A}\right)^{1/b_i}$$

$\therefore \quad P = \int_0 \wedge (E) \, d(E)$

where $\wedge (E)$ is the distribution of the consumers in proportion over the expenditure levels. The frequency against any given expenditure interval gives the proportion of the population covered by the survey whose average expenditure per capita falls within the specified class interval. From Table VII it is imperative to note that the calorie-deficient consumers are larger in the urban than in the rural sectors of all the States.

These results are in conformity with the rankings of Dandekar and Rath who have arrived at them by different approach using the 17th Round (1961-62) of NSS data.[7]

*Conclusion*

The most conspicuous result of our study is that about 46 per cent of the rural consumers and 62 per cent of the urban consumers, on an average, are living below the required norm of calories. While calculating the calorie elasticity, the following assumptions are to be kept in kind. Quality variations in food items having different nutritional values are assumed to be absent because of the paucity of data. For example, we have been forced to use the averages of meat, fish and eggs consumed without the discrimination of their varieties. Similar is the case with cereals and cereal substitutes.

7. V. M. Dandekar and Nilakantha Rath : Poverty in India, Indian School of Political Economy, Poona-4, 1971.

TABLE VI—TOTAL CONSUMER EXPENDITURE LEVEL (Rs.) AT WHICH 2,250 CALORIES ARE REACHED

| Sr. No. | States | | | | | | Rural | Urban |
|---|---|---|---|---|---|---|---|---|
| 1. | Andhra Pradesh | .. | .. | .. | .. | .. | 19·79 | 29·17 |
| 2. | Assam | .. | .. | .. | .. | .. | 22·49 | 38·23 |
| 3. | Bihar | .. | .. | .. | .. | .. | 17·65 | 24·98 |
| 4. | Gujarat | .. | .. | .. | .. | .. | 18·21 | 32·83 |
| 5. | Jammu & Kashmir | .. | .. | .. | .. | | 18·38 | 29·03 |
| 6. | Kerala | .. | .. | .. | .. | .. | 27·07 | 38·66 |
| 7. | Madhya Pradesh | .. | .. | .. | .. | | 15·04 | 25·46 |
| 8. | Maharashtra | .. | .. | .. | .. | .. | 19·52 | 40·24 |
| 9. | Mysore | .. | .. | .. | .. | .. | 15·34 | 26·24 |
| 10. | Orissa | .. | .. | .. | .. | .. | 17·66 | 31·07 |
| 11. | Punjab | .. | .. | .. | .. | .. | 16·14 | 32·50 |
| 12. | Rajasthan | .. | .. | .. | .. | .. | 12·12 | 21·58 |
| 13. | Tamil Nadu | .. | .. | .. | .. | .. | 22·88 | 34·16 |
| 14. | Uttar Pradesh | .. | .. | .. | .. | .. | 14·18 | 29·01 |
| 15. | West Bengal | .. | .. | .. | .. | .. | 24·29 | 44·33 |
| 16. | All-India | .. | .. | .. | .. | .. | 18·03 | 36·89 |

TABLE VII—PERCENTAGE OF POPULATION HAVING DEFICIENCIES IN CALORIES

| Sr. No. | States | | | | | | Rural | Urban |
|---|---|---|---|---|---|---|---|---|
| 1. | Andhra Pradesh | .. | .. | .. | .. | .. | 66·52 | 71·85 |
| 2. | Assam | .. | .. | .. | .. | .. | 49·77 | 68·36 |
| 3. | Bihar | .. | .. | .. | .. | .. | 51·04 | 63·50 |
| 4. | Gujarat | .. | .. | .. | .. | .. | 58·49 | 72·74 |
| 5. | Jammu & Kashmir | .. | .. | .. | .. | | 34·38 | 72·96 |
| 6. | Kerala | .. | .. | .. | .. | .. | 82·02 | 83·97 |
| 7. | Madhya Pradesh | .. | .. | .. | .. | | 34·53 | 65·61 |
| 8. | Maharashtra | .. | .. | .. | .. | .. | 62·31 | 74·43 |
| 9. | Mysore | .. | .. | .. | .. | .. | 53·87 | 68·55 |
| 10. | Orissa | .. | .. | .. | .. | .. | 56·07 | 69·94 |
| 11. | Punjab | .. | .. | .. | .. | .. | 26·11 | 68·02 |
| 12. | Rajasthan | .. | .. | .. | .. | .. | 21·25 | 49·83 |
| 13. | Tamil Nadu | .. | .. | .. | .. | .. | 66·20 | 74·58 |
| 14. | Uttar Pradesh | .. | .. | .. | .. | .. | 35·88 | 70·12 |
| 15. | West Bengal | .. | .. | .. | .. | .. | 64·89 | 77.83 |

Also, the calories derived from prepared foods are not included in our analysis. The norm set up by the NAC may vary according to climate and the activities of the people. An individual may take more than the required norm in one day and less than the norm in another day. But the norm of the NAC represents an average measure for a rational consumer to keep him just normal. The entire analysis is based on mean expenditure level and mean commodity consumption and not on individual consumption. To assist the planners and to have a general view of the prevailing calorie deficiency among the States, this kind of analysis may be a better one than the analysis based on each individual's requirement and deficiency, which will consume more time and energy. Thus the results of this study should be valued accordingly. Despite these limitations, the method of finding the calorie distribution through the calorie elasticity is superior to other methods in the sense that given the total expenditure level, the calorie consumption at that level can immediately be worked out without much difficulty.

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## A NOTE ON THE PRACTICE OF STANDARDISATION OF LAND IN FARM PRODUCTION FUNCTION STUDIES

It is usual for researchers estimating farm production functions to measure land in standardised units—often with the help of data on land revenue—to allow for the varying quality of land over the sample of farms. The purpose of this note is to suggest that, while it is important in such studies to take into account the quality variable, the device of standardised land is not necessarily the best way of introducing the variable in the production function. Standardised land is a composite variable, changes in whose value can arise either through change in quality of land or change in the quantum or a combination of the two changes. Since the use of a composite variable entails loss of information about the separate influence of the components comprised in it, it is obviously a good research strategy to employ composite variables only in situations where the component variables are incapable of independent variation or, in practice, display high inter-correlations among themselves. It is doubtful that the current practice of standardisation of land conforms to this principle since it would not seem usual for it to be preceded by a consideration of the extent of correlation existing between land and the chosen index of quality. Our impression, in fact, is that the practice derives not so much from an explicit consideration of alternative procedures as from a general feeling that it is inappropriate to measure land in ordinary acres without any thought being given at all to the dimension of quality. It is only fair to add that rules of thumb are indispensable in empirical investigations and that a researcher seeking to settle every methodological issue to his

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