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Maital, S., 1973; 'Public Goods and Income Distribution', *Econometrica*, Vol. XLI, May, 1973.

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FOOD SECURITY AND CALORIE ADEQUACY ACROSS STATES: IMPLICATIONS FOR REFORM

M.H. Suryanarayana

This paper examines some of the issues regarding food security and their implications for the PDS reform at the state-level from the perspective of changing consumer choices and preferences dictated largely by availability. Judged by conventional measures, there has been a substantial improvement in food security across states in India. However, actual levels of cereal consumption, an important indicator of food security in a poor developing country, have declined in the majority of the states under changing institutional and production conditions. Thus, the task for the 'Human Face' of the reform programme is not, as conventionally posed, that of minimising the reductions likely to be caused by the economic reforms, rather it is one of stopping the ongoing decline and preventing a likely acceleration in the decline in cereal consumption and calorie intake. The solution for these issues seems to be a set of integrated, targeted and appropriately weighted policies across states.

Food security comes under the Directive Principles of State Policy as embodied in the Indian Constitution. As Article 47 says : 'The State shall regard the raising of the level of nutrition and the standard of living of its people and the improvement of public health as among its primary duties...' [Basu, 1988, p. 276]. Today, in the context of economic reforms for stabilization and structural adjustment, policy options are being considered with the objective of minimising the social cost of the reform programme [Government of India (GOI)*, 1994, pp. 9-10 and 65-66], that is, with the objective of minimising the likely reductions in the levels of nutrition and standard of living of the poor. But the fact is that there has already been a reduction in cereal consumption and calorie intake due to structural changes as part of the development process.

The different suggestions for reforming the safety-nets like the public distribution system (PDS) so as to economise on government expenditures and reduce budget deficits have been discussed in an earlier study [Suryanarayana, 1995a]. Evaluation of the different suggestions based essentially on information for all-India rural and urban sectors has emphasised the important role that the PDS will have to play in ensuring food security of the poor during the adjustment programme. The two major factors that emphasised the role of the PDS are (i) that the levels of cereal consumption have been stagnant even after an increase in the total real consumer expenditure/income of the poorer decile groups particularly in rural India due to changing institutional and production conditions, and (ii) that the marginal food choices of the poor are guided more by commodity characteristics than by their calorie content [Suryanarayana, 1995b]. The available evidence on the determinants of inter-state variations in cereal consumption and calorie intake [Centre for Development Studies (CDS), 1975; Krishnan, 1992] further emphasises that food security in India has to do more with physical access to food than with economic access. The scope for self-targeting based on commodity reorientation of the PDS in favour of coarse cereals has been found to be limited because of (i) the changing consumption patterns against coarse cereals and hence their low levels of absolute consumption in both rural and urban all-India, and (ii) equi-proportionate consumption of coarse cereals by all population decile groups as found in rural all-India. Given these constraints, it has been found that the PDS-reform to provide for normative cereal consumption of all the poor would involve its expansion on a scale which the current budget constraint of the Government will not permit [Geetha and Suryanarayana, 1993]. At

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* The abbreviations used in the paper are listed alphabetically with their elongated form at the end of the paper, for the readers' convenience.

the same time, there are potential costs due to the PDS in terms of high inflation rate, reduced development potential, inadequate growth of employment opportunities, and economic costs owing to associated price distortions which the Adjustment Programme seeks to minimise. This would imply a search for cost effective options involving a weighted set of policy instruments across states and over time with weights dictated by the prevailing local conditions and causes of food insecurity [Suryanarayana, 1995c].

Among the alternative policy instruments, food stamp programme has the merit that it can do away with undue budgetary and economic costs associated with a full-fledged food distribution programme but the demerit that it cannot ensure physical access to food, at least in the short run, and that a targeted food stamp programme may not improve collective food security because of the likely inflationary spirals in foodgrain prices [Suryanarayana, 1995d]. Therefore, one possible option would be to restrict the food stamps to geographical areas according to need-based and market-efficiency criteria. Food stamp targeting could be based on regular life cycle contingencies like maternity, sickness, disability, age-related and seasonal undernutrition, unemployment and old age through public health care system and municipal schools. These are the major conclusions of our earlier studies on issues in food targeting and the role of food stamps.

The conclusions mentioned above, however, are based on statistics for all-India and even the state-level evidence [CDS, 1975] is either, being for the year 1961-62, dated or incomplete since it [Krishnan, 1992] attempts to explain the inter-state (rural-urban combined) variations in average cereal consumption and not in both, cereal consumption and calorie intake. Further, the findings of both these two studies are based on cross-sectional regressions of cereal consumption/calorie intake on estimates of nominal agricultural income/ state domestic product (SDP) without any adjustment for inter-state price variations. This may be a reason that gave rise to a negative correlation between per capita agricultural income and per capita cereal consumption or calorie intake as found in the CDS study [Dasgupta, 1982]. As Panikar [1980] points out per capita agricultural income is not identical with per capita rural income. Further, the all-India result on stagnant cereal consumption and changing patterns of cereal consumption is only an aggregated picture of predominantly rice growing, wheat growing, jowar growing states, etc., which also reflects the variety in the predominant cereal in the consumption pattern of different states. The observed changes in the cereal consumption levels and composition of the poorer decile groups could be due to differences in the rate of change in the poverty proportions of different states and the associated changes in cereal consumption. And the inter-state variations in cereal consumption and calorie intake have to be explained in terms of, at least, real agricultural income per head of rural population (AIPHRP) and not nominal agricultural income per head of total state population. Further, when it comes to implementation, the question of PDS reform has to be examined in a disaggregate perspective. This is because even though the central government decides on total procurement of foodgrains and its statewise allocation, finally it is the state government which has a pivotal role in implementation by determining the amount of off-take and its public distribution. For instance, the Centre allotted 19.11 million tonne in 1990-91 and 24.72 million tonne in 1991-92 of rice and wheat for the states, but the offtake was only 14.94 million tonne and 18.77 million tonne, respectively [GOI, 1993]. And the fair price shop locations are decided by officials at the district level considering factors like suitability of applicants and size of the village. It is again the state government which is going to decide on the list of commodities to be provided under the PDS [Bapna, 1990]. These factors call for a careful, disaggregate, up-to-date analysis. The present paper makes an attempt to examine some of the issues regarding the PDS reforms at a disaggregate state-level from the point of view of food security and consumer preferences. The paper is organised along the following lines: Section 1 discusses the importance of the PDS in the context of policy design for food security, particularly of the poor during the ongoing Adjustment Programme. Section 2 provides a

profile of poverty and food insecurity across the sixteen states considered for the analysis. Section 3 deals with inter-state variations in average cereal consumption and average calorie intake and their determinants. Section 4 examines the changing cereal consumption levels and patterns over time across states which is followed by a section on changing consumer preferences and their implications for the PDS reform by commodity reorientation. The final section concludes the paper.

I. FOOD SECURITY AND THE PDS

A household is said to be food secure when it has the necessary purchasing power to buy foodgrains and access to the required amount of foodgrains. The causes of food insecurity, as generally recognised, are poverty - transient or chronic - and inadequate foodgrain production - seasonal, annual or secular. Accordingly, a distinction is made between temporary and chronic food insecurity. It should be noted that, even in the absence of the these two causes, there can exist food insecurity due to market imperfections.

The policies and programmes generally considered for solving food insecurity are as follows: (i) Income generating programmes, like (a) public works, including food-for-work, as done in India, (b) employment generation with or without subsidies, as done in India, and (c) informal sector support. (ii) Direct income transfer programmes which deal with economic aspect of the food insecurity and which are easier and faster to implement, e.g., (a) food stamp programme which is essentially a tied income transfer programme and, hence, ensures that marginal propensity to consume food will be higher than that from direct cash transfer; (b) social programmes for poverty relief; and (c) unemployment compensation. (iii) Food price subsidies, like the PDS, which influence nutritional status in two different ways, viz., (a) through the income effect by increasing the purchasing power of beneficiary households since they can buy a larger amount of food at the same cost; and (b) through the substitution effect by reducing the price of food relative to the prices of other goods. Programmes like the PDS have a major role to play in the context of food insecurity due to market imperfections and inadequate delivery system. (iv) Food supplementation schemes, like the school feeding programmes in Jamaica [Suryanarayana, 1995d], and Supplementary Nutrition Programme (SNP) in Kerala, which consists of (a) SNP for pregnant women and pre-school children, and (b) school meal programmes for primary school children [Kannan, 1995]. These programmes have the advantages that they rely little on the private sector for food distribution, permit enough scope for targeting on individual household members, involve relatively small quantities of food, and can be limited to relatively small geographical regions; but their disadvantage is that they require more administrative support in implementation *vis-a-vis* income transfer programmes. (v) Other programmes include (a) on-site feeding schemes; (b) take-home schemes; and (c) nutrition rehabilitation centers. And (vi) programmes to expand subsistence food production, like (a) home gardens as done in Indonesia under the Family Nutrition Improvement Programme called *Usaha Perbaikan Gizi Keluarga (UPGK)* [Syarief, 1990], and in Kerala under applied nutrition programmes, whereby women are trained to develop kitchen gardens and prepare nutritious food using available local resources [Kannan, 1995], and (b) programmes to increase agricultural production and incomes on small farms.

These are the conventional solutions prescribed for food insecurity on the basis of perceptions about 'ability to acquire' and 'availability' of foodgrains. Among these instruments, the importance of the PDS as a safety-net during the adjustment programme can be appreciated by the fact that aggregate availability *per se* is not enough [Sen, 1981], and even the ability to buy will not guarantee food security unless there is an effective delivery system [Venugopal, 1992]. During the ongoing reforms for efficiency in resource allocation, this assessment gets all the more strengthened by the recent findings that consumer choices in response to income increases are concerned more with variety than with nutrition *per se* [Shah, 1983; Behrman and Deolalikar, 1987; Behrman and Deolalikar, 1989;

Behrman, Deolalikar and Wolfe, 1988; Suryanarayana, 1995b]. This would imply that undernutrition cannot be removed by income transfers alone. If the reform programme is also concerned with labour efficiency and hence with food intake and nutrition, it would call for suitable government interventions, like the PDS and nutrition education programmes, as undertaken in Indonesia under the *UPGK* (Syarief, 1990).

The PDS cannot carry on as it operates today, benefiting virtually all segments of the population [Dev and Suryanarayana, 1991; Parikh, 1994]. The need for reducing government expenditures under the Stabilisation programme calls for a discriminatory approach in providing the PDS benefits and, hence, should be targeted only to the vulnerable groups since malnutrition is caused by an unequal distribution of food and misplaced consumer choices, rather than inadequate supply. Targeting involves designing rules so as to confine the PDS benefits only to the deserving and needy poor. The case for targeting rests on cost considerations since it is supposed to achieve economy of resources in delivering benefits to the needy by excluding the non-needy. But in India, targeting means not only excluding the non-poor but also covering all the needy poor currently excluded from the PDS network. And the dimension of the problem is such that, given the budget constraint of the government, providing safety-nets only in terms of an efficient PDS may not be a feasible proposition. In addition, there will be a substantial administrative cost also. Therefore, the government will have to search for an optimum combination of policies described above with a targeted PDS relying, if possible, even on self-targeting mechanisms to improve targeting.

The types of targeting for the PDS may be as follows: Discretionary targeting wherein the administrators decide on the eligibility of a given household. Eligibility may be decided on the basis of a means test or by needs, as identified by health workers. This approach has limitations like scope for corruption, exclusion of eligible cases due to ignorance, low levels of education and remote location. The second approach can be the non-discretionary one based on self-targeting with the provision for universal availability within a restricted category. This may be achieved by (a) subsidising only basic or 'inferior' food items; (b) locating subsidised ration schemes in areas where a high proportion of the target population live; (c) age, that is, providing subsidies to all those below (or above) a certain age (including even pregnant or lactating women); (d) through employment in food-for-work schemes; and (e) season, providing free or subsidised foodgrains during certain times of the year.

The options chosen and the mechanisms considered for targeting depend upon the local conditions, institutions, nature and causes of food insecurity. Therefore, the following sections make an attempt to examine the problem of food insecurity across sixteen major states which account for about 97 per cent of the total Indian population. The focus is only limited to examining the main contours of the issues using the available National Sample Survey (NSS) data on cereal consumption and the scope for self-targeting through commodity based PDS reorientation.

II. FOOD SECURITY: A STATEWISE PROFILE

India with a per capita income of $300 in 1993 is still a low income economy as per the World Bank classification [World Bank, 1995, p. 162]. The per capita net national product in 1993-94 is Rs 2,901.50 [GOI, 1995, p. S-3]. The net production of foodgrains in 1993-94 is 159.30 million tonne which, with net imports and additions to stocks, provides for a per capita daily availability of 436.40 gm of cereals and 37.8 gm of pulses [GOI, 1995, Pp. S-24-S-25]. The availability of cereals exceeds the Indian Council of Medical Research (ICMR) norm of 386 gm per day [Radhakrishna, 1991, p. 214]. But it falls short of the cereal consumption bundle (15.46 kg per capita per month, that is, 515 gm per capita per day) of the rural population group in the expenditure class enclosing the all-India rural poverty line (Rs 49.09 per capita per month at 1973-74 prices) recommended by the Task Force [Perspective Planning Division, 1979; National Sample Survey Organisation (NSSO), 1977, p. S-63]. Within India, regional imbalances in development exist even after four decades of

development. The problem of food insecurity varies across states with respect to both economic and availability aspects. In order to examine this problem, the estimates of different measures and relevant economic parameters of food insecurity for the sixteen states and all-India for the latest available year 1987-88 are presented in Tables 1 and 2.

The estimates of per capita SDP at current prices and per capita food production show considerable variation in terms of economic and physical access to food. The coefficient of variation in the per capita SDP is 29.70 per cent. This estimate is an exaggerated one, since the data is at current state prices and there is price dispersion across states. Still it is much lower than that in per capita food production which is 78.88 per cent. A higher variance in per capita food production *per se* need not cause any alarm unless the markets across states are not well- integrated and the delivery system is inefficient. Thus, the finding based on the macro parameters itself emphasises the significance of an efficient market and delivery system and hence physical access to food. The question may be examined further by sectors with appropriate adjustments for inter-state price variations since it is generally believed that the urban markets are better integrated due to higher urban incomes and prices [CDS, 1975; Krishnan, 1992]. In the absence of data on incomes, and since we are primarily interested in examining the final outcome and the problem itself, we examine the available NSS data on population average monthly per capita total consumer expenditure (AMPCTCE) by sector, rural/urban, across states at state- specific as well as at all-India sector-specific current prices. That there exist inter-state price dispersions can be seen by the fact that the coefficient of variation in AMPCTCE across states at all-India sector-specific prices is lower than that at state-specific prices in both rural and urban sectors. The estimates reveal variation in AMPCTCE across states, even though the AMPCTCE itself is very low. For instance, the rural AMPCTCE is the lowest in Orissa which, at Rs 123.57 at 1987-88 all-India rural prices, is just above the all-India rural poverty line of Rs 122.63 for the same year [Minhas et al, 1991, p. 1675]; but about 43.44 per cent less than the highest AMPCTCE of Rs 218.51 for rural Punjab. As regards the urban sector, the AMPCTCE is much above the all-India urban poverty line of Rs 158.31 [Minhas et al, 1991, p. 1675] in almost all the states. There exist considerable inequalities in the distribution of monthly per capita total consumer expenditure (MPCTCE) within each state in both the rural and urban sectors also. The estimates of Lorenz ratios of MPCTCE presented in Table 2 are not strictly comparable across states since they are based on data at state-specific current prices and not on data with adjustments for inter-state decile group specific price variation which is very important [Chatterjee and Bhattacharya, 1974]. Therefore, the problem may be examined by looking at the consequence of low AMPCTCE and inequalities in MPCTCE distribution, that is, poverty across states. As regards the rural sector, Assam, Bihar, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu and West Bengal have more than half of their populations living in poverty. As regards the urban sector, only in Bihar the poor proportion exceeds the non-poor one.

Accordingly, we find that the Indian rural population spends about 64 per cent and the urban Indian population spends about 56 per cent of the total expenditure on food on an average (Table 2). The estimates of Engel ratios for food for the rural and urban sectors across states also reveal a similar picture with little variation around the national average. Thus, food continues to dominate the household budgets implying that food security should be the major focus of policies concerned with the welfare, particularly of the poor. Yet the average cereal consumption is not sufficient. Rural Kerala has a monthly per capita cereal consumption of 10.42 kg which is less than even the ICMR norm of 11.67 kg. As regards the urban sector, Gujarat, Haryana, Karnataka, Kerala, Maharashtra, Punjab and Tamil Nadu have a cereal consumption less than the ICMR norm. While richer states like Haryana may be spending, as per the Engel law, more on non-cereal and non-food items and hence deriving enough calories, the case of the poorer states should be a matter of policy concern. The estimates on statewise per capita calorie intake per day by sectors only confirm this hunch. The

average calorie intake of the population is 2,221 in rural India and 2,089 in urban India (Table 1). These levels of calorie intake are below the calorie norms of 2,400 for rural India and 2,100 for urban India recommended by the Task Force appointed by the Planning Commission [Perspective Planning Division, 1979]. This is only an average picture and the statewise dispersion about this average is much more. As regards the rural population, only Haryana, Jammu and Kashmir, Punjab, and Rajasthan have an average calorie intake more than the norm of 2,400 calories recommended by the Task Force. In comparison with the rural picture, the urban one looks better in that nine states consisting of Bihar, Haryana, Jammu and Kashmir, Karnataka, Madhya Pradesh, Orissa, Punjab, Rajasthan and Tamil Nadu have an average urban calorie intake exceeding the norm (2,100 calories) for the urban sector. One important factor that needs mention is that statewise dispersions about the average differ between measures and between sectors. For instance, while the coefficient of variation is 13.22 per cent for rural per capita consumption at all-India rural prices, it is 10.39 per cent for rural per capita cereal consumption and is much less, at 8.48 per cent, for rural calorie intake. As regards the urban sector, the dispersion in cereal consumption about the weighted state average is higher than that in AMPCTCE and much lower for calorie intake, the estimates being 10.32, 8.42 and 3.41 per cent, respectively. The lower statewise dispersion in calorie intake for the urban sector is also around a lower mean in comparison with that for the rural sector. Accordingly, while the lowest rural calorie intake is 1,844 for rural Kerala, the lowest urban is 2,000 for urban Gujarat. This is so, in spite of the fact that Kerala's rural AMPCTCE at all-India rural prices is more than the national average, is one of the highest, and food items account for 61 per cent of the total expenditure. As regards Gujarat, its urban AMPCTCE is below the national average but it spends 61.63 per cent on food items alone. That the calorie intakes are still low seems to be largely because per capita cereal consumption is also the lowest in rural Kerala and urban Gujarat across respective state sector averages (Table 1). These findings on regional variations in cereal consumption and calorie intake call for a much more careful analysis of their determinants, so as to throw more light on the policy options for ensuring food security by sectors across states. The following section addresses these issues.

III. POLICY OPTIONS ON AVERAGE CEREAL CONSUMPTION AND CALORIE INADEQUACY ACROSS STATES

The CDS has put up and verified the hypothesis that the observed variations in calorie intake across states can be explained by variations in levels of foodgrain production and not by disparities in levels of income [CDS, 1975]. This hypothesis is found to hold good at the state-level as a whole and at the rural sector level across states. As regards the inter-state disparities in urban calorie intake, in addition to per capita food-grain production, per capita income is also found to be an important determinant. This finding is explained in terms of rural-urban price and income differentials, particularly the latter with respect to the market-dependent population, the majority of whom are poor landless labourers and small peasants in the rural sector. It is found that rural calorie intake is negatively correlated with the degree of inequality in land distribution and positively correlated with per capita food production. The study has found that about 88 per cent of the inter-state variation in calories derived from cereals and cereal substitutes in the rural sector are accounted for by per capita income, price of cereals, per capita food-grain production and inequality in land distribution. The last two variables, namely, per capita food-grain production and inequality in the distribution of land, by themselves account for about 73 per cent of the variation in rural per capita cereal consumption and 76 per cent of the variation in rural per capita calorie intake, respectively. The results of a similar exercise to explain inter-state variations in cereal consumption by Krishnan also confirm the hypothesis and have been interpreted to indicate that the structure of the grain market has not undergone any significant change [Krishnan, 1992]. However, as already noted, these two studies are based on estimates of nominal income/SDP and have not made any adjustments for inter-state price variations.

Further, Krishnan explains inter-state variations in cereal consumption and not calorie intake, that too for the state as a whole and not by sectors. Panikar [1980] differs from these two studies [CDS, 1975 and Krishnan, 1992] with respect to hypothesis specification and choice of variables. Panikar emphasises the 'economic access to cereals' aspect of the problem, which in turn depends on the level of employment and average price of cereals. Reasoning that the average price of cereals depends upon the production and composition of the cereal basket and that AMPCTCE is a better proxy for per capita rural income, Panikar explains inter-regional variations in calorie intake in terms of per capita output of cereals, price of cereals, AMPCTCE, coefficient of variation of MPCTCE and person-day unemployment rate. Unlike CDS [1975] and Krishnan [1992], Panikar has found that cereal prices and AMPCTCE are significant regressors and explain about 83 per cent of the inter-state variation in calorie intake in 1961-62. As regards 1971-72, person-day unemployment rate emerges as the only significant regressor and, for 1973-74, both price and person-day unemployment rate appear as significant regressors. Accordingly, Panikar concludes that increase in cereal production may be a necessary condition but not a sufficient condition, while increase in employment opportunities and income is a precondition for improving the nutritional status of the low-calorie group of states. But Panikar [1980] also suffers from the limitation that the estimates of AMPCTCE and inequality in MPCTCE have not been adjusted for inter-state variations in prices.

This section of the paper attempts to verify hypotheses similar to the CDS [1975] one, making use of available estimates of the relevant variables based largely on the NSS data by rural and urban sectors across states for the years 1961-62, 1972-73, 1973-74, 1977-78, 1983, 1986-87 and 1987-88. As regards the rural sector, the present attempt differs from the CDS [1975] for the year 1961-62 in its choice of per capita agricultural income and rural AMPCTCE, both measured at current all-India rural prices, as alternative measures of 'economic access to food' of the rural population. For the remaining years, the present study differs from the CDS approach with respect to the use of agricultural income and foodgrain production per head of rural population. The use of AIPHRP may be justified on the ground that agricultural income accrues largely to the rural sector and may, if normalised with respect to the total population, give a misleading picture of the relative position of the state, particularly for relatively more urbanised states. The same approach could not be adopted with respect to the estimates for the year 1961-62, due to non-availability of data on agricultural income for all the states from any other published source. Similarly, since foodgrains are largely grown in the rural areas and only surplus reaches the urban sector even within a state, we measure physical access to foodgrains in the rural sector by foodgrain production per head of rural population (FPPHRP) and not total state population. The estimates of per capita agricultural income and AMPCTCE at all-India rural prices for the year 1961-62 are obtained using the relevant state-specific price indices relative to all-India from Chatterjee and Bhattacharya [1974]. Estimates of AIPHRP and AMPCTCE at all-India rural prices for the remaining years are obtained using the price indices from Jain and Minhas [1991], Minhas and Jain [1990], and Tendulkar and Jain [1993]. Even though these price indices have been estimated for deflating total consumer expenditure, their application for price-adjusting estimates of SDP may be justified on the ground that our primary interest is to evaluate the variations in 'economic access to food' across states. No attempt is made to verify Panikar's specification since it requires decile group specific inter-regional price indices and such estimates are not readily available. Altogether the study seeks to explain inter-state variations in rural calorie intake and cereal consumption in terms of AIPHRP/AMPTCE at all-India rural prices, FPPHRP, inequality in the distribution of operational land holdings and unit cost of cereals as measured by their average unit values.

The present study also differs from the earlier studies in its attempt to estimate similar hypotheses for the urban sector. As regards the urban sector, 'economic access' is measured

using two alternative variables: per capita non-agricultural income and urban AMPCTCE, both measured at all-India urban prices, for the year 1961-62 and non-agricultural income per head of urban population (NAIPHUP) and urban AMPCTCE at all-India urban prices for the remaining years. The estimates of these two variables at all-India urban prices are obtained using the relevant price indices form Jain and Minhas [1991], Minhas, Jain and Saluja [1990] and Tendulkar and Jain [1993]. Physical access to foodgrains in the urban sector is measured by foodgrain production with respect to total state population, that is, state per capita foodgrain production (SPCFP). Thus, the model for explaining inter-state variations in urban calorie intake and cereal consumption is formulated in terms of NAIPHUP/AMPCTCE, unit values of cereals and SPCFP.

The estimated parameters of the model along with the relevant statistics are presented in Tables 3 and 4 for the rural and urban sectors, respectively. The regression estimates of the model are made by Classical Ordinary Least Squares using Shazam version 6.0. Linear, semi-log and double-log are the three important functional forms that have been tried while estimating the parameters. The important results and their economic implications are presented below:

Results for the Rural Sector

1961-62: As per the results for the year 1961-62 presented in Table 3a, per capita foodgrain production and unit cost of cereals as measured by their unit values are the two most important variables which account for 64 per cent of the observed variation in calorie intake across the fifteen states considered for this regression exercise. The coefficients of these two regressors have the expected signs. Per capita agricultural income or AMPCTCE at all-India rural prices and inequality in land distribution do not make any additional contribution to the explanatory power of the model. This has been confirmed by F-test which is not reported here. In fact, when the model is estimated with all the relevant variables, none of the regressors appear statistically significant in explaining inter-state variations in calorie intake and the adjusted R-square even declines. Variations in cereal consumption are explained by per capita foodgrain production and none of the other variables contribute significantly to any additional explanatory power of the model. Thus, foodgrain production and unit cost of cereals emerge as the major factors accounting for inter-state variations in calorie intake, and only foodgrain production for inter-state variations in cereal consumption.

1972-73: The inter-state variations in calorie intake in 1972-73 are explained significantly by economic access as measured by AMPCTCE at all-India rural prices and unit cost of cereals. And only cereal cost seems to be the significant variable that accounted for the variations in cereal consumption (Table 3b).

1973-74: Unit cost of cereals explains a substantial part of the inter-state variation in calorie intake. The model in double-log form accounts for 74 per cent of the variation in (log) calorie intake. Cereal cost accounts for 60 per cent of the observed variation in cereal consumption. AIPHRP at all-India rural prices is even negatively and significantly correlated with cereal consumption. Therefore, AIPHRP does not seem to be a satisfactory measure of rural economic access to food or, if it is, then a statistically significant negative coefficient emphasises the significance of other variables, like physical access at reasonable prices (Table 3c).

1977-78: Unit cost of cereals along with AIPHRP at all-India rural prices and FPPHRP seem to explain much of the inter-state variation in cereal consumption; but AIPHRP has the unexpected negative sign for its coefficient (Table 3d).

1983: Unit cost of cereals as measured by their unit values, scarcities in rural areas as measured by inequalities in land distribution and availability in terms of FPPHRP are the variables which explain 86 per cent of the observed variation in calorie intake. As regards the inter-state variation in cereal consumption, inequalities in land distribution and FPPHRP are the major significant explanatory variables (Table 3e).

1986-87: None of the relevant and appropriate

variables either individually or collectively explains the observed variation (Table 3f). Inclusion of estimates of inequalities in distribution of operational holdings in 1981-82 as an additional regressor increases the explanatory power to some extent but use of such estimates of 1981-82 for 1986-87 does not make any economic or statistical sense. What is striking is the irrelevance of the cost of cereals as an explanatory variable.

1987-88: AIPHRP at all-India rural prices and FPPHRP are the two variables which explain some (about 45 per cent in double-log form) variation in (log) cereal consumption but AIPHRP has the unexpected negative sign (Table 3g). Cereal cost again has no significant role to play in explaining inter-state variation in cereal consumption. As regards the results for this year, allowance should be made for the fact that the NSS estimates are based on sub-sample one data and are not combined sub-sample estimates.

Results for the Urban Sector

1961-62: The estimated parameters of the model (Table 4a) show that SPCFP by itself accounts for 39 per cent of the variation in average per capita calorie intake across the 15 states considered here. Per capita non-agricultural income at all-India urban prices is not a significant explanatory variable. Instead, SPCFP, unit cost of cereals and AMPCTCE at all-India urban prices together explain 70 per cent of the inter-state variation in average per capita calorie intake. None of the explanatory variables could explain inter-state variations in urban cereal consumption. Hence the results are not reported here.

1972-73: For 1972-73 also, unit value of cereals and SPCFP appear significant and explain 78 per cent of the observed variation in calorie intake. NAIPHUP is not a significant regressor (Table 4b). Variation in cereal consumption is also explained by unit cost of cereals; F-tests (not reported here) have shown that other explanatory variables do not make any significant additional contribution to the explanatory power of the model.

1973-74: Unit cost of cereals emerges as the statistically significant regressor for urban average per capita calorie intake while SPCFP for urban average per capita cereal consumption (Table 4c). Measures of economic access like NAIPHUP and AMPCTCE are neither significant nor have the expected sign.

1977-78: The explanatory power of the model is considerably reduced (Table 4d). SPCFP and AMPCTCE together explain about 35 per cent of the observed variation but AMPCTCE does not have the expected sign for its coefficient.

1983: None of the regressors are significant and the models explain less than 30 per cent of the variation in calorie intake and cereal consumption (Table 4e).

For the remaining years, the postulated variables do not explain to any extent the observed variation in cereal consumption. The proportion of variation explained is less than 5 per cent. Hence, the results for these years are not reported in the Tables.

The results presented above do not support our earlier impression that market structures have remained stable during the last three decades and foodgrain production is the major determinant of inter-state variations in rural calorie intake and cereal consumption. As per the present results, after 1961-62, FPPHRP is a significant explanatory variable for inter-state variations in rural calorie intake only in 1983 and for cereal consumption in 1983 and 1987-88. The latter two years being drought years (only in parts of India in 1983), what these findings imply is that the existing transport and delivery system by itself is sufficient to ensure regional balances in average cereal consumption and calorie intake in normal years. But in drought years, states with larger FPPHRP have experienced relatively less hardships *vis-a-vis* the drought affected states, which calls for active public intervention in such years in the latter group of states. Its policy significance is that physical access and an efficient delivery system have a major role to play in drought years. Economic access, as measured by AIPHRP at all-India rural prices alone is either not significant or does not have the expected sign for its coefficient. Economic access as measured by AMPCTCE at all-India rural prices together with cereal cost explain about 90 per cent of the variation in rural calorie intake in 1972-73. Cost

of cereals as measured by their unit values has been a major explanatory variable in explaining variations in both rural cereal consumption and calorie intake only until 1983. It is no longer an important variable in explaining inter-state variations in cereal consumption. This could be because, as seen in Suryanarayana [1995a], coarse cereals are no longer an important item of cereal consumption and as a result, states where coarse cereals constituted the major component of the cereal consumption basket must have lost their comparative advantage in terms of average cost of cereals. How far this is true is verified in the following section.

The results for the urban sector also indicate changes in institutional structures and hence in the determinants of inter-state variations in urban cereal consumption and calorie intake. Economic access as determined by AMPCTCE at all-India urban prices and unit cost of cereals are important in explaining inter-state variations in urban calorie intake in 1961-62. Unit cost of cereals is important for explaining variations until 1973-74. SPCFP is a significant regressor until 1973-74. The explanatory variables considered seem to be irrelevant for explaining inter-state variations in urban cereal consumption and calorie intake after 1973-74. If so, what are the relevant variables that have to be considered in any policy option for ensuring urban food security. This needs a much more disaggregated analysis which is beyond the scope of the present study. The following section makes a limited attempt to examine the issues within the framework of changing consumption patterns and their implications.

IV. CHANGING CEREAL CONSUMPTION COMPOSITION AND IMPLICATIONS

On an average, at the all-India level, cereals account for more than 85 per cent of the calorie intake of the poorer households, particularly in the rural sector [NSSO, 1976a, 1976b; Bhattacharya et. al., 1991, p. 53]. Further, cereals constitute about 60 per cent of total consumption expenditure for these groups. Hence changes in cereals quantities consumed and composition in different states should throw some light on the results obtained in the preceding section. To examine this issue, the available NSS estimates of average per capita quantities consumed per month of three different types of cereals, that is, rice, wheat and other cereals (comprising coarse cereals like jowar, bajra, maize, barley, small millets, ragi and gram) by the rural and urban populations in the sixteen states and all-India are given in Tables 5(a-q) and 6(a-q), respectively.[1] The estimates correspond to the period 1961-62 (NSS 17th Round) to 1990-91 (NSS 45th Round). The tables also provide information on the percentage changes in the consumption of these three types of cereals between 1961-62 and 1990-91. Use of 1990-91 as the terminal year for working out the changes in cereal consumption will not affect our analysis and conclusions since in almost all the states the changes between 1987-88 and 1990-91 are marginal.

Rural Areas

From Tables 5(a-q), it can be seen that average per capita cereal quantity consumption has declined in all the states, except Kerala between 1960-61 and 1990-91. The percentage decline varies across states. It exceeds 10 per cent in the states of Andhra Pradesh, Assam, Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu and Uttar Pradesh.

Much of the decline in per capita total cereal consumption in many states has occurred due to a decline in coarse cereal consumption, which is largely grown for self-consumption by subsistence farmers. For instance, coarse cereals constituted 70 per cent of the cereal consumption in Gujarat, 64 per cent in Karnataka, 68 per cent in Maharashtra, 80 per cent in Rajasthan and 41 per cent in Uttar Pradesh in 1961-62. By 1990-91, coarse cereal consumption declined by 38 per cent in Gujarat, 33 per cent in Karnataka, 30 per cent in Maharashtra, 58 per cent in Rajasthan and 37 per cent in Uttar Pradesh. As a result, shares of the coarse cereals declined to 43 percent, 54 per cent, 53 per cent, 32 per cent and 5 per cent, respectively in these states. The decline in coarse cereal consumption, in its turn, in almost all the states, except Maharashtra and Orissa, seem to have occurred due to a decline in per capita availability of coarse cereals. From Table 7, it can

be seen that total coarse cereal production increased at a rate higher than the population growth rate only in the two states of Maharashtra and Orissa. Total coarse cereal output declined in the states of Bihar, Haryana, Kerala, Punjab, Rajasthan and Tamil Nadu. In the remaining states, coarse cereals either are not grown at all or have been grown at negligible rates *vis-a-vis* the population growth rates, with the result that state per capita coarse cereal availability has declined.

What is to be noted is that the decline in coarse cereal production, which is grown largely for self-consumption, has occurred along with changes in the labour market involving decrease in self-employment, increase in wage employment and growing casualisation of wage labour [Vaidyanathan, 1986]. As can be seen from Table 8, the proportion of casual workers in total workforce, particularly for males, has increased in almost all the states which implies increasing commercialisation and market dependence of the rural population for their foodgrains. In sum, the increasing market dependence on superior but costly cereals of the general population has increased, which must have eroded its ability to purchase cereals in sufficient quantities.

As can be seen from the Tables 5(a-q), even though consumption of superior cereals, rice and wheat together (largely the latter), increased in important coarse cereal-consuming states like Andhra Pradesh, Gujarat, Maharashtra, Rajasthan and Uttar Pradesh, the increases have not been sufficient to neutralise the decline in coarse cereal consumption. Thus, the total cereal consumption also declined. In states like Assam, Bihar, Haryana, Jammu and Kashmir, Karnataka, Madhya Pradesh, Orissa and West Bengal total cereal consumption declined because of a decline in the consumption of both rice and coarse cereals. In West Bengal, where coarse cereal consumption is negligible, the decline in total cereal consumption is also negligible. In fact, Kerala is the only state where rural cereal consumption increased, that too by 8 per cent between 1961-62 and 1990-91. Even the lower cereal consumption levels in rural Kerala in 1988-89 and 1989-90 are only marginally (less than five per cent) different from the level in the initial year. This could be because, with coarse cereal consumption being almost nil and the state being foodgrain deficit, the rural population in Kerala has all along been virtually market dependent for rice. It did not have to experience the kind of shocks of increasing market dependence for higher-priced superior cereals experienced by the predominantly coarse cereal consuming states. Instead, with a well established PDS, the rural population in Kerala is insulated against the vagaries of market. Substantial inward remittances by the Kerala emigrants from the Gulf must have only increased economic access to cereals in rural Kerala, resulting in such increases in consumption.

In sum, with the decline in coarse cereal availability and consumption, the predominantly coarse cereal consuming states have lost their comparative advantage in terms of cereal costs. This may be a major reason why unit cost of cereals does not appear as a significant explanatory variable for years after 1983, when coarse cereal consumption also declined dramatically in many states and, hence, at the all-India level too. This is the average and predominant picture obtaining across many states. There are five outliers, viz., Bihar, Jammu and Kashmir, Orissa, Rajasthan and West Bengal which are enjoying, in spite of a decline, a cereal consumption level above the poverty line cereal bundle of 15.46 kg per capita per month, and hence need not cause any concern from the point of cereal consumption and food security of the average population. Richer states like Punjab and Haryana, on the other hand, may be diversifying their consumption baskets relying largely on non-basic food items and also need not cause much concern.

Urban Areas

From Tables 6(a-q), it can be seen that average per capita cereals consumption declined in the urban areas of all the states. But the instability and the percentage decline in cereal consumption have been less in urban than in the rural areas in all the states, except Bihar and Kerala. The percentage decline in cereal consumption in urban Bihar in 1990-91 seems to be an outlier, since similar comparisons for the earlier years

show that the extent of decline to be lower in the urban than in the rural areas. Not so in Kerala where the urban cereal consumption has been lower than that in 1961-62 in all the years after 1983. This could be due to changes in consumption patterns in favour of non-food items.

With the exception of states like Bihar, Haryana, Jammu and Kashmir, Punjab and Tamil Nadu, per capita cereal consumption of the urban population declined by more than 10 per cent (sometimes even 20 per cent), mainly in Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan and Uttar Pradesh which are the important coarse cereal consuming states. In most of these states, coarse cereal share in the cereal consumption basket declined dramatically after 1973-74. This may be a reason why unit value of cereals is not a significant regressor for the urban areas after 1973-74. From the point of view of average food security, urban areas in Bihar, Jammu and Kashmir and Orissa still have a cereal consumption level above the cereal bundle of 12.25 kg per capita per month for the urban population group in the expenditure class [NSSO, 1977, p. S 131] enclosing the all-India urban poverty line (Rs 56.64 per capita per month at 1973-74 prices) recommended by the Task Force [Perspective Planning Division, 1979]. Hence, these states need not cause any policy concern from the point of view of average food security for the urban sector.

What emerges from the preceding analysis is that with changing composition of cereal production and consumption, average cereal cost is no longer a significant variable explaining inter-state variations in average cereal consumption and, hence, in calorie intake. This, however, does not imply that cereal price is not a matter of policy concern from the point of view of food security. What this finding implies is that the states, which are predominantly coarse cereal-consuming, depend more on superior and costlier cereals and, hence, have lost their advantage in terms of average cost of cereals. Thus, from the point of view of average cost of cereals, almost all the states are placed on an even keel. This must have been a major reason that accounted for the decline in total cereal consumption, even after the confirmed reductions in poverty ratios in almost all the states [Minhas, Jain and Tendulkar, 1991]. Further, the inadequate levels of average cereal consumption along with the inequalities in distribution among persons within a sector implies considerable cereal and calorie inadequacy among the poorer sections. From Table 9, it can be seen that except Haryana, Jammu and Kashmir and Punjab, in all other states the percentage of rural population, having a calorie intake of less than 2,400, ranges between 60 and 90. As regards the urban population, except Tamil Nadu where bottom eight decile groups have a per capita daily calorie intake of less than 2,100, in all other states the proportion varies between 40 and 60 per cent (Table 10).

The issues discussed above may be examined much more carefully using estimates of population weighted coefficient of variation of the important variables at current all-India sector-specific prices for the relevant years. The estimates for the rural and urban areas are presented in Tables 11 and 12, respectively. The estimates of coefficient of variation in AIPHRP at current all-India prices do not show any trend but marginal variations in its dispersion, increasing in years of drought and declining in normal years. However, coefficient of variation in rural AMPCTCE at current all-India rural prices does not show any such pattern. It is not only less than that in AIPHRP but has also declined since 1977-78. Inter-state dispersions in rural cereal consumption and calorie intake are also much less and have declined since the 1970s, even though those in FPPHRP have increased since 1973-74. This finding must have been the result of increasing integration of markets across states even with respect to the rural sector. A similar picture is obtained for the urban sector also (Table 12). Further, the inter-state urban dispersions in all the variables considered are much less than those for the rural sector, indicating better inter-state urban integration than rural one.

The results discussed above may be heartening from the point of view of policy concerns regarding inter-regional imbalances in average cereal consumption and calorie intake. However,

the results cannot be generalised as to the policy options regarding similar imbalances within regions and cereal consumption inequalities among income groups, particularly the poorer sections. With the increasing market dependence of the poorer groups, due to changing crop composition and institutional conditions like increasing landlessness, the need for ensuring food security of the poor assumes significance. All the more so, in the context of increasing integration into the world market and the impending alignment of only domestic commodity (food) prices (and not income) with the higher and more unstable international prices. These factors along with the changing consumption patterns observed at the all-India level [Suryanarayana, 1995b] would call for direct public intervention to ensure adequate cereal consumption and calorie intake of the poor. For the various reasons cited in Suryanarayana [1995a] and given India's experience in effectively tackling drought and its consequences through the PDS, the latter emerges as the important available option. However, the PDS needs revamping to ensure targeting only on the poor by excluding the non-poor and including the poor not covered at present. In this respect, given the constrains on identifying the poor [GOI, 1985], possibilities for self-targeting through commodity reorientation of the PDS should be examined. The following section addresses this issue.

V. SCOPE FOR COMMODITY BASED TARGETING

As already noted, the state governments will have a major say in the implementation of any reform of the PDS. Further, the scope for self-targeting through changing the commodity composition of the PDS in favour of coarse cereals depends essentially on the consumption patterns of the local population. This is important given the finding in the preceding section that the coarse cereal consumption has declined substantially in all the states. However, these are aggregate estimates corresponding to the sectoral total populations. The hypothesis has to be verified much more carefully using income group-wise data or at least on the basis of Engel functions. For this purpose, Engel functions are estimated, based on the data from the household consumption survey of the NSSO conducted during 1961-62 (17th Round) [NSSO, 1971], 1972-73 (27th Round) [NSSO, 1979, 1983], 1983 (38th Round) [NSSO, 1986b, 1989c and 1989d], and during 1987-88 (43rd Round) [NSSO, 1991].

The methodology used in the estimation of Engel functions is as follows: The Engel relation $y = f(x)$ between per capita expenditure on a specific commodity (y) and per capita monthly total consumer expenditure (x) and hence Engel elasticities are generally estimated using different methods. Given that the published NSS data are available only in the form of grouped arithmetic means in unequal size classes of total expenditure, the assumptions of the conventional method of least squares about the error terms may not hold. Therefore, Engel elasticities for the present study are estimated using the method based on the concentration curve approach [Iyengar, 1960, 1964]. This method makes less restrictive assumptions; it is suitable for the available data sets and provides consistent results.

This approach is based on the following assumptions:

(i) The variable per capita total consumer expenditure (x) has a log-logistic distribution which is characterised by the equation

$$\log \frac{F(x)}{1-F(x)} = a + b \log x \qquad (1)$$

(ii) The Engel curve is linear in double logarithmic scale and is given by

$$\Phi(x) = E(y/x) = AX^{\eta} \qquad (2)$$

where y and x denote the household expenditure on the specific commodity and total expenditure respectively.

Now, the Engel elasticity is given by

$$\eta = \frac{L_s}{L_o} \qquad (3)$$

where η stands for Engel elasticity which can be estimated from the Lorenz ratio (L_o) of the size distribution of x and the specific concentration coefficient (L_x) for the commodity under consideration.

The Engel elasticity estimates and other related consumer behavior parameters are presented in Tables 13 and 14, respectively for the rural and urban sectors for the sixteen states considered in this paper and all-India. The commodities considered, due to data availability constraint, are: (i) rice, (ii) wheat, (iii) coarse cereals consisting of jowar, bajra, maize, barley, small millet and ragi, (iv) edible oil, and (vi) sugar.

As per the Engel law, with an increase in total expenditure, (i) an increase in Engel ratio indicates that the commodity concerned is a relative luxury with an expenditure elasticity greater than unity; and (ii) a decrease shows that the item is a necessity with expenditure elasticity less than or equal to unity. From the point of view of the PDS targeting, (i) negative Engel elasticity implies that the poor would gain more subsidy in absolute terms, (ii) a positive fraction implies that the poor benefit more, relative to their total expenditure; and (iii) more than one implies that the richer groups benefit both in absolute terms and relative to total expenditure.

Between 1961-62 and 1987-88, there was an increase in per capita total consumer expenditure at constant prices in both rural and urban all-India [Suryanarayana, 1995b]. The estimates presented in the Tables 13 and 14 show a decline in Engel ratios for all foodgrains, particularly coarse cereals both in the rural and urban sectors in all the states. The only states where rural Engel ratios exceed five per cent for jowar and bajra together are Gujarat, Karnataka and Maharashtra. As regards the urban sector, only Gujarat for bajra and Karnataka and Maharashtra for jowar have their Engel ratios more than just one per cent. In fact, both the rural and the urban populations of Assam, Kerala and West Bengal do not consume any coarse cereals at all. Thus, coarse cereal consumption seems to have disappeared from the diets, particularly of the urban population. Engel ratios increased for edible oil in both rural and urban areas of all the states, though not consistently. As regards sugar, there is no clear-cut trend.

Going by Engel elasticities, what strikes one most is that bajra is not at all an inferior foodgrain in the rural areas of Gujarat, Madhya Pradesh, Maharashtra and Rajasthan; and because of their weight in the total consumption of bajra across states, at rural all-India level too. Among the food items, wheat is a luxury consumed largely by the rich in the rural areas of Andhra Pradesh, Karnataka, Kerala, Orissa and Tamil Nadu and in the urban areas of Andhra Pradesh, Kerala and Tamil Nadu. Rice is a luxury only in the state (both rural and urban) of Rajasthan. Edible oil is a luxury for the rural population of Gujarat, Madhya Pradesh and Orissa and for the urban population of Orissa. Sugar is largely consumed by the rich in the rural areas of Andhra Pradesh, Assam, Bihar, Madhya Pradesh, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal, and not in the urban areas of any state.

Further, the Engel ratios and elasticities over time indicate changes in consumption patterns dictated by changing consumer tastes and preferences, availabilities and, hence, relative prices. Some of the inconsistencies between changes in Engel elasticities and ratios could be due to changes in relative prices. Changes in relative prices during 1970s and 1980s have been such that estimates of Engel ratios based on data at current prices provide an exaggerated and sometimes even distorted picture about the underlying real changes [Suryanarayana, 1995b]. Going by the elasticities presented in the Tables 13 and 14, it appears that the consumption profile of the rural and urban populations of all the states have changed involving a decline in the response of foodgrain consumption to expenditure and hence to income growth. That these changes across expenditure groups are essentially in favour of non-nutritious food items is confirmed by the decline in Engel elasticities for calories between 1972-73 and 1983 in all states, except urban areas of Assam, Bihar, Jammu and Kashmir, Karnataka and Tamil Nadu.

It is quite possible that the preceding analyses based, as they are, largely on summary parameters, do not reflect the underlying changes correctly. Therefore, as a cross-check, decile group-wise consumption shares and absolute per

capita quantity consumption of important coarse cereals in major consuming states are presented in Tables 15 and 16. As per these estimates for rural areas, there seems to be some scope for the PDS targeting by changing its orientation in favour of (i) jowar in rural Andhra Pradesh, Madhya Pradesh, Maharashtra, Rajasthan and Tamil Nadu; (ii) maize in rural Bihar, Gujarat and Jammu and Kashmir; and (iii) bajra in Tamil Nadu. In terms of consumption shares, jowar in Gujarat and Karnataka, bajra in Maharashtra and Rajasthan and maize in Rajasthan are consumed disproportionately more by the richer decile groups. As regards the urban areas, some scope for targeting exists through (i) jowar in Andhra Pradesh, Gujarat, Karnataka and Maharashtra; and (ii) bajra in Gujarat. This is not a promising scenario given the finding that majority of the rural and urban populations in all the states are underfed and undernourished in terms of calories and since these select coarse cereals by themselves cannot provide all the dietary requirements and meet diverse tastes and preferences.

VI. CONCLUSION

The present study has made an attempt to examine some of the issues regarding food security and their implications for the PDS reform at a disaggregated level from the perspective of changing consumer choices and preferences dictated largely by availability. The important findings of the study and their policy implications are summarised below.

Going by the conventional measures of food security, namely, measures of economic access and physical access, there seems to have occurred substantial improvement in food security across states in India. There has been an improvement in total income/ expenditure as reflected in increases in all-India per capita consumption at constant prices and the consequent reductions in poverty ratios. Increases in all-India per capita foodgrain production indicate improvement in physical access. However, inter-regional imbalances in income levels do not seem to have got reduced, in spite of the policy emphasis on reductions in such imbalances. Available data until 1987-88 indicate increases in inter-state disparities in per capita foodgrain production. But inter-state variations in rural cereal consumption and calorie intake have declined substantially. And this decline in variation is around a declining rural mean per capita cereal consumption. This seems to be largely because of the changing crop composition of foodgrain output and consumption in favour of superior but costlier cereals and against coarse cereals. As a result, unit cost of cereals no longer explains the inter-state variations in cereal consumption, but explains the declining cereal consumption over time, mainly in predominantly coarse cereal consuming states. Coarse cereals are largely grown by subsistence farmers for self-consumption. With increasing landlessness and casualisation of labour, and decreasing coarse cereal availability, market dependence of the population, the poor in particular, has increased. Even though income or consumer expenditures, adjusted by deflators accounting for percentage variations in prices, show an increase in income and economic access, this has not been so in reality. With increasing market dependence and changing consumption patterns in favour of costlier superior cereals dictated largely by availability than by choice, the economic entitlement of the poor with respect to the cereal basket has declined and hence average cereal consumption and average calorie intake have declined. Coarse cereals constitute a relatively smaller proportion of the urban cereal consumption basket and the urban population is relatively less affected by such changes in labour markets and production patterns. Hence the average cereal consumption and calorie intake have been relatively stable and have not shown any drastic decline. Thus, the question for the 'Human Face' of the reform programme is not how to minimise the likely reductions in the level of living and nutrition of the population but how to stop the current decline and prevent the likely accelerated decline in cereal consumption as a part of the social cost of the programme and ensure adequate cereal consumption so as to achieve improvement in labour efficiency along with efficient resource allocation.

Further, foodgrain production does not appear as a significant explanatory variable for inter-state variations in rural average cereal consumption and calorie intake, except in drought years. This indicates that private trade by itself can take care of the inter-regional aggregate foodgrain requirements in normal years but public intervention would be required in drought years.

These findings raise the following important issues with respect to food security, particularly during the Adjustment period. They are: (i) income transfers to the poor to stop the current decline, prevent an accelerated decline in and ensure adequate cereal consumption (not by statistical concoctions of implicit subsidies in a distorted market); (ii) protection for the increasingly market dependent poor against the likely high instabilities in foodgrain prices in the wake of integration into the world market; (iii) efficient foodgrain delivery system within states, particularly for backward and poorer regions and localities; and (iv) consumer education so as to ensure that consumer choices regarding food items do not get misplaced.

The solutions for these issues could be a combination of targeted policies. Income transfers may be achieved either implicitly through the subsidised PDS or through food stamps, the latter mainly in urban areas and food surplus rural areas or through appropriate employment generating and poverty alleviation programmes or a feasible and targeted combination of all. Price stabilisation may be taken care of by appropriate policies on buffer-stocks and the PDS in food deficit regions. Misplaced consumer choices would call for consumer education, as attempted under the *UPGK* in Indonesia, influencing consumer choices through instruments like the PDS or tied food stamps. Thus, along with structural reforms, there is also a need for an understanding and appreciation of the problem of food security and possible safety-nets for putting up an effective 'Human Face'.

NOTE

1. To ensure consistency with other studies [Bhattacharya, *et al.*, 1991; Suryanarayana, 1995a 1995b], we have defined (i) 'other cereals' to include jowar, bajra, maize, barley, small millets, ragi and gram; and (ii) 'total cereals' to include rice, wheat and other cereals. But the published NSS reports provide estimates of quantities of gram consumed for the years 1988-89, 1989-90 and 1990-91, only for all-India and not for states. Therefore, the estimates of quantities consumed of 'Other cereals' and 'Total cereals' provided in Tables 5 and 6 do not include gram and hence underestimate their consumption for these three years for different states. This may not affect our conclusions substantially, since the average levels of consumption of gram per month are less than 50 gm in most of the states and are about 100 gm in Bihar, Haryana, Madhya Pradesh and Uttar Pradesh.

ABBREVIATIONS

AIPHRP	Agricultural Income Per Head of Rural Population
AMPCTCE	Average Monthly Per Capita Total Consumer Expenditure
CDS	Centre for Development Studies
FPPHRP	Foodgrain Production Per Head of Rural Population
GOI	Government of India
ICMR	Indian Council of Medical Research
MPCTCE	Monthly Per Capita Total Consumer Expenditure
NA	Not Available
NAIPHUP	Non-agricultural Income Per Head of Urban Population
NSS	National Sample Survey
NSSO	National Sample Survey Organisation
PDS	Public Distribution System
SDP	State Domestic Product
SNP	Supplementary Nutrition Programme
SPCFP	State Per Capita Foodgrain Production
UPGK	*Usaha Perbaikan Gizi Keluarga*

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TABLE 1: A PROFILE OF FOOD SECURITY ACROSS STATES: INTER-STATE DISPARITIES

State	Per Capita (Rural-Urban Combined) Net SDP in 1987-88 (Rs Per Annum at Current Prices)	Per Capita (Rural-Urban Combined) Food Production in 1987-88 (kg. Per Annum)	Per Capita Consumer Expenditure in 1987-88 (Rs Per Month at Current Prices)		Per Capita Consumer Expenditure (Rs Per Month at Current All-India Prices) (1987-88)		Per Capita Cereal Consumption (kg. Per Month) (1987-88)		Per Capita Calorie Intake Per Diem (1983)	
			Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
Andhra Pradesh	2,741	156.17	160.13	230.28	185.28	256.53	14.35	11.71	2,204	2,009
Assam	2,589	136.53	153.60	269.94	143.53	273.38	14.26	12.45	2,056	2,043
Bihar	1,846	112.35	136.57	186.48	128.15	187.23	15.54	13.52	2,189	2,131
Gujarat	3,509	35.21	161.20	240.65	152.32	219.21	12.04	9.50	2,113	2,000
Haryana	4,312	413.50	214.66	251.76	196.97	245.47	15.13	11.12	2,554	2,242
Jammu & Kashmir	2,701	135.70	204.36	270.81	197.35	280.28	17.30	14.14	2,569	2,234
Karnataka	3,254	149.89	149.13	222.78	158.88	215.66	13.80	11.12	2,260	2,124
Kerala	2,828	38.18	211.47	266.22	173.64	251.49	10.42	9.69	1,844	2,049
Madhya Pradesh	2,433	230.45	141.98	235.98	147.84	248.20	15.46	11.97	2,323	2,137
Maharashtra	4,558	150.80	160.77	279.53	151.46	245.56	13.06	10.23	2,144	2,028
Orissa	2,194	168.96	127.51	225.20	123.57	227.68	15.72	13.76	2,103	2,219
Punjab	5,572	893.48	244.19	269.95	218.51	281.88	12.51	9.85	2,677	2,100
Rajasthan	2,197	118.91	177.84	237.87	167.82	227.87	16.66	12.75	2,433	2,255
Tamil Nadu	3,362	142.16	154.29	248.79	148.21	229.50	12.27	10.19	1,861	2,140
Uttar Pradesh	2,382	217.08	148.67	216.73	153.77	246.08	15.48	11.72	2,399	2,043
West Bengal	3,089	162.35	149.87	249.45	136.31	260.10	15.13	11.73	2,027	2,048
Weighted state average	2,925	177.69	156.71	241.48	153.55	240.08	14.53	11.26	2,217	2,084
Coefficient of variation (per cent)	29.70	78.88	14.68	10.02	13.22	8.42	10.39	10.32	8.48	3.41
All-India	3,319	175.20	158.10	249.93	158.10	249.93	14.54	11.25	2,221	2,089

Sources: 1) Estimates of per capita net SDP are from GOI [1991, p. 11].

2) Estimates of state per capita food production are made using total food production data from Chandhok and The Policy Group [1990, Vol. II, p. 707].

3) Estimates of per capita consumer expenditure at current prices are from NSSO [1991]. These estimates at current all-India sector-specific prices are obtained using the relevant price indices from Minhas and Jain [1990, pp. 346-347], Minhas, Jain and Saluja [1990, p. 229] and Minhas, Jain and Tendulkar [1991, p. 1674].

4) Estimates of cereal consumption are from NSSO [1991].

5) Estimates of per capita calorie intake are from NSSO [1989b].

TABLE 2: A PROFILE OF FOOD SECURITY ACROSS STATES: INTRASTATE INEQUALITIES

State	Lorenz Ratio of Per Capita Total Consumer Expenditure Distribution (at Current Prices 1987-88)		Lorenz Ratio of Per Capita Total Cereal Consumer Expenditure Distribution (1987-88)		Lorenz Ratio of Per Capita Calorie Intake Per Day Distribution (1983)		Head-Count Ratio (Per cent) (1987-88)		Engel Ratio for Food (Per cent) (1987-88)	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
Andhra Pradesh	0.302	0.360	0.116	0.115	0.122	0.118	31.56	40.04	59.30	53.37
Assam	0.222	0.337	0.106	0.035	0.103	0.112	53.08	11.37	70.06	60.24
Bihar	0.264	0.297	0.126	0.067	0.149	0.124	66.26	56.70	69.87	62.93
Gujarat	0.233	0.286	0.101	0.081	0.120	0.108	41.57	38.80	69.26	61.63
Haryana	0.280	0.287	0.108	0.054	0.131	0.128	23.17	18.25	59.97	57.69
Jammu & Kashmir	0.322	0.282	0.131	0.080	0.097	0.086	33.11	10.96	62.35	60.31
Karnataka	0.292	0.336	0.160	0.086	0.163	0.147	42.29	45.03	63.46	56.60
Kerala	0.323	0.387	0.134	0.150	0.173	0.212	44.02	44.47	60.98	58.68
Madhya Pradesh	0.294	0.328	0.111	0.060	0.142	0.099	49.83	46.03	64.64	56.37
Maharashtra	0.327	0.351	0.106	0.102	0.108	0.124	54.17	35.64	59.83	56.42
Orissa	0.268	0.327	0.120	0.043	0.134	0.126	65.64	44.49	68.78	61.44
Punjab	0.295	0.278	0.094	0.078	0.156	0.146	21.02	11.18	58.16	54.37
Rajasthan	0.311	0.345	0.100	0.076	0.132	0.119	41.89	41.50	63.50	57.01
Tamil Nadu	0.322	0.347	0.148	0.090	0.187	0.270	51.30	39.19	63.63	54.79
Uttar Pradesh	0.280	0.328	0.089	0.074	0.141	0.120	47.70	41.87	62.00	56.92
West Bengal	0.250	0.357	0.115	0.049	0.179	0.126	57.19	30.63	70.90	57.81
All India	0.298	0.353	0.099	0.071	0.141	0.140	44.88	36.52	64.10	56.39

Sources: 1) Estimates of Lorenz ratios for consumer expenditure distribution and cereal consumer expenditure distribution are based on data in NSSO [1991].
2) Estimates of Lorenz ratios for calorie intake distribution are based on data in NSSO [1989d].
3) Estimates of head-count ratios are from Minhas, Jain and Tendulkar [1991, p. 1676].
4) Estimates of Engel ratios for food are based on NSSO [1991].

TABLE 3A: ESTIMATED PARAMETERS OF THE MODEL ON INTER-STATE VARIATIONS IN RURAL AVERAGE PER CAPITA CALORIE INTAKE AND CEREAL CONSUMPTION: 1961-62

Regressand	Functional Form	Intercept	Per Capita Agricultural Income at Current All-India Prices	Lorenz Ratio of Operational Land Distribution	Unit Values of Cereals in Rural Areas	Per Capita Foodgrain Production	Average Monthly Per Capita Total Consumer Expenditure (AMPCTCE) at Current All-India Prices	R-squre	R-squre Adjusted
Average per capita calorie intake	Linear	3448.50***	-	-	(-)3190.7**	2.76**	-	0.64	0.58
		(4.81)			((-)2.46)	(2.31)			
"	"	3517.20**	0.68	(-)461.14	(-)3115.90	2.71	-	0.66	0.52
		(2.71)	(0.24)	((-)0.44)	((-)2.09)	(2.01)			
"	"	2769.90**	-	(-)250.46	(-)2843.00	2.31	32.79	0.71	0.60
		(2.53)		((-)0.27)	((-)2.17)	(1.88)	(1.42)		
Average per capita cereal consumption	Double-log	1.12**	-	-	-	0.34***	-	0.59	0.56
		(2.75)				(4.31)			
"	"	2.04	(-)0.25	(-)0.20	(-)0.46	0.32***	-	0.68	0.55
		(1.72)	((-)1.01)	((-)0.86)	((-)1.57	(3.63)			
"	"	0.98	-	(-)0.13	(-)0.35	0.30***	(-)0.02	0.46	0.42
		(1.17)		((-)0.55)	((-)1.17)	(3.31)	((-)0.06)		

Note: Figures in parentheses are t-ratios and (**) indicates significance for a two-tail test at 5 per cent level and (***), at 1 per cent level.

Sources: (i) Estimates of per capita calorie intake, per capita agricultural income and prices (unit values) of cereals are from CDS [1975, p. 15].
(ii) Estimates of rural AMPCTCE are from NSSO [1971, pp. 213-230].
(iii) Estimates of per capita agricultural income and rural AMPCTCE at all-India rural prices are obtained using Fisher's state specific price indices relative to all-India for total population from Chatterjee and Bhattacharya [1974, pp. 346-347].
(iv) Estimates of Lorenz ratio of operational land holdings in different states for the year 1960-61 are from Sirohi, Ram and Singh [1976, p. 19].

TABLE 3B: ESTIMATED PARAMETERS OF THE MODEL ON INTER-STATE VARIATIONS IN RURAL AVERAGE PER CAPITA CALORIE INTAKE AND CEREAL CONSUMPTION: 1972-73

Regressand	Functional Form	Intercept	Agricultural Income Per Head of Rural Population (AIPHRP) at Current All-India Prices	Lorenz Ratio of Operational Land Distribution	Unit Values of Cereals	Foodgrain Production Per Head of Rural Population (FPPHRP)	Average Monthly Per Capita Total Consumer Expenditure (AMPCTCE) at Current All-India Prices	R-squre	R-squre Adjusted
Average per capita calorie intake	Double-log	7.90** (225.47)	-	-	(-)1.05*** ((-)7.11)	-	-	0.78	0.77
"	"	8.27*** (15.31)	(-)0.09 ((-)0.63)	(-)0.13 ((-)0.45)	(-)1.00*** ((-)3.66)	0.02 (0.17)	-	0.81	0.73
"	"	5.94*** (10.78)	-	-	(-)0.69*** ((-)4.57)	-	0.50*** (3.56)	0.89	0.87
"	"	5.72*** (7.20)	-	(-)0.17 ((-)0.79)	(-)0.58** ((-)2.46)	0.01 (0.18)	0.51*** (3.23)	0.90	0.86
Average per capita cereal consumption	Linear	27.01*** (11.31)	-	-	(-)9.86*** ((-)4.97)	-	-	0.64	0.61
"	"	31.41*** (7.04)	(-)0.00 ((-)0.16)	0.66 (0.08)	(-)12.49*** ((-)4.10)	(-)0.01 ((-)0.60)	-	0.72	0.62
"	"	33.58*** (5.45)	-	0.20 (0.02)	(-)13.27*** ((-)4.12)	(-)0.01 ((-)1.66)	(-)0.03 ((-)0.48)	0.72	0.62

Note: Figures in parentheses are t-ratios and (**) indicates significance for a two-tail test at 5 per cent level and (***), at 1 per cent level.

Sources: (i) Estimates of calorie intake are from NSSO [1983, pp. 5-6].

(ii) Estimates of average per capita cereal consumption are from NSSO [1979, pp. S 306 - S 330].

(iii) Estimates of unit values of cereals are obtained by dividing total consumer expenditure on cereals by cereal quantities consumed [NSSO, 1979, pp. S 306- S 330].

(iv) Estimates of statewise total agricultural income are from Chandhok and The Policy Group [1990, Vol. I, pp. 157-183].

(v) Estimates of statewise total foodgrain production are from Chandhok and The Policy Group [1990, Vol. II, p. 707].

(vi) Estimates of rural AMPCTCE at state-specific current prices are from NSSO [1979, pp. S 331- S 355].

(vii) Estimates of AIPHRP and rural AMPCTCE at current all-India rural prices are obtained using price indices from Jain and Minhas [1991, p. 14] and Minhas and Jain [1990, pp. 346-347].

(viii) Estimates of Lorenz ratio of operational land holdings in various states for the year 1971-72 are from Haque [1987, p. 317].

TABLE 3C: ESTIMATED PARAMETERS OF THE MODEL ON INTER-STATE VARIATIONS IN RURAL AVERAGE PER CAPITA CALORIE INTAKE AND CEREAL CONSUMPTION: 1973-74

Regressand	Functional form	Intercept	Agricultural Income Per Head of Rural Population (AIPHRP) at Current All-India Prices	Lorenz Ratio of Operational Land Distribution	Unit Values of Cereals	Foodgrain Production Per Head of Rural Population (FPPHRP)	Average Monthly Per Capita Total Consumer Expenditure (AMPCTCE) at Current All-India Prices	R-squre	R-squre Adjusted
Average per capita calorie intake	Double-log	7.95*** (192.41)	-	-	(-)0.59*** ((-)6.33)	-	-	0.74	0.72
"	"	7.42*** (10.37)	(-)0.07 ((-)0.51)	(-)0.09 ((-)0.39)	(-)0.35 ((-)2.02)	0.15 (1.40)	-	0.79	0.72
"	"	6.56*** (6.60)	-	(-)0.17 ((-)0.81)	(-)0.29 ((-)1.54)	0.10 (1.30)	0.15 (0.70)	0.80	0.72
Average per capita cereal consumption	Linear	23.67*** (12.61)	-	-	(-)5.57*** ((-)4.59)	-	-	0.60	0.57
"	"	29.65*** (9.55)	(-)0.01** ((-)2.27)	-	(-)7.32*** ((-)5.57)	-	-	0.71	0.67
"	"	29.52*** (6.31)	(-)0.01 (((-)1.14)	0.27 (0.03)	(-)7.31*** ((-)4.25)	0.00 (0.05)	-	0.71	0.61
"	"	31.11*** (5.18)	-	(-)3.33 ((-)0.37)	(-)7.26*** ((-)3.85)	(-)0.01 ((-)1.10)	(-)0.03 ((-)0.31)	0.68	0.57

Note: Figures in parentheses are t-ratios and (**) indicates significance for a two-tail test at 5 per cent level and (***), at 1 per cent level.

Sources: (i) Estimates of calorie intake are from Sengupta and Joshi [1978, p. 5].
(ii) Estimates of average per capita cereal consumption are from NSSO [1977, pp. S 39 - S 63].
(iii) Estimates of unit values of cereals are obtained by dividing total consumer expenditure on cereals by cereal quantities consumed [NSSO, 1977, pp. S 39- S 63].
(iv) Estimates of statewise total agricultural income are from Chandhok and The Policy Group [1990, Vol. I, pp. 157-183].
(v) Estimates of statewise total foodgrain production are from Chandhok and The Policy Group [1990, Vol. II, p. 707].
(vi) Estimates of rural AMPCTCE at state-specific current prices are from NSSO [1977, pp. S 14- S 38].
(vii) Estimates of AIPHRP and rural AMPCTCE at current all-India rural prices are obtained using price indices from Jain and Minhas [1991, p. 14] and Minhas and Jain [1990, pp. 346-347].
(viii) Estimates of Lorenz ratio of operational land holdings in various states for the year 1971-72 are from Haque [1987, p. 317].

TABLE 3D: ESTIMATED PARAMETERS OF THE MODEL ON INTER-STATE VARIATIONS IN RURAL AVERAGE PER CAPITA CEREAL CONSUMPTION: 1977-78

Regressand	Functional Form	Intercept	Agricultural Income Per Head of Rural Population (AIPHRP) at Current All-India Prices	Lorenz Ratio of Operational Land Distribution	Unit Values of Cereals	Foodgrain Production Per Head of Rural Population (FPPHRP)	Average Monthly Per Capita Total Consumer Expenditure (AMPCTCE) at Current All-India Prices	R-squre	R-squre Adjusted
Average per capita cereal consumption	Double-log	2.98*** (27.29)	-	-	(-)0.68** ((-)2.58)	-	-	0.32	0.27
"	"	4.72*** (5.05)	(-)0.44** ((-)2.83)	-	(-)0.80** ((-)2.41)	0.21** (2.34)	-	0.61	0.51
"	"	4.51*** (3.70)	-	-	(-)0.96** ((-)2.19)	0.06 (0.73)	(-)0.42 ((-)1.87)	0.50	0.37

Note: Figures in parentheses are t-ratios and (**) indicates significance for a two-tail test at 5 per cent level and (***), at 1 per cent level.

Sources: (i) Estimates of average per capita cereal consumption are from NSSO [1986a, pp. S 67 - S 87].
(ii) Estimates of unit values of cereals are obtained by dividing total consumer expenditure on cereals by cereal quantities consumed [NSSO, 1986a, pp. S 67- S 87].
(iii) Estimates of statewise total agricultural income are from Chandhok and The Policy Group [1990, Vol. I, pp. 157-183].
(iv) Estimates of statewise total foodgrain production are from Chandhok and The Policy Group [1990, Vol. II, p. 707].
(v) Estimates of rural AMPCTCE at state-specific current prices are from NSSO [1986a, pp. S 92- S 112].
(vi) Estimates of AIPHRP and rural AMPCTCE at current all-India rural prices are obtained using price indices from Jain and Minhas [1991, p. 14] and Minhas and Jain [1990, pp. 346-347].

TABLE 3E: ESTIMATED PARAMETERS OF THE MODEL ON INTER-STATE VARIATIONS IN RURAL AVERAGE PER CAPITA CALORIE INTAKE AND CEREAL CONSUMPTION: 1983

Regressand	Functional Form	Intercept	Agricultural Income Per Head of Rural Population (AIPHRP) at Current All-India Prices	Lorenz Ratio of Operational Land Distribution	Unit Values of Cereals	Foodgrain Production Per Head of Rural Population (FPPHRP)	Average Monthly Per Capita Total Consumer Expenditure (AMPCTCE) at Current All-India Prices	R-squre	R-squre Adjusted
Average per capita calorie intake	Linear	3398.80*** (11.42)	-	(-)1555.30** ((-)2.93)	(-)173.97** ((-)2.93)	0.63*** (4.34)	-	0.86	0.82
"	"	3457.60*** (9.33)	(-)0.04 ((-)0.29)	(-)1583.50** ((-)2.82)	(-)180.21** ((-)2.75)	0.68** (2.84)	-	0.86	0.81
"	"	3332.80*** (8.94)	-	(-)1593.30** ((-)2.82)	(-)166.19** ((-)2.50)	0.61*** (3.60)	0.65 (0.32)	0.86	0.81
Average per capita cereal consumption	Double-log	1.94*** (11.35)	-	(-)0.64** ((-)2.69)	-	0.08*** (3.33)	-	0.60	0.54
"	"	2.76*** (4.46)	(-)0.11 ((-)1.42)	(-)0.65** ((-)2.70)	(-)0.15 ((-)0.86)	0.08** (2.36)	-	0.67	0.54
"	"	3.59*** (3.38)	-	(-)0.54 ((-)2.17)	(-)0.20 ((-)1.11)	0.06 (1.86)	(-)0.28 ((-)1.57)	0.68	0.56

Note: Figures in parentheses are t-ratios and (**) indicates significance for a two-tail test at 5 per cent level and (***), at 1 per cent level.

Sources: (i) Estimates of calorie intake are from NSSO [1989b, p. 30].
(ii) Estimates of average per capita cereal consumption are from NSSO [1989b, pp. S 6 - S 25].
(iii) Estimates of unit values of cereals are obtained by dividing total consumer expenditure on cereals by cereal quantities consumed [NSSO, 1986, pp. S 6- S 25].
(iv) Estimates of statewise total agricultural income are from Chandhok and The Policy Group [1990, Vol. I, pp. 157-183].
(v) Estimates of statewise total foodgrain production are from Chandhok and The Policy Group [1990, Vol. II, p. 707].
(vi) Estimates of rural AMPCTCE at state-specific current prices are from NSSO [1989b, pp. S 46- S 67].
(vii) Estimates of AIPHRP and rural AMPCTCE at current all-India rural prices are obtained using price indices from Jain and Minhas [1991, p. 14] and Minhas and Jain [1990, pp. 346-347].
(viii) Estimates of Lorenz ratio of operational land holdings in various states for the year 1981-82 are from Haque [1987, p. 317].

TABLE 3F: ESTIMATED PARAMETERS OF THE MODEL ON INTER-STATE VARIATIONS IN RURAL AVERAGE PER CAPITA CEREAL CONSUMPTION: 1986-87

Regressand	Functional Form	Intercept	Agricultural Income Per Head of Rural Population (AIPHRP) at Current All-India Prices	Lorenz Ratio of Operational Land Distribution	Unit Values of Cereals	Foodgrain Production Per Head of Rural Population (FPPHRP)	Average Monthly Per Capita Total Consumer Expenditure (AMPCTCE) at Current All-India Prices	R-squre	R-squre Adjusted
Average per capita cereal consumption	Double-log	2.52** (2.27)	(-)0.19 ((-)1.14)	(-)0.95** ((-)2.77)	(-)0.02 ((-)0.07)	0.17 (2.02)	-	0.51	0.33
"	"	2.19*** (10.89)	-	(-)0.82** ((-)2.26)	-	-	-	0.27	0.21
"	"	2.58 (1.68)	-	(-)0.87** ((-)2.43)	(-)0.02 ((-)0.06)	0.12 (1.69)	(-)0.21 ((-)0.80)	0.48	0.29

Note: Figures in parentheses are t-ratios and (**) indicates significance for a two-tail test at 5 per cent level and (***), at 1 per cent level.

Sources: (i) Estimates of average per capita cereal consumption are from NSSO [1989a, pp. S 18 - S 46].
(ii) Estimates of unit values of cereals are obtained by dividing total consumer expenditure on cereals by cereal quantities consumed [NSSO, 1989a, pp. S 18- S 46].
(iii) Estimates of statewise total agricultural income are from Chandhok and The Policy Group [1990, Vol. I, pp. 157-183].
(iv) Estimates of statewise total foodgrain production are from Chandhok and The Policy Group [1990, Vol. II, p. 707].
(v) Estimates of rural AMPCTCE at state-specific current prices are from NSSO [1989a, pp. S 47- S 76].
(vi) Estimates of AIPHRP and rural AMPCTCE at current all-India rural prices are obtained using price indices from Minhas and Jain [1990, pp. 346-347] and Tendulkar and Jain [1993, p. 290].
(vii) Estimates of Lorenz ratio of operational land holdings in various states for the year 1981-82 are from Haque [1987, p. 317].

TABLE 3C: ESTIMATED PARAMETERS OF THE MODEL ON INTER-STATE VARIATIONS IN RURAL AVERAGE PER CAPITA CALORIE INTAKE AND CEREAL CONSUMPTION: 1987-88

Regressand	Functional Form	Intercept	Agricultural Income Per Head of Rural Population (AIPHRP) at Current All-India Prices	Unit Values of Cereals	Foodgrain Production Per Head of Rural Population (FPPHRP)	Average Monthly Per Capita Total Consumer Expenditure (AMPCTCE) at Current All-India Prices	R-squre	R-squre Adjusted
Average per capita cereal consumption	Double-log	4.84*** (5.75)	(-)0.49** ((-)2.97)	-	0.25*** (3.22)	-	0.45	0.36
"	"	5.01*** (5.21)	(-)0.50** ((-)2.91)	(-)0.07 ((-)0.41)	0.25** (2.99)	-	0.45	0.32
"	"	4.06** (2.71)	-	(-)0.13 ((-)0.54)	0.06 (1.00)	(-)0.31 ((-)1.14)	0.16	(-)0.05

Note: Figures in parentheses are t-ratios and (**) indicates significance for a two-tail test at 5 per cent level and (***), at 1 per cent level.

Sources: (i) Estimates of average per capita cereal consumption are from NSSO [1991, pp. S 97 - S 127].
(ii) Estimates of unit values of cereals are obtained by dividing total consumer expenditure on cereals by cereal quantities consumed [NSSO, 1991, pp. S 97- S 127 & S 159 - S 189].
(iii) Estimates of statewise total agricultural income are from Chandhok and The Policy Group [1990, Vol. I, pp. 157-183].
(iv) Estimates of statewise total foodgrain production are from Chandhok and The Policy Group [1990, Vol. II, p. 707].
(v) Estimates of rural AMPCTCE at state-specific current prices are from NSSO [1991, pp. S 35- S 65].
(vi) Estimates of AIPHRP and rural AMPCTCE at current all-India rural prices are obtained using price indices from Minhas and Jain [1990, pp. 346-347] and Tendulkar and Jain [1993, p. 290].

TABLE 4A: ESTIMATED PARAMETERS OF THE MODEL ON INTER-STATE VARIATIONS IN URBAN AVERAGE PER CAPITA CALORIE INTAKE AND CEREAL CONSUMPTION: 1961-62

Regressand	Functional Form	Intercept	Per Capita Non-Agricultural Income at Current All-India Urban Prices	Unit Values of Cereals	Per Capita Foodgrain Production	Average Monthly Per Capita Total Consumer Expenditure (AMPCTCE) at Current All-India Prices	R-squre	R-squre Adjusted
Average per capita calorie intake	Double-log	6.86*** (24.92)	-	-	0.15** (2.89)	-	0.39	0.34
"	"	6.76*** (11.44)	0.01 (0.19)	(-)0.26 ((-)1.51)	0.12 (2.14)	-	0.50	0.36
"	"	4.80*** (6.19)	-	(-)0.51*** ((-)3.16)	0.11** (2.40)	0.58** (2.75)	0.70	0.62

Note: Figures in parentheses are t-ratios and (**) indicates significance for a two-tail test at 5 per cent level and (***), at 1 per cent level.

Sources: (i) Estimates of urban average per capita calorie intake, per capita non-agricultural income and price (unit values) of cereals are from CDS [1975, p. 15].
(ii) Estimates of urban AMPCTCE are from NSSO [1971, pp. 400-417].
(iii) Estimates of per capita non-agricultural income and urban AMPCTCE at all-India urban prices are obtained using Fisher's state specific price indices relative to all-India for urban total population from Minhas, Jain and Saluja [1990, p. 229].

TABLE 4B: ESTIMATED PARAMETERS OF THE MODEL ON INTER-STATE VARIATIONS IN URBAN AVERAGE PER CAPITA CALORIE INTAKE AND CEREAL CONSUMPTION: 1972-73

Regressand	Functional Form	Intercept	Non-Agricultural Income Per Head of Urban Population (NAIPHUP) at Current All-India Urban Prices	Unit Values of Cereals	State Per Capita Foodgrain Production	Average Monthly Per Capita Total Consumer Expenditure (AMPCTCE) at Current All-India Prices	R-squre	R-squre Adjusted
Average per capita calorie intake	Linear	2551.90***	-	(-)462.96**	1.14***	-	0.78	0.74
		(9.54)		((-)2.71)	(3.31)			
"	"	2563.50***	0.08	(-)556.72**	0.97**	-	0.78	0.73
		(9.38)	(0.72)	((-)2.55)	(2.29)			
"	"	2548.20***	-	(-)475.50	1.11**	0.43	0.78	0.72
		(9.04)		((-)2.06)	(2.25)	(0.09)		
Average per capita cereal consumption	Double-log	1.71***	-	-	0.15**	-	0.31	0.26
		(5.59)			(2.48)			
"	"	3.43**	(-)0.24	0.03	0.16	-	0.42	0.28
		(2.87)	((-)1.34)	(0.14)	(1.97)			
"	"	3.09***	-	0.19	0.22**	(-)0.44	0.49	0.37
		(4.34)		(0.72)	(2.48)	((-)1.92)		

Note: Figures in parentheses are t-ratios and (**) indicates significance for a two-tail test at 5 per cent level and (***), at 1 per cent level.

Sources: (i) Estimates of urban average calorie intake are from NSSO [1983, pp. 7-8].

(ii) Estimates of urban average per capita cereal consumption are from NSSO [1979, pp. S 370 - S 396].

(iii) Estimates of urban unit values of cereals are obtained by dividing total consumer expenditure on cereals by cereal quantities consumed [NSSO, 1979, pp. S 370 - S 396].

(iv) Estimates of statewise total non-agricultural income are from Chandhok and The Policy Group [1990, Vol. I, pp. 157-183].

(v) Estimates of statewise total foodgrain production are from Chandhok and The Policy Group [1990, Vol. II, p. 707].

(vi) Estimates of urban AMPCTCE at state-specific current prices are from NSSO [1979, pp. S 397- S 423].

(vii) Estimates of NAIPHUP and urban AMPCTCE at current all-India urban prices are obtained using price indices from Jain and Minhas [1991, p. 19] and Minhas, Jain and Saluja [1990, p. 229].

TABLE 4C: ESTIMATED PARAMETERS OF THE MODEL ON INTER-STATE VARIATIONS IN URBAN AVERAGE PER CAPITA CALORIE INTAKE AND CEREAL CONSUMPTION: 1973-74

Regressand	Functional Form	Intercept	Non-Agricultural Income Per Head of Urban Population (NAIPHUP) at Current All-India Urban Prices	Unit Values of Cereals	State Per Capita Foodgrain Production	Average Monthly Per Capita Total Consumer Expenditure (AMPCTCE) at Current All-India Prices	R-squre	R-squre Adjusted
Average per capita calorie intake	Double-log	7.76*** (257.46)	-	(-)0.20*** ((-)3.44)	-	-	0.46	0.42
"	"	7.63*** (9.15)	(-)0.02 ((-)0.18)	(-)0.14 ((-)1.90)	0.05 (1.09)	-	0.51	0.39
"	"	7.62*** (8.69)	-	(-)0.14 ((-)1.89)	0.05 (1.16)	(-)0.03 ((-)0.16)	0.51	0.39
Average per capita cereal consumption	Double-log	1.64*** (4.47)	-	-	0.16** (2.25)	-	0.26	0.21
"	"	2.92** (1.56)	(-)0.12 ((-)0.53)	(-)0.16 ((-)0.96)	0.09 (0.99)	-	0.32	0.15
"	"	4.56** (2.48)	-	(-)0.14 ((-)0.89)	0.15 (1.64)	(-)0.67 ((-)1.46)	0.41	0.27

Note: Figures in parentheses are t-ratios and (**) indicates significance for a two-tail test at 5 per cent level and (***), at 1 per cent level.

Sources: (i) Estimates of urban average calorie intake are from Sengupta and Joshi [1978, p. 5].
(ii) Estimates of urban average per capita cereal consumption are from NSSO [1977, pp. S 105 - S 134].
(iii) Estimates of urban unit values of cereals are obtained by dividing total consumer expenditure on cereals by cereal quantities consumed [NSSO, 1977, pp. S 105 -S 134].
(iv) Estimates of statewise total non-agricultural income are from Chandhok and The Policy Group [1990, Vol. I, pp. 157-183].
(v) Estimates of statewise total foodgrain production are from Chandhok and The Policy Group [1990, Vol. II, p. 707].
(vi) Estimates of urban AMPCTCE at state-specific current prices are from NSSO [1977, pp. S 78 - S 104].
(vii) Estimates of NAIPHUP and urban AMPCTCE at current all-India urban prices are obtained using price indices from Jain and Minhas [1991, p. 19] and Minhas, Jain and Saluja [1990, p. 229].

TABLE 4D: ESTIMATED PARAMETERS OF THE MODEL ON INTER-STATE VARIATIONS IN URBAN AVERAG PER CAPITA CEREAL CONSUMPTION: 1977-78

Regressand	Functional Form	Intercept	Non-Agricultural Income Per Head of Urban Population (NAIPHUP) at Current All-India Urban Prices	Unit Values of Cereals	State Per Capita Foodgrain Production	Average Monthly Per Capita Total Consumer Expenditure (AMPCTCE) at Current All-India Prices	R-squre	R-squre Adjusted
Average per capita cereal consumption	Double-log	8.13*** (20.95)	(-)0.09 ((-)1.67)	0.07 (0.72)	0.05 (1.64)	-	0.29	0.11
"	"	5.50*** (3.38)	-	-	0.16** (2.47)	(-)0.85** ((-)2.15)	0.35	0.25
"	"	5.34*** (3.12)	-	0.13 (0.46)	0.18** (2.27)	(-)0.85 ((-)2.09)	0.36	0.20

Note: Figures in parentheses are t-ratios and (**) indicates significance for a two-tail test at 5 per cent level and (***), at 1 per cent level.

Sources: (i) Estimates of urban average per capita cereal consumption are from NSSO [1986a, pp. S 131 - S 152].
(ii) Estimates of urban unit values of cereals are obtained by dividing total consumer expenditure on cereals by cereal quantities consumed [NSSO, 1986a, pp. S 131 - S 152].
(iii) Estimates of statewise total non-agricultural income are from Chandhok and The Policy Group [1990, Vol. I, pp. 157-183].
(iv) Estimates of statewise total foodgrain production are from Chandhok and The Policy Group [1990, Vol. II, p. 707].
(v) Estimates of urban AMPCTCE at state-specific current prices are from NSSO [1986a, pp. S 158 - S 179].
(vi) Estimates of NAIPHUP and urban AMPCTCE at current all-India urban prices are obtained using price indices from Jain and Minhas [1991, p. 19] and Minhas, Jain and Saluja [1990, p. 229].

TABLE 4E: ESTIMATED PARAMETERS OF THE MODEL ON INTER-STATE VARIATIONS IN URBAN AVERAGE PER CAPITA CALORIE INTAKE AND CEREAL CONSUMPTION: 1983

Regressand	Functional Form	Intercept	Non-Agricultural Income Per Head of Urban Population (NAIPHUP) at Current All-India Urban Prices	Unit Values of Cereals	State Per Capita Foodgrain Production	Average Monthly Per Capita Total Consumer Expenditure (AMPCTCE) at Current All-India Prices	R-squre	R-squre Adjusted
Average per capita calorie intake	Double-log	8.13*** (20.95)	(-)0.09 ((-)1.67)	0.07 (0.72)	0.05 (1.64)	-	0.29	0.11
"	"	8.23*** (12.18)	-	(-)0.02 ((-)0.18)	0.03 (1.03)	(-)0.14 ((-)1.03)	0.19	(-)0.01
Average per capita cereal consumption	Double-log	2.75 (2.01)	(-)0.09 ((-)0.46)	0.17 (0.52)	0.06 (0.56)	-	0.03	(-)0.21
"	"	5.70** (2.86)	-	0.07 (0.26)	0.07 (0.94)	(-)0.72 ((-)1.84)	0.23	0.04

Note: Figures in parentheses are t-ratios and (**) indicates significance for a two-tail test at 5 per cent level and (***), at 1 per cent level.

Sources: (i) Estimates of urban average calorie intake are from NSSO [1989b, p. 31].
(ii) Estimates of urban average per capita cereal consumption are from NSSO [1989c, pp. S 131 - S 150].
(iii) Estimates of urban unit values of cereals are obtained by dividing total consumer expenditure on cereals by cereal quantities consumed [NSSO, 1989c, pp. S 131 - S 150].
(iv) Estimates of statewise total non-agricultural income are from Chandhok and The Policy Group [1990, Vol. I, pp. 157-183].
(v) Estimates of statewise total foodgrain production are from Chandhok and The Policy Group [1990, Vol. II, p. 707].
(vi) Estimates of urban AMPCTCE at state-specific current prices are from NSSO [1986b, pp. S 74- S 96].
(vii) Estimates of NAIPHUP and urban AMPCTCE at current all-India urban prices are obtained using price indices from Jain and Minhas [1991, p. 19] and Minhas, Jain and Saluja [1990, p. 229].

TABLE 5A: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: ANDHRA PRADESH RURAL

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	10.52	0.05	6.04	16.60
	(63.35)	(0.28)	(36.37)	(100.00)
October, 1972 - Sept., 1973	8.96	0.12	6.17	15.25
	(58.75)	(0.79)	(40.46)	(100.00)
October, 1973 - June, 1974	10.60	0.13	5.07	15.80
	(67.09)	(0.82)	(32.09)	(100.00)
July, 1977 - June, 1978	10.86	0.11	4.89	15.86
	(68.47)	(0.69)	(30.83)	(100.00)
January-December, 1983	11.79	0.12	3.46	15.37
	(76.71)	(0.78)	(22.51)	(100.00)
July, 1986 - June, 1987	10.96	0.15	2.89	14.00
	(78.29)	(1.07)	(20.64)	(100.00)
July, 1987 - June, 1988	11.39	0.14	2.82	14.35
	(79.37)	(0.98)	(19.65)	(100.00)
July, 1988 - June, 1989	11.78	0.20	2.17	14.15
	(83.25)	(1.41)	(15.34)	(100.00)
July, 1989 - June, 1990	12.58	0.24	1.49	14.31
	(87.91)	(1.67)	(10.41)	(100.00)
July, 1990 - June, 1991	11.67	0.13	1.82	13.62
	(85.68)	(0.95)	(13.36)	(100.00)
Percentage change in 1990-91 over 1961-62	6.92	0.48	(-)25.41	(-)18.00

Note: Figures in parentheses are percentage shares in total cereal consumption.

TABLE 5B: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: ASSAM RURAL

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	16.72	0.32	0.02	17.06
	(98.01)	(1.86)	(0.11)	(100.00)
October, 1972 - Sept., 1973	14.33	0.48	0.00	14.81
	(96.76)	(3.24)	(0.00)	(100.00)
October, 1973 - June, 1974	14.85	0.48	0.00	15.33
	(96.87)	(3.13)	(0.00)	(100.00)
July, 1977 - June, 1978	13.55	0.79	0.04	14.38
	(94.23)	(5.49)	(0.28)	(100.00)
January-December, 1983	13.56	0.67	0.02	14.25
	(95.16)	(4.70)	(0.14)	(100.00)
July, 1986 - June, 1987	12.55	0.69	0.03	13.27
	(94.57)	(5.20)	(0.23)	(100.00)
July, 1987 - June, 1988	13.46	0.77	0.03	14.26
	(94.39)	(5.39)	(0.21)	(100.00)
July, 1988 - June, 1989	13.52	0.77	0.00	14.29
	(94.61)	(5.39)	(0.00)	(100.00)
July, 1989 - June, 1990	13.44	0.49	0.00	13.93
	(96.48)	(3.52)	(0.00)	(100.00)
July, 1990 - June, 1991	13.09	0.59	0.00	13.68
	(95.69)	(4.31)	(0.00)	(100.00)
Percentage change in 1990-91 over 1961-62	(-)21.28	1.58	(-)0.12	(-)19.81

Note: Figures in parentheses are percentage shares in total cereal consumption.

TABLE 5C: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: BIHAR RURAL

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	12.15	2.80	3.14	18.08
	(67.20)	(15.48)	(17.34)	(100.00)
October, 1972 - Sept., 1973	7.83	4.10	3.91	15.84
	(49.43)	(25.88)	(24.68)	(100.00)
October, 1973 - June, 1974	8.82	3.22	3.16	15.20
	(58.03)	(21.18)	(20.79)	(100.00)
July, 1977 - June, 1978	9.09	4.73	2.53	16.35
	(55.60)	(28.93)	(15.47)	(100.00)
January-December, 1983	6.66	5.56	3.66	15.88
	(41.94)	(35.01)	(23.05)	(100.00)
July, 1986 - June, 1987	8.99	5.30	1.15	15.44
	(58.23)	(34.33)	(7.45)	(100.00)
July, 1987 - June, 1988	8.88	5.57	1.09	15.54
	(57.14)	(35.84)	(7.01)	(100.00)
July, 1988 - June, 1989	9.06	5.62	1.29	15.97
	(56.73)	(35.19)	(8.08)	(100.00)
July, 1989 - June, 1990	8.58	5.88	0.68	15.14
	(56.67)	(38.84)	(4.49)	(100.00)
July, 1990 - June, 1991	9.22	6.13	1.10	16.45
	(56.05)	(37.26)	(6.69)	(100.00)
Percentage change in 1990-91 over 1961-62	(-)16.20	18.41	(-)11.28	(-)9.07

Note: Figures in parentheses are percentage shares in total cereal consumption.

TABLE 5D: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: GUJARAT RURAL

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	2.43	2.30	11.03	15.75
	(15.40)	(14.57)	(70.02)	(100.00)
October, 1972 - Sept., 1973	1.60	3.68	8.05	13.33
	(12.00)	(27.61)	(60.39)	(100.00)
October, 1973 - June, 1974	1.35	3.66	8.86	13.87
	(9.73)	(26.39)	(63.88)	(100.00)
July, 1977 - June, 1978	1.77	3.60	8.13	13.50
	(13.11)	(26.67)	(60.22)	(100.00)
January-December, 1983	1.93	2.81	7.87	12.61
	(15.31)	(22.28)	(62.41)	(100.00)
July, 1986 - June, 1987	1.83	3.35	5.95	11.13
	(16.44)	(30.10)	(53.46)	(100.00)
July, 1987 - June, 1988	1.88	4.69	5.47	12.04
	(15.61)	(38.95)	(45.43)	(100.00)
July, 1988 - June, 1989	1.94	3.51	6.77	12.22
	(15.88)	(28.72)	(55.40)	(100.00)
July, 1989 - June, 1990	2.02	4.39	5.81	12.22
	(16.56)	(35.98)	(47.62)	(100.00)
July, 1990 - June, 1991	2.59	4.12	5.04	11.75
	(22.04)	(35.06)	(42.89)	(100.00)
Percentage change in 1990-91 over 1961-62	1.02	11.55	(-)8.01	(-)25.44

Note: Figures in parentheses are percentage shares in total cereal consumption.

TABLE 5E: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: HARYANA RURAL

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	2.05	11.09	5.15	18.30
	(11.22)	(60.63)	(28.15)	(100.00)
October, 1972 - Sept., 1973	1.15	12.51	4.55	18.21
	(6.32)	(68.70)	(24.99)	(100.00)
October, 1973 - June, 1974	0.72	10.95	5.13	16.80
	(4.29)	(65.18)	(30.54)	(100.00)
July, 1977 - June, 1978	1.26	12.24	2.10	15.60
	(8.08)	(78.46)	(13.46)	(100.00)
January-December, 1983	0.96	11.34	2.33	14.63
	(6.56)	(77.51)	(15.93)	(100.00)
July, 1986 - June, 1987	1.04	12.80	1.23	15.07
	(6.90)	(84.94)	(8.16)	(100.00)
July, 1987 - June, 1988	0.85	13.42	0.86	15.13
	(5.62)	(88.70)	(5.68)	(100.00)
July, 1988 - June, 1989	0.86	12.05	2.02	14.93
	(5.76)	(80.71)	(13.53)	(100.00)
July, 1989 - June, 1990	1.01	12.35	0.38	13.74
	(7.35)	(89.88)	(2.77)	(100.00)
July, 1990 - June, 1991	0.73	12.53	0.89	14.15
	(5.16)	(88.55)	(6.29)	(100.00)
Percentage change in 1990-91 over 1961-62	(-)7.22	7.87	(-)23.29	(-)22.64

Notes: (i) Figures in parentheses are percentage shares in total cereal consumption.
(ii) The estimates for the year 1961-62 are based on the data for the undivided Punjab and hence are not strictly comparable with the estimates for the remaining years.

TABLE 5F: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: JAMMU AND KASHMIR RURAL

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	13.04	3.28	6.15	22.48
	(58.03)	(14.61)	(27.35)	(100.00)
October, 1972 - Sept., 1973	10.10	3.97	4.65	18.72
	(53.95)	(21.21)	(24.84)	(100.00)
October, 1973 - June, 1974	10.90	2.98	5.21	19.09
	(57.09)	(15.61)	(27.29)	(100.00)
July, 1977 - June, 1978	10.71	3.95	3.35	18.01
	(59.47)	(21.93)	(18.60)	(100.00)
January-December, 1983	10.25	4.68	2.68	17.61
	(58.21)	(26.58)	(15.22)	(100.00)
July, 1986 - June, 1987	10.79	3.93	3.16	17.88
	(60.35)	(21.98)	(17.67)	(100.00)
July, 1987 - June, 1988	9.71	5.15	2.44	17.30
	(56.13)	(29.77)	(14.10)	(100.00)
July, 1988 - June, 1989	-	-	-	-
July, 1989 - June, 1990	-	-	-	-
July, 1990 - June, 1991	-	-	-	-
Percentage change in 1987-88 over 1961-62	(-)14.81	8.32	(-)16.50	(-)23.04

Note: Figures in parentheses are percentage shares in total cereal consumption.

TABLE 5G: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: KARNATAKA RURAL

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	6.52	0.57	12.70	19.79
	(32.96)	(2.88)	(64.17)	(100.00)
October, 1972 - Sept., 1973	4.61	0.70	10.36	15.67
	(29.42)	(4.47)	(66.11)	(100.00)
October, 1973 - June, 1974	4.77	0.31	10.56	15.64
	(30.50)	(1.98)	(67.52)	(100.00)
July, 1977 - June, 1978	4.40	0.47	10.22	15.09
	(29.16)	(3.11)	(67.73)	(100.00)
January-December, 1983	5.32	0.53	9.26	15.11
	(35.21)	(3.51)	(61.28)	(100.00)
July, 1986 - June, 1987	5.04	0.73	7.47	13.24
	(38.07)	(5.51)	(56.42)	(100.00)
July, 1987 - June, 1988	5.16	0.80	7.84	13.80
	(37.39)	(5.80)	(56.81)	(100.00)
July, 1988 - June, 1989	4.96	0.75	7.63	13.34
	(37.18)	(5.62)	(57.20)	(100.00)
July, 1989 - June, 1990	4.93	0.78	6.40	12.11
	(40.71)	(6.44)	(52.85)	(100.00)
July, 1990 - June, 1991	4.46	0.93	6.23	11.62
	(38.38)	(8.00)	(53.61)	(100.00)
Percentage change in 1990-91 over 1961-62	(-)10.41	1.82	(-)32.69	(-)41.28

Note: Figures in parentheses are percentage shares in total cereal consumption.

TABLE 5H: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: KERALA RURAL

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	9.83	0.07	0.02	9.92
	(99.06)	(0.75)	(0.19)	(100.00)
October, 1972 - Sept., 1973	7.39	0.55	0.04	7.98
	(92.61)	(6.89)	(0.50)	(100.00)
October, 1973 - June, 1974	7.33	0.29	0.09	7.71
	(95.07)	(3.76)	(1.17)	(100.00)
July, 1977 - June, 1978	9.92	0.26	0.05	10.23
	(96.97)	(2.54)	(0.49)	(100.00)
January-December, 1983	9.40	0.61	0.05	10.06
	(93.44)	(6.06)	(0.50)	(100.00)
July, 1986 - June, 1987	9.54	0.72	0.11	10.37
	(92.00)	(6.94)	(1.06)	(100.00)
July, 1987 - June, 1988	9.74	0.63	0.05	10.42
	(93.47)	(6.05)	(0.48)	(100.00)
July, 1988 - June, 1989	9.06	0.70	0.00	9.76
	(92.83)	(7.17)	(0.00)	(100.00)
July, 1989 - June, 1990	8.98	0.77	0.00	9.75
	(92.10)	(7.90)	(0.00)	(100.00)
July, 1990 - June, 1991	9.83	0.90	0.00	10.73
	(91.61)	(8.39)	(0.00)	(100.00)
Percentage change in 1990-91 over 1961-62	0.00	8.37	(-)0.20	8.17

Note: Figures in parentheses are percentage shares in total cereal consumption.

TABLE 5I: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: MADHYA PRADESH RURAL

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	8.84	5.34	6.73	20.90
	(42.28)	(25.54)	(32.19)	(100.00)
October, 1972 - Sept., 1973	8.10	4.34	5.05	17.49
	(46.31)	(24.81)	(28.87)	(100.00)
October, 1973 - June, 1974	6.55	5.47	5.31	17.33
	(37.80)	(31.56)	(30.64)	(100.00)
July, 1977 - June, 1978	6.26	4.75	5.27	16.28
	(38.45)	(29.18)	(32.37)	(100.00)
January-December, 1983	6.41	5.40	4.22	16.03
	(39.99)	(33.69)	(26.33)	(100.00)
July, 1986 - June, 1987	5.90	6.30	3.10	15.30
	(38.56)	(41.18)	(20.26)	(100.00)
July, 1987 - June, 1988	6.64	5.93	2.89	15.46
	(42.95)	(38.36)	(18.69)	(100.00)
July, 1988 - June, 1989	5.93	5.44	4.04	15.41
	(38.48)	(35.30)	(26.22)	(100.00)
July, 1989 - June, 1990	5.90	5.88	2.82	14.60
	(40.41)	(40.27)	(19.32)	(100.00)
July, 1990 - June, 1991	5.40	5.95	3.87	15.22
	(35.48)	(39.09)	(25.43)	(100.00)
Percentage change in 1990-91 over 1961-62	(-)16.45	2.92	(-)13.68	(-)27.21

Note: Figures in parentheses are percentage shares in total cereal consumption.

TABLE 5J: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: MAHARASHTRA RURAL

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	3.79	1.35	10.93	16.07
	(23.57)	(8.42)	(68.00)	(100.00)
October, 1972 - Sept., 1973	2.02	2.74	7.88	12.64
	(15.98)	(21.68)	(62.34)	(100.00)
October, 1973 - June, 1974	2.39	1.32	9.77	13.48
	(17.73)	(9.79)	(72.48)	(100.00)
July, 1977 - June, 1978	2.59	1.66	9.32	13.57
	(19.09)	(12.23)	(68.68)	(100.00)
January-December, 1983	2.69	1.59	9.55	13.83
	(19.45)	(11.50)	(69.05)	(100.00)
July, 1986 - June, 1987	2.99	2.39	6.50	11.88
	(2.17)	(20.12)	(54.71)	(100.00)
July, 1987 - June, 1988	2.83	2.26	7.97	13.06
	(21.67)	(17.30)	(61.03)	(100.00)
July, 1988 - June, 1989	3.00	2.48	6.99	12.47
	(24.06)	(19.89)	(56.05)	(100.00)
July, 1989 - June, 1990	2.91	2.41	6.57	11.89
	(24.47)	(20.27)	(55.26)	(100.00)
July, 1990 - June, 1991	3.20	2.22	6.06	11.48
	(27.87)	(19.34)	(52.79)	(100.00)
Percentage change in 1990-91 over 1961-62	(-)3.67	5.41	(-)30.30	(-)28.56

Note: Figures in parentheses are percentage shares in total cereal consumption.

TABLE 5K: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: ORISSA RURAL

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	17.17	0.07	0.99	18.22
	(94.23)	(0.36)	(5.43)	(100.00)
October, 1972 - Sept., 1973	13.36	0.77	1.09	15.22
	(87.78)	(5.06)	(7.16)	(100.00)
October, 1973 - June, 1974	14.67	0.34	0.87	15.88
	(92.38)	(2.14)	(5.48)	(100.00)
July, 1977 - June, 1978	14.35	0.54	1.09	15.98
	(89.80)	(3.38)	(6.82)	(100.00)
January-December, 1983	13.80	1.08	0.74	15.62
	(88.35)	(6.91)	(4.74)	(100.00)
July, 1986 - June, 1987	14.37	0.06	1.62	16.05
	(89.53)	(0.37)	(10.09)	(100.00)
July, 1987 - June, 1988	14.35	0.63	0.74	15.72
	(91.29)	(4.01)	(4.71)	(100.00)
July, 1988 - June, 1989	15.59	0.70	0.54	16.83
	(92.63)	(4.16)	(3.21)	(100.00)
July, 1989 - June, 1990	15.60	0.53	0.39	16.52
	(94.43)	(3.21)	(2.36)	(100.00)
July, 1990 - June, 1991	15.01	0.49	0.48	15.98
	(93.93)	(3.07)	(3.00)	(100.00)
Percentage change in 1990-91 over 1961-62	(-)11.85	2.30	(-)2.80	(-)12.34

Note: Figures in parentheses are percentage shares in total cereal consumption.

TABLE 5L: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: PUNJAB RURAL

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	2.05	11.09	5.15	18.30
	(11.22)	(60.63)	(28.15)	(100.00)
October, 1972 - Sept., 1973	1.03	10.88	3.56	15.47
	(6.66)	(70.33)	(23.01)	(100.00)
October, 1973 - June, 1974	0.97	10.85	3.12	14.94
	(6.49)	(72.62)	(20.88)	(100.00)
July, 1977 - June, 1978	1.02	11.49	2.07	14.58
	(7.00)	(78.81)	(14.20)	(100.00)
January-December, 1983	0.99	11.63	0.99	13.61
	(7.27)	(85.45)	(7.27)	(100.00)
July, 1986 - June, 1987	0.74	10.59	0.64	11.97
	(6.18)	(88.47)	(5.35)	(100.00)
July, 1987 - June, 1988	0.71	11.09	0.71	12.51
	(5.68)	(88.65)	(5.68)	(100.00)
July, 1988 - June, 1989	0.91	11.13	0.40	12.44
	(7.32)	(89.47)	(3.22)	(100.00)
July, 1989 - June, 1990	0.64	11.34	0.31	12.29
	(5.21)	(92.27)	(2.52)	(100.00)
July, 1990 - June, 1991	0.74	10.76	0.19	11.69
	(6.33)	(92.04)	(1.63)	(100.00)
Percentage change in 1990-91 over 1961-62	(-)7.16	(-)1.80	(-)27.12	(-)36.09

Notes: (i) Figures in parentheses are percentage shares in total cereal consumption.
(ii) The estimates for the year 1961-62 are based on the data for the undivided Punjab and hence are not strictly comparable with the estimates for the remaining years.

TABLE 5M: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: RAJASTHAN RURAL

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	0.40	3.86	17.98	22.25
	(1.80)	(17.36)	(80.81)	(100.00)
October, 1972 - Sept., 1973	0.26	5.53	13.03	18.82
	(1.38)	(29.38)	(69.23)	(100.00)
October, 1973 - June, 1974	0.31	5.02	13.94	19.27
	(1.61)	(26.05)	(72.34)	(100.00)
July, 1977 - June, 1978	0.75	8.34	9.59	18.68
	(4.01)	(44.65)	(51.34)	(100.00)
January-December, 1983	0.29	7.60	9.48	17.37
	(1.67)	(43.75)	(54.58)	(100.00)
July, 1986 - June, 1987	0.35	11.18	5.32	16.85
	(2.08)	(66.35)	(31.57)	(100.00)
July, 1987 - June, 1988	0.19	11.98	4.49	16.66
	(1.14)	(71.91)	(26.95)	(100.00)
July, 1988 - June, 1989	0.33	9.08	6.96	16.37
	(2.02)	(55.47)	(42.52)	(100.00)
July, 1989 - June, 1990	0.21	9.00	6.33	15.54
	(1.35)	(57.92)	(40.73)	(100.00)
July, 1990 - June, 1991	0.24	10.45	5.06	15.75
	(1.52)	(66.35)	(32.13)	(100.00)
Percentage change in 1990-91 over 1961-62	(-)0.72	29.63	(-)58.09	(-)29.18

Note: Figures in parentheses are percentage shares in total cereal consumption.

TABLE 5N: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: TAMIL NADU RURAL

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	11.15	0.11	4.45	15.71
	(70.96)	(0.71)	(28.33)	(100.00)
October, 1972 - Sept., 1973	9.71	0.07	4.75	14.53
	(66.83)	(0.48)	(32.69)	(100.00)
October, 1973 - June, 1974	10.53	0.08	4.11	14.72
	(71.54)	(0.54)	(27.92)	(100.00)
July, 1977 - June, 1978	9.20	0.17	4.49	13.86
	(66.38)	(1.23)	(32.40)	(100.00)
January-December, 1983	8.60	0.41	4.06	13.07
	(65.80)	(3.14)	(31.06)	(100.00)
July, 1986 - June, 1987	9.49	0.27	2.54	12.30
	(77.15)	(2.20)	(20.65)	(100.00)
July, 1987 - June, 1988	9.57	0.22	2.48	12.27
	(78.00)	(1.79)	(20.21)	(100.00)
July, 1988 - June, 1989	10.03	0.29	2.31	12.63
	(79.41)	(2.30)	(18.29)	(100.00)
July, 1989 - June, 1990	10.10	0.30	2.03	12.43
	(81.26)	(2.41)	(16.33)	(100.00)
July, 1990 - June, 1991	10.54	0.22	1.44	12.20
	(86.40)	(1.80)	(11.80)	(100.00)
Percentage change in 1990-91 over 1961-62	(-)3.88	0.70	(-)19.16	(-)22.34

Note: Figures in parentheses are percentage shares in total cereal consumption.

TABLE 5O: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: UTTAR PRADESH RURAL

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	5.38	5.45	7.46	18.30
	(29.42)	(29.78)	(40.79)	(100.00)
October, 1972 - Sept., 1973	3.99	8.70	4.71	17.40
	(22.93)	(50.00)	(27.07)	(100.00)
October, 1973 - June, 1974	4.53	8.13	3.92	16.58
	(27.32)	(49.03)	(23.64)	(100.00)
July, 1977 - June, 1978	4.76	9.13	3.06	16.95
	(28.08)	(53.86)	(18.05)	(100.00)
January-December, 1983	3.82	10.20	1.67	15.69
	(24.35)	(65.01)	(10.64)	(100.00)
July, 1986 - June, 1987	4.66	9.87	1.21	15.74
	(29.61)	(62.71)	(7.69)	(100.00)
July, 1987 - June, 1988	3.70	10.59	1.19	15.48
	(23.90)	(68.41)	(7.69)	(100.00)
July, 1988 - June, 1989	3.89	10.44	1.04	15.37
	(25.31)	(67.92)	(6.77)	(100.00)
July, 1989 - June, 1990	3.93	9.86	0.98	14.77
	(26.61)	(66.76)	(6.64)	(100.00)
July, 1990 - June, 1991	4.13	9.91	0.75	14.79
	(27.92)	(67.00)	(5.07)	(100.00)
Percentage change in 1990-91 over 1961-62	(-)6.83	24.38	(-)36.69	(-)19.14

Note: Figures in parentheses are percentage shares in total cereal consumption.

TABLE 5P: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: WEST BENGAL RURAL

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	15.41	0.43	0.12	15.97
	(96.52)	(2.69)	(0.76)	(100.00)
October, 1972 - Sept., 1973	11.09	2.50	0.05	13.64
	(81.30)	(18.33)	(0.37)	(100.00)
October, 1973 - June, 1974	10.56	1.98	0.44	12.98
	(81.36)	(15.25)	(3.39)	(100.00)
July, 1977 - June, 1978	12.23	2.47	0.05	14.75
	(82.92)	(16.75)	(0.34)	(100.00)
January-December, 1983	11.73	2.45	0.11	14.29
	(82.09)	(17.14)	(0.77)	(100.00)
July, 1986 - June, 1987	13.88	1.49	0.06	15.43
	(89.95)	(9.66)	(0.39)	(100.00)
July, 1987 - June, 1988	13.66	1.46	0.01	15.13
	(90.28)	(9.65)	(0.07)	(100.00)
July, 1988 - June, 1989	14.19	1.33	0.00	15.52
	(91.43)	(8.57)	(0.00)	(100.00)
July, 1989 - June, 1990	14.03	1.41	0.00	15.44
	(92.67)	(9.31)	(0.00)	(100.00)
July, 1990 - June, 1991	13.58	1.47	0.01	15.06
	(90.17)	(9.76)	(0.07)	(100.00)
Percentage change in 1990-91 over 1961-62	(-)11.47	6.52	(-)0.69	(-)5.64

Note: Figures in parentheses are percentage shares in total cereal consumption.

TABLE 5Q: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: ALL INDIA RURAL (CONCLD.)

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	8.78	2.64	6.13	17.55
	(50.03)	(15.05)	(34.93)	(100.00)
October, 1972 - Sept., 1973	6.59	3.88	4.99	15.46
	(42.63)	(25.10)	(32.28)	(100.00)
October, 1973 - June, 1974	6.90	3.52	4.79	15.21
	(45.36)	(23.14)	(31.49)	(100.00)
July, 1977 - June, 1978	7.12	4.05	4.23	15.40
	(46.23)	(26.30)	(27.47)	(100.00)
January-December, 1983	6.63	4.46	3.81	14.90
	(44.50)	(29.93)	(25.57)	(100.00)
July, 1986 - June, 1987	7.11	4.77	2.52	14.40
	(49.38)	(33.12)	(17.50)	(100.00)
July, 1987 - June, 1988	7.04	4.94	2.56	14.54
	(48.42)	(33.98)	(17.61)	(100.00)
July, 1988 - June, 1989	7.07	4.73	2.82	14.62
	(48.36)	(32.35)	(19.29)	(100.00)
July, 1989 - June, 1990	6.93	4.70	2.42	14.05
	(49.32)	(33.45)	(17.22)	(100.00)
July, 1990 - June, 1991	6.95	4.82	2.44	14.21
	(48.91)	(33.92)	(17.17)	(100.00
Percentage change in 1990-91 over 1961-62	(-)10.42	12.42	(-)21.03	(-)19.03

Note: Figures in parentheses are percentage shares in total cereal consumption.

TABLE 6A: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: ANDHRA PRADESH URBAN

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	10.94	0.53	1.83	13.30
	(82.26)	(3.99)	(13.76)	(100.00)
October, 1972 - Sept., 1973	10.33	0.82	1.53	12.68
	(81.47)	(6.47)	(12.07)	(100.00)
October, 1973 - June, 1974	11.19	0.74	1.14	13.07
	(85.62)	(5.66)	(8.72)	(100.00)
July, 1977 - June, 1978	10.69	0.85	1.30	12.84
	(83.26)	(6.62)	(10.12)	(100.00)
January-December, 1983	10.43	0.79	0.74	11.96
	(87.21)	(6.61)	(6.19)	(100.00)
July, 1986 - June, 1987	9.97	0.72	0.69	11.38
	(87.61)	(6.33)	(6.06)	(100.00)
July, 1987 - June, 1988	10.28	0.75	0.68	11.71
	(87.79)	(6.40)	(5.81)	(100.00)
July, 1988 - June, 1989	9.81	0.91	0.59	11.31
	(86.74)	(8.05)	(5.22)	(100.00)
July, 1989 - June, 1990	10.23	1.11	0.40	11.74
	(87.14)	(9.45)	(3.41)	(100.00)
July, 1990 - June, 1991	10.30	0.92	0.48	11.70
	(88.03)	(7.86)	(4.10)	(100.00)
Percentage change in 1990-91 over 1961-62	(-)4.81	2.93	(-)10.15	(-)12.03

Note: Figures in parentheses are percentage shares in total cereal consumption.

TABLE 6B: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: ASSAM URBAN

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	11.00	1.38	0.00	12.39
	(88.79)	(11.15)	(0.00)	(100.00)
October, 1972 - Sept., 1973	11.54	1.01	0.00	12.55
	(91.95)	(8.05)	(0.00)	(100.00)
October, 1973 - June, 1974	11.02	1.29	0.00	12.31
	(89.52)	(10.48)	(0.00)	(100.00)
July, 1977 - June, 1978	11.80	1.45	0.00	13.44
	(87.80)	(10.79)	(0.00)	(100.00)
January-December, 1983	11.59	1.18	0.04	12.81
	(90.48)	(9.21)	(0.31)	(100.00)
July, 1986 - June, 1987	10.53	1.36	0.07	11.96
	(88.04)	(11.37)	(0.59)	(100.00)
July, 1987 - June, 1988	10.91	1.44	0.10	12.45
	(87.63)	(11.57)	(0.80)	(100.00)
July, 1988 - June, 1989	10.94	1.53	0.02	12.49
	(87.59)	(12.25)	(0.16)	(100.00)
July, 1989 - June, 1990	11.04	1.30	0.00	12.34
	(89.47)	(10.53)	(0.00)	(100.00)
July, 1990 - June, 1991	10.72	1.36	0.00	12.08
	(88.74)	(11.26)	(0.00)	(100.00)
Percentage change in 1990-91 over 1961-62	(-)2.26	(-)0.16	0.00	(-)2.42

Note: Figures in parentheses are percentage shares in total cereal consumption.

TABLE 6C: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: BIHAR URBAN

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	10.00	4.71	0.41	15.13
	(66.11)	(31.14)	(2.71)	(100.00)
October, 1972 - Sept., 1973	6.71	6.00	1.03	13.74
	(48.84)	(43.67)	(7.50)	(100.00)
October, 1973 - June, 1974	7.62	4.77	1.05	13.44
	(56.70)	(35.49)	(7.81)	(100.00)
July, 1977 - June, 1978	7.46	7.21	0.67	15.34
	(48.63)	(47.00)	(4.37)	(100.00)
January-December, 1983	6.89	6.11	0.66	13.66
	(50.44)	(44.73)	(4.83)	(100.00)
July, 1986 - June, 1987	7.12	5.66	0.47	13.25
	(53.74)	(42.72)	(3.55)	(100.00)
July, 1987 - June, 1988	7.16	5.96	0.40	13.52
	(52.93)	(44.08)	(2.96)	(100.00)
July, 1988 - June, 1989	7.44	5.70	0.24	13.38
	(55.61)	(42.60)	(1.79)	(100.00)
July, 1989 - June, 1990	7.31	6.05	0.14	13.50
	(54.15)	(44.81)	(1.04)	(100.00)
July, 1990 - June, 1991	6.76	6.00	0.09	12.85
	(52.61)	(46.69)	(0.70)	(100.00)
Percentage change in 1990-91 over 1961-62	(-)21.43	8.53	(-)2.12	(-)15.01

Note: Figures in parentheses are percentage shares in total cereal consumption.

TABLE 6D: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: GUJARAT URBAN

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	2.39	4.90	3.34	10.63
	(22.47)	(46.08)	(31.43)	(100.00)
October, 1972 - Sept., 1973	1.72	6.04	3.04	10.80
	(15.93)	(55.93)	(28.15)	(100.00)
October, 1973 - June, 1974	1.61	5.73	3.38	10.72
	(15.02)	(53.45)	(31.53)	(100.00)
July, 1977 - June, 1978	1.83	6.14	2.28	10.25
	(17.85)	(59.90)	(22.24)	(100.00)
January-December, 1983	2.04	5.27	2.38	9.69
	(21.05)	(54.39)	(24.56)	(100.00)
July, 1986 - June, 1987	1.87	5.22	1.83	8.92
	(20.96)	(58.52)	(20.52)	(100.00)
July, 1987 - June, 1988	2.23	5.50	1.77	9.50
	(23.47)	(57.89)	(18.63)	(100.00)
July, 1988 - June, 1989	2.21	5.70	1.71	9.62
	(22.97)	(59.25)	(17.78)	(100.00)
July, 1989 - June, 1990	2.14	5.73	1.61	9.48
	(22.57)	(60.44)	(16.98)	(100.00)
July, 1990 - June, 1991	2.02	5.84	1.69	9.55
	(21.15)	(61.15)	(17.70)	(100.00)
Percentage change in 1990-91 over 1961-62	(-)3.48	8.84	(-)15.52	(-)10.16

Note: Figures in parentheses are percentage shares in total cereal consumption.

TABLE 6E: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: HARYANA URBAN

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	0.74	10.46	1.02	12.21
	(6.09)	(86.45)	(8.41)	(100.00)
October, 1972 - Sept., 1973	0.91	10.33	0.81	12.05
	(7.55)	(85.73)	(6.72)	(100.00)
October, 1973 - June, 1974	0.74	10.89	0.66	12.29
	(6.02)	(88.61)	(5.37)	(100.00)
July, 1977 - June, 1978	1.49	10.52	0.37	12.38
	(12.04)	(84.98)	(2.99)	(100.00)
January-December, 1983	0.87	10.30	0.55	11.72
	(7.42)	(87.88)	(4.69)	(100.00)
July, 1986 - June, 1987	1.34	9.21	0.17	10.72
	(12.50)	(85.91)	(1.59)	(100.00)
July, 1987 - June, 1988	1.24	9.71	0.17	11.12
	(11.15)	(87.32)	(1.53)	(100.00)
July, 1988 - June, 1989	1.04	8.58	0.53	10.15
	(10.25)	(84.53)	(5.22)	(100.00)
July, 1989 - June, 1990	1.00	9.03	0.21	10.24
	(9.77)	(8.18)	(2.05)	(100.00)
July, 1990 - June, 1991	0.85	9.07	0.19	10.11
	(8.41)	(89.71)	(1.88)	(100.00)
Percentage change in 1990-91 over 1961-62	0.90	(-)11.37	(-)6.79	(-)17.27

Notes: (i) Figures in parentheses are percentage shares in total cereal consumption.
(ii) The estimates for the year 1961-62 are based on the data for the undivided Punjab and hence are not strictly comparable with the estimates for the remaining years.

TABLE 6F: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: JAMMU & KASHMIR URBAN

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	13.04	2.93	0.66	16.63
	(78.38)	(17.62)	(3.98)	(100.00)
October, 1972 - Sept., 1973	10.33	3.63	0.20	14.16
	(72.95)	(25.64)	(1.41)	(100.00)
October, 1973 - June, 1974	11.00	3.09	0.22	14.31
	(76.87)	(21.59)	(1.54)	(100.00)
July, 1977 - June, 1978	9.89	3.08	0.21	13.18
	(75.04)	(23.37)	(1.59)	(100.00)
January-December, 1983	9.66	4.04	0.14	13.84
	(69.80)	(29.19)	(1.01)	(100.00)
July, 1986 - June, 1987	9.88	4.66	0.14	14.68
	(67.30)	(31.74)	(0.95)	(100.00)
July, 1987 - June, 1988	9.47	4.53	0.14	14.14
	(66.97)	(32.04)	(0.99)	(100.00)
July, 1988 - June, 1989	-	-	-	-
July, 1989 - June, 1990	-	-	-	-
July, 1990 - June, 1991	-	-	-	-
Percentage change in 1987-88 over 1961-62	(-)21.47	9.62	(-)3.13	(-)14.97

Note: Figures in parentheses are percentage shares in total cereal consumption.

TABLE 6G: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: KARNATAKA URBAN

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	6.66	1.05	5.51	13.22
	(50.40)	(7.98)	(41.64)	(100.00)
October, 1972 - Sept., 1973	5.89	1.14	4.31	11.34
	(51.94)	(10.05)	(38.01)	(100.00)
October, 1973 - June, 1974	5.81	0.85	4.60	11.26
	(51.60)	(7.55)	(40.85)	(100.00)
July, 1977 - June, 1978	6.76	1.40	4.61	12.77
	(52.94)	(10.96)	(36.10)	(100.00)
January-December, 1983	6.21	1.49	4.07	11.77
	(52.76)	(12.66)	(34.58)	(100.00)
July, 1986 - June, 1987	5.89	1.54	3.03	10.46
	(52.97)	(14.72)	(28.97)	(100.00)
July, 1987 - June, 1988	5.89	1.57	3.66	11.12
	(52.97)	(14.12)	(32.91)	(100.00)
July, 1988 - June, 1989	6.16	1.44	3.49	11.09
	(55.55)	(12.98)	(31.47)	(100.00)
July, 1989 - June, 1990	5.99	1.61	3.11	10.71
	(55.93)	(15.03)	(29.04)	(100.00)
July, 1990 - June, 1991	6.04	1.55	2.81	10.40
	(58.08)	(14.90)	(27.02)	(100.00)
Percentage change in 1990-91 over 1961-62	(-)4.69	3.78	(-)20.42	(-)21.33

Note: Figures in parentheses are percentage shares in total cereal consumption.

TABLE 6H: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: KERALA URBAN

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	9.87	0.17	0.01	10.05
	(98.23)	(1.67)	(0.09)	(100.00)
October, 1972 - Sept., 1973	7.21	0.90	0.09	8.20
	(87.93)	(10.98)	(1.10)	(100.00)
October, 1973 - June, 1974	7.23	0.70	0.03	7.96
	(90.83)	(8.79)	(0.38)	(100.00)
July, 1977 - June, 1978	8.47	0.43	0.09	8.99
	(94.22)	(4.78)	(1.00)	(100.00)
January-December, 1983	9.11	1.01	0.08	10.20
	(89.31)	(9.90)	(0.78)	(100.00)
July, 1986 - June, 1987	8.57	0.98	0.09	9.64
	(88.90)	(10.17)	(0.93)	(100.00)
July, 1987 - June, 1988	8.63	0.97	0.09	9.69
	(89.06)	(10.01)	(0.93)	(100.00)
July, 1988 - June, 1989	8.56	1.23	0.00	9.79
	(87.44)	(12.56)	(0.00)	(100.00)
July, 1989 - June, 1990	8.81	1.07	0.00	9.88
	(89.17)	(10.83)	(0.00)	(100.00)
July, 1990 - June, 1991	8.41	1.19	0.00	9.60
	(87.60)	(12.40)	(0.00)	(100.00)
Percentage change in 1990-91 over 1961-62	(-)14.52	10.15	(-)0.10	(-)4.48

Note: Figures in parentheses are percentage shares in total cereal consumption.

TABLE 6I: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: MADHYA PRADESH URBAN

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	3.29	8.05	1.64	12.99
	(25.36)	(61.99)	(12.64)	(100.00)
October, 1972 - Sept., 1973	3.39	7.84	1.73	12.96
	(26.16)	(60.49)	(13.35)	(100.00)
October, 1973 - June, 1974	3.36	7.84	1.42	12.62
	(26.62)	(62.12)	(11.25)	(100.00)
July, 1977- June, 1978	3.69	7.78	1.30	12.77
	(28.90)	(60.92)	(10.18)	(100.00)
January-December, 1983	3.78	7.86	0.78	12.42
	(30.43)	(63.29)	(6.28)	(100.00)
July, 1986 - June, 1987	3.77	7.53	0.49	11.79
	(31.98)	(63.87)	(4.16)	(100.00)
July, 1987 - June, 1988	3.40	8.02	0.55	11.97
	(28.40)	(67.00)	(4.59)	(100.00)
July, 1988 - June, 1989	3.98	7.60	0.71	12.29
	(32.38)	(61.84)	(5.78)	(100.00)
July, 1989 - June, 1990	3.79	7.47	0.37	11.63
	(32.59)	(64.23)	(3.18)	(100.00)
July, 1990 - June, 1991	3.76	7.12	0.66	11.54
	(32.58)	(61.70)	(5.72)	(100.00)
Percentage change in 1990-91 over 1961-62	3.62	(-)7.16	(-)7.55	(-)11.09

Note: Figures in parentheses are percentage shares in total cereal consumption.

TABLE 6J: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: MAHARASHTRA URBAN

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	3.61	3.08	4.11	10.81
	(33.41)	(28.49)	(38.07)	(100.00)
October, 1972 - Sept., 1973	1.64	4.93	2.42	8.99
	(18.24)	(54.84)	(26.92)	(100.00)
October, 1973 - June, 1974	1.57	3.45	4.24	9.26
	(16.95)	(37.26)	(45.79)	(100.00)
July, 1977 - June, 1978	2.65	4.42	2.94	10.01
	(26.47)	(44.16)	(29.37)	(100.00)
January-December, 1983	2.82	4.21	2.97	10.00
	(28.20)	(42.10)	(29.70)	(100.00)
July, 1986 - June, 1987	2.84	4.28	2.17	9.29
	(30.57)	(46.07)	(23.36)	(100.00)
July, 1987 - June, 1988	2.90	4.59	2.74	10.23
	(28.35)	(44.87)	(26.78)	(100.00)
July, 1988 - June, 1989	3.07	4.45	2.21	9.73
	(31.55)	(45.74)	(22.71)	(100.00)
July, 1989 - June, 1990	3.85	4.58	1.75	10.18
	(37.82)	(44.99)	(17.19)	(100.00)
July, 1990 - June, 1991	3.36	4.77	1.66	9.79
	(34.32)	(48.72)	(16.96)	(100.00)
Percentage change in 1990-91 over 1961-62	(-)2.31	15.63	(-)22.66	(-)9.43

Note: Figures in parentheses are percentage shares in total cereal consumption.

TABLE 6K: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: ORISSA URBAN

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	13.58	1.18	0.24	15.00
	(90.53)	(7.87)	(1.60)	(100.00)
October, 1972 - Sept., 1973	11.33	2.19	0.25	13.77
	(82.28)	(15.90)	(1.82)	(100.00)
October, 1973 - June, 1974	11.29	2.00	0.13	13.42
	(84.13)	(14.90)	(0.97)	(100.00)
July, 1977 - June, 1978	11.34	2.32	0.32	13.98
	(81.12)	(16.60)	(2.29)	(100.00)
January-December, 1983	11.60	2.40	0.21	14.21
	(81.63)	(16.89)	(1.48)	(100.00)
July, 1986 - June, 1987	11.51	2.36	0.14	14.01
	(82.16)	(16.85)	(1.00)	(100.00)
July, 1987 - June, 1988	11.22	2.49	0.05	13.76
	(81.54)	(18.10)	(0.36)	(100.00)
July, 1988 - June, 1989	12.14	2.46	0.20	14.80
	(82.03)	(16.62)	(1.35)	(100.00)
July, 1989 - June, 1990	11.77	2.45	0.17	14.39
	(81.79)	(17.03)	(1.18)	(100.00)
July, 1990 - June, 1991	11.18	2.45	0.30	13.93
	(80.26)	(17.59)	(2.15)	(100.00)
Percentage change in 1990-91 over 1961-62	(-)16.00	8.47	0.40	(-)7.13

Note: Figures in parentheses are percentage shares in total cereal consumption.

TABLE 6L: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: PUNJAB URBAN

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	0.74	10.46	1.02	12.22
	(6.09)	(86.45)	(8.41)	(100.00)
October, 1972 - Sept., 1973	0.83	9.21	0.74	10.78
	(7.70)	(85.44)	(6.86)	(100.00)
October, 1973 - June, 1974	0.66	9.79	0.62	11.07
	(5.96)	(88.44)	(5.60)	(100.00)
July, 1977- June, 1978	1.01	9.39	0.55	10.95
	(9.22)	(85.75)	(5.02)	(100.00)
January-December, 1983	1.02	8.65	0.38	10.05
	(10.15)	(86.07)	(3.78)	(100.00)
July, 1986 - June, 1987	1.13	9.03	0.21	10.37
	(10.90)	(87.08)	(2.03)	(100.00)
July, 1987 - June, 1988	1.03	8.61	0.21	9.85
	(10.45)	(87.41)	(0.21)	(100.00)
July, 1988 - June, 1989	1.05	8.41	0.19	9.65
	(10.88)	(87.15)	(1.97)	(100.00)
July, 1989 - June, 1990	0.94	8.35	0.11	9.40
	(10.00)	(88.83)	(1.17)	(100.00)
July, 1990 - June, 1991	0.92	8.06	0.08	9.06
	(10.15)	(88.96)	(0.88)	(100.00)
Percentage change in 1990-91 over 1961-62	1.47	(-)19.64	(-)7.69	(-)25.86

Notes: (i) Figures in parentheses are percentage shares in total cereal consumption.
(ii) The estimates for the year 1961-62 are based on the data for the undivided Punjab and hence are not strictly comparable with the estimates for the remaining years.

TABLE 6M: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: RAJASTHAN URBAN

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	0.57	9.24	5.42	15.23
	(3.74)	(60.67)	(35.59)	(100.00)
October, 1972 - Sept., 1973	0.47	8.59	4.47	13.53
	(3.47)	(63.49)	(33.04)	(100.00)
October, 1973 - June, 1974	0.42	8.23	4.53	13.18
	(3.19)	(62.44)	(34.37)	(100.00)
July, 1977 - June, 1978	0.55	10.18	2.00	12.73
	(4.32)	(79.97)	(15.71)	(100.00)
January-December, 1983	0.41	10.04	2.58	13.03
	(3.15)	(77.05)	(19.80)	(100.00)
July, 1986 - June, 1987	0.67	11.51	1.22	13.40
	(5.00)	(85.90)	(9.10)	(100.00)
July, 1987 - June, 1988	0.45	11.42	0.88	12.75
	(3.53)	(89.57)	(6.90)	(100.00)
July, 1988 - June, 1989	0.52	9.84	1.72	12.08
	(4.30)	(81.46)	(14.24)	(100.00)
July, 1989 - June, 1990	0.56	10.03	1.17	11.76
	(4.76)	(85.29)	(9.95)	(100.00)
July, 1990 - June, 1991	0.67	9.35	2.01	12.03
	(5.57)	(77.72)	(16.71)	(100.00)
Percentage change in 1990-91 over 1961-62	0.66	0.72	(-)22.39	(-)21.01

Note: Figures in parentheses are percentage shares in total cereal consumption.

TABLE 6N: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: TAMIL NADU URBAN

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	11.57	0.27	0.93	12.77
	(90.61)	(2.12)	(7.31)	(100.00)
October, 1972 - Sept., 1973	10.27	0.26	0.59	11.12
	(92.36)	(2.34)	(5.31)	(100.00)
October, 1973 - June, 1974	10.56	0.20	0.63	11.39
	(92.71)	(1.76)	(5.53)	(100.00)
July, 1977 - June, 1978	9.83	0.60	0.63	11.06
	(88.88)	(5.43)	(5.70)	(100.00)
January-December, 1983	8.91	0.83	0.67	10.41
	(85.59)	(7.97)	(6.44)	(100.00)
July, 1986 - June, 1987	8.83	0.85	0.28	9.96
	(88.65)	(8.53)	(2.81)	(100.00)
July, 1987 - June, 1988	9.24	0.74	0.21	10.19
	(90.68)	(7.26)	(2.06)	(100.00)
July, 1988 - June, 1989	9.36	0.76	0.27	10.39
	(90.09)	(7.31)	(2.60)	(100.00)
July, 1989 - June, 1990	9.30	0.77	0.19	10.26
	(90.64)	(7.50)	(1.85)	(100.00)
July, 1990 - June, 1991	9.21	0.81	0.12	10.14
	(90.82)	(7.99)	(1.18)	(100.00)
Percentage change in 1990-91 over 1961-62	(-)18.48	4.23	(-)6.34	(-)20.60

Note: Figures in parentheses are percentage shares in total cereal consumption.

TABLE 6O: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: UTTAR PRADESH URBAN

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	2.68	8.30	1.93	12.90
	(20.76)	(64.30)	(14.97)	(100.00)
October, 1972 - Sept., 1973	2.39	8.86	1.20	12.45
	(19.20)	(71.16)	(9.64)	(100.00)
October, 1973 - June, 1974	2.71	8.92	0.86	12.49
	(21.70)	(71.42)	(6.89)	(100.00)
July, 1977 - June, 1978	2.62	9.32	0.55	12.49
	(20.98)	(74.62)	(4.40)	(100.00)
January-December, 1983	2.33	9.07	0.38	11.78
	(19.78)	(76.99)	(3.23)	(100.00)
July, 1986 - June, 1987	2.81	8.86	0.25	11.92
	(23.57)	(74.33)	(2.10)	(100.00)
July, 1987 - June, 1988	2.36	9.23	0.13	11.72
	(20.14)	(78.75)	(1.11)	(100.00)
July, 1988 - June, 1989	2.70	8.47	0.18	11.35
	(23.79)	(74.63)	(1.59)	(100.00)
July, 1989 - June, 1990	2.62	8.35	0.36	11.33
	(23.12)	(73.70)	(3.18)	(100.00)
July, 1990 - June, 1991	2.56	8.47	0.11	11.14
	(22.98)	(76.03)	(0.99)	(100.00)
Percentage change in 1990-91 over 1961-62	(-)0.93	1.32	(-)14.10	(-)13.71

Note: Figures in parentheses are percentage shares in total cereal consumption.

TABLE 6P: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: WEST BENGAL URBAN

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	9.86	2.38	0.02	12.26
	(80.45)	(19.41)	(0.15)	(100.00)
October, 1972 - Sept., 1973	6.19	4.31	0.06	10.56
	(58.62)	(40.81)	(0.57)	(100.00)
October, 1973 - June, 1974	6.50	4.26	0.17	10.93
	(59.47)	(38.98)	(1.56)	(100.00)
July, 1977 - June, 1978	7.68	4.23	0.04	11.95
	(64.27)	(35.40)	(0.33)	(100.00)
January-December, 1983	8.09	3.70	0.06	11.85
	(68.27)	(31.22)	(0.51)	(100.00)
July, 1986 - June, 1987	8.82	3.33	0.64	12.79
	(68.96)	(26.04)	(5.00)	(100.00)
July, 1987 - June, 1988	8.55	3.15	0.03	11.73
	(72.89)	(26.85)	(0.26)	(100.00)
July, 1988 - June, 1989	8.81	3.16	0.01	11.98
	(73.54)	(26.38)	(0.08)	(100.00)
July, 1989 - June, 1990	8.99	3.13	0.00	12.12
	(74.17)	(25.83)	(0.00)	(100.00)
July, 1990 - June, 1991	8.70	3.08	0.00	11.78
	(73.85)	(26.15)	(0.00)	(100.00)
Percentage change in 1990-91 over 1961-62	(-)9.46	5.71	(-)0.16	(-)3.92

Note: Figures in parentheses are percentage shares in total cereal consumption.

TABLE 6Q: ESTIMATES OF MONTHLY PER CAPITA CEREAL CONSUMPTION (KG) FOR TOTAL POPULATION: ALL INDIA URBAN (CONCL.)

Year	Rice	Wheat	Other Cereals	Total
Sept., 1961 - July, 1962	6.16	4.11	2.23	12.50
	(49.29)	(32.86)	(17.85)	(100.00)
October, 1972 - Sept., 1973	4.94	4.82	1.56	11.32
	(43.64)	(42.58)	(13.78)	(100.00)
October, 1973 - June, 1974	5.38	4.32	1.67	11.37
	(47.32)	(37.99)	(14.69)	(100.00)
July, 1977 - June, 1978	5.48	4.87	1.37	11.72
	(46.76)	(41.55)	(11.69)	(100.00)
January-December, 1983	5.32	4.82	1.25	11.38
	(46.75)	(42.36)	(10.90)	(100.00)
July, 1986 - June, 1987	5.33	4.83	0.88	11.04
	(48.28)	(43.75)	(7.97)	(100.00)
July, 1987 - June, 1988	5.35	4.98	0.92	11.25
	(47.56)	(44.27)	(8.18)	(100.00)
July, 1988 - June, 1989	5.35	4.81	1.11	11.27
	(47.47)	(42.68)	(9.85)	(100.00)
July, 1989 - June, 1990	5.45	4.84	0.80	11.09
	(49.14)	(43.64)	(7.21)	(100.00)
July, 1990 - June, 1991	5.32	4.77	0.81	10.90
	(48.81)	(43.76)	(7.43)	(100.00)
Percentage change in 1990-91 over that in 1960-61	(-)6.72	5.28	(-)11.36	(-)12.80

Note: Figures in parentheses are percentage shares in total cereal consumption.

TABLE 7: COMPOUND GROWTH RATES (PER CENT PER ANNUM) OF PRODUCTION: (1967-68 TO 1986-87)

State	Rice	Wheat	Total Coarse Cereals	Total Foodgrains	Total Population (Compound Annual Growth Rrate (Per Cent) Between 1961 and 1991)
Andhra Pradesh	3.34	3.10	0.53	3.45	2.07
Assam	1.35	16.90	1.62	2.86	2.45
Bihar	0.67	4.59	(-)0.47	1.69	2.09
Gujarat	3.29	3.09	0.29	2.01	2.34
Haryana	10.02	6.46	(-)3.13	4.42	2.61
Jammu & Kashmir	2.81	1.75	2.20	2.96	2.61
Karnataka	0.75	0.93	1.40	1.95	2.17
Kerala	(-)0.31	-	(-)7.42	0.95	1.83
Madhya Pradesh	1.68	3.75	0.46	2.31	2.41
Maharashtra	3.05	4.66	3.12	3.36	2.33
Orissa	2.52	10.57	4.40	2.46	1.99
Punjab	15.64	5.58	(-)3.67	6.57	2.02
Rajasthan	2.77	5.71	(-)0.20	2.10	2.64
Tamil Nadu	0.51	(-)2.75	(-)0.29	1.43	1.70
Uttar Pradesh	4.87	6.23	1.10	3.88	2.14
West Bengal	1.43	4.30	2.05	2.42	2.25
All-India	2.54	5.48	0.44	2.68	2.20

Source: 1) Compound annual growth rates for different crops are from Bansil [1990, Pp. 398-399].
2) Population growth rates are estimates by the author based on data from Census reports.

TABLE 8: PROPORTION (PER CENT) OF CASUAL WORKERS IN TOTAL RURAL WORKFORCE (NSS USUAL STATUS)

State	Rural Males					Rural Females				
	1972-73	1977-78	1983	1987-88	1989-90	1972-73	1977-78	1983	1987-88	1989-90
Andhra Pradesh	27.40	33.60	36.40	38.10	38.70	48.90	52.80	52.60	49.70	50.80
Bihar	24.10	32.60	35.90	35.20	31.00	6.00	45.70	42.40	43.00	30.70
Gujarat	22.20	29.40	34.50	39.80	49.90	26.20	31.70	38.20	48.80	59.30
Haryana	9.70	14.90	19.70	22.50	23.10	8.40	18.90	21.90	19.90	42.00
Karnataka	27.30	33.60	34.60	36.80	24.20	37.20	47.90	46.30	52.20	35.70
Kerala	39.10	37.70	40.40	43.20	49.40	47.70	32.20	31.50	32.90	33.30
Madhya Pradesh	15.50	22.20	25.30	25.50	32.40	24.80	31.10	31.00	31.00	46.10
Maharashtra	31.80	30.80	35.60	35.50	41.20	44.80	46.80	48.70	44.10	52.20
Orissa	27.10	33.90	35.20	37.60	31.40	37.90	45.90	45.50	41.30	42.20
Punjab	16.00	19.00	21.50	22.00	31.40	9.60	17.40	7.00	11.30	7.10
Rajasthan	5.50	10.90	13.80	25.00	6.90	4.90	8.90	10.30	16.00	2.60
Tamil Nadu	45.90	48.60	52.50	41.70	44.90	35.50	43.50	N.A.	47.10	47.00
Uttar Pradesh	12.90	16.00	20.20	21.00	14.90	14.00	14.00	17.00	18.20	19.50
West Bengal	32.10	34.10	39.10	36.30	36.60	38.90	33.10	34.10	31.60	25.60
All-India	22.00	26.60	29.20	31.40	30.50	31.40	35.10	35.20	35.50	36.30

Source: Sen and Ghosh [1993, p. 76].

TABLE 9: PER CAPITA CALORIE INTAKE PER DIEM BY DECILE GROUP BY STATE: RURAL SECTOR (1983)

Decile Group	Andhra Pradesh	Assam	Bihar	Gujarat	Haryana	Jammu & Kashmir
0-10	1,429.78	1,429.82	1,284.07	1,387.04	1,649.29	1,747.69
10-20	1,738.39	1,694.00	1,606.00	1,678.15	1,985.13	2,130.03
20-30	1,904.77	1,787.10	1,788.42	1,754.55	2,130.80	2,315.00
30-40	1,966.85	1,869.00	1,945.44	1,868.00	2,243.00	2,424.82
40-50	2,127.00	2,001.09	2,031.00	2,043.08	2,339.75	2,507.00
50-60	2,236.51	2,128.00	2,211.59	2,127.00	2,511.00	2,507.00
60-70	2,289.00	2,128.00	2,357.70	2,247.55	2,741.44	2,744.24
70-80	2,459.90	2,293.19	2,539.00	2,432.81	2,909.00	2,906.49
80-90	2,697.08	2,472.78	2,752.96	2,718.00	3,353.65	3,107.00
90-100	3,190.72	2,757.03	3,373.81	2,873.81	3,676.94	3,300.73
0-100	2,204.00	2,056.00	2,189.00	2,113.00	2,554.00	2,569.00

TABLE 9: PER CAPITA CALORIE INTAKE PER DIEM BY DECILE GROUP BY STATE: RURAL SECTOR (1983)

Decile Group	Karnataka	Kerala	Madhya Pradesh	Maharashtra	Orissa	Punjab
0-10	1,262.39	1,031.69	1,495.23	1,540.19	1,329.27	1,524.00
10-20	1,570.53	1,301.94	1,749.02	1,737.43	1,583.99	1,985.33
20-30	1,808.05	1,418.73	1,917.89	1,851.14	1,760.05	2,153.14
30-40	1,952.45	1,551.98	2,066.39	1,920.00	1,932.61	2,266.44
40-50	2,108.00	1,716.76	2,146.00	2,064.21	2,008.04	2,537.00
50-60	2,368.23	1,777.54	2,289.72	2,155.86	2,092.14	2,727.93
60-70	2,403.27	1,919.37	2,431.28	2,230.00	2,251.02	2,842.00
70-80	2,548.16	2,194.41	2,566.66	2,337.80	2,321.48	3,082.58
80-90	2,897.00	2,406.89	2,855.41	2,544.24	2,525.67	3,320.83
90-100	3,681.93	3,120.69	3,712.41	3,059.13	3,225.74	4,330.75
0-100	2,260.00	1,844.00	2,323.00	2,144.00	2,103.00	2,677.00

TABLE 9: PER CAPITA CALORIE INTAKE PER DIEM BY DECILE GROUP BY STATE: RURAL SECTOR (1983)

Decile Group	Rajasthan	Tamil Nadu	Uttar Pradesh	West Bengal	All-India
0-10	1,612.05	979.59	1,487.98	957.47	1,356.31
10-20	1,909.92	1,279.97	1,807.00	1,402.95	1,681.80
20-30	2,077.61	1,422.60	1,957.25	1,609.52	1,847.86
30-40	2,153.70	1,610.00	2,150.02	1,779.00	1,952.00
40-50	2,227.20	1,698.53	2,229.73	1,918.38	2,111.53
50-60	2,387.00	1,821.28	2,390.00	2,055.98	2,229.56
60-70	2,497.66	1,784.92	2,586.10	2,184.00	2,322.00
70-80	2,708.97	2,207.00	2,688.70	2,305.30	2,506.92
80-90	2,879.84	2,366.32	2,981.19	2,693.40	2,779.53
90-100	3,876.05	3,439.79	3,712.04	3,363.99	3,422.49
0-100	2,433.00	1,861.00	2,399.00	2,027.00	2,221.00

TABLE 10: PER CAPITA CALORIE INTAKE PER DIEM BY DECILE GROUP BY STATE: URBAN SECTOR (1983)

Decile Group	Andhra Pradesh	Assam	Bihar	Gujarat	Haryana	Jammu & Kashmir
0-10	1,317.49	1,310.32	1,393.70	1,361.98	1,280.49	1,646.00
10-20	1,605.31	1,637.22	1,701.12	1,527.27	1,847.75	1,957.08
20-30	1,758.85	1,782.35	1,787.84	1,798.00	1,916.00	2,071.00
30-40	1,835.35	1,858.00	1,864.56	1,798.00	1,987.34	2,071.00
40-50	1,855.40	2,044.61	2,042.00	1,969.61	2,121.00	2,172.55
50-60	2,000.00	2,105.26	2,118.08	2,020.28	2,280.63	2,186.00
60-70	2,142.76	2,216.00	2,251.00	2,195.00	2,334.32	2,309.76
70-80	2,231.00	2,216.00	2,512.53	2,233.04	2,655.00	2,371.00
80-90	2,446.06	2,490.21	2,619.58	2,443.56	2,910.70	2,449.47
90-100	2,897.78	2,770.02	3,019.59	2,653.26	3,086.77	3,106.14
0-100	2,009.00	2,043.00	2,131.00	2,000.00	2,242.00	2,234.00

TABLE 10: PER CAPITA CALORIE INTAKE PER DIEM BY DECILE GROUP BY STATE: URBAN SECTOR (1983)

Decile Group	Karnataka	Kerala	Madhya Pradesh	Maharashtra	Orissa	Punjab
0-10	1,306.20	1,085.60	1,579.13	1,400.22	1,354.18	1,255.34
10-20	1,524.25	1,318.84	1,762.00	1,592.57	1,717.26	1,500.57
20-30	1,701.41	1,414.72	1,855.46	1,719.90	1,945.00	1,704.41
30-40	1,802.12	1,672.58	1,975.26	1,788.68	2,073.67	1,806.85
40-50	1,947.56	1,787.84	2,027.00	1,886.00	2,109.87	1,946.00
50-60	2,173.20	1,895.00	2,092.02	1,999.84	2,241.00	2,229.19
60-70	2,459.00	2,201.59	2,182.57	2,049.21	2,338.61	2,261.00
70-80	2,481.68	2,308.02	2,468.00	2,217.71	2,437.00	2,383.61
80-90	2,645.28	2,751.69	2,532.30	2,695.69	2,668.39	2,959.54
90-100	3,199.31	4,054.13	2,896.26	2,930.16	3,305.02	2,953.50
0-100	2,124.00	2,049.00	2,137.00	2,028.00	2,219.00	2,100.00

TABLE 10: PER CAPITA CALORIE INTAKE PER DIEM BY DECILE GROUP BY STATE: URBAN SECTOR (1983)

Decile Group	Rajasthan	Tamil Nadu	Uttar Pradesh	West Bengal	All-India
0-10	1,470.02	1,035.43	1,398.71	1,275.13	1,331.76
10-20	1,815.19	1,300.53	1,613.98	1,592.56	1,588.29
20-30	2,000.67	1,489.42	1,727.00	1,723.13	1,724.00
30-40	2,052.00	1,589.28	1,849.35	1,871.00	1,861.19
40-50	2,120.58	1,617.50	1,955.44	1,987.84	1,912.41
50-60	2,187.90	1,867.00	1,992.00	2,105.46	2,046.00
60-70	2,368.00	1,978.52	2,155.00	2,195.00	2,221.13
70-80	2,449.33	2,076.96	2,272.00	2,266.31	2,294.20
80-90	2,803.63	2,380.86	2,427.40	2,455.43	2,500.71
90-100	3,282.67	6,064.50	3,037.13	3,008.14	3,410.30
0-100	2,255.00	2,140.00	2,043.00	2,048.00	2,089.00

TABLE 11A: ESTIMATES OF AVERAGES AND COEFFICIENTS OF VARIATION IN AIPHRP AND RURAL AMPCTCE ACROSS STATES

	Agricultural Income Per Head of Rural Population				Average Monthly Per Capita Total Consumer Expenditure			
	At Current Prices		At Current All-India Prices		At Current Prices		At Current All-India Prices	
Year	Statewise Rural Population Weighted Average (Rs)	Coefficient of Variation (Per Cent)	Statewise Rural Population Weighted Average (Rs)	Coefficient of Variation (Per Cent)	Statewise Population Weighted Average (Rs)	Coefficient of Variation (Per cent)	Statewise Population Weighted Average (Rs)	Coefficient of Variation (Per Cent)
1961-62	N.A.	N.A.	N.A.	N.A.	21.79	13.40	21.36	15.07
1972-73	365.94	32.22	359.66	33.29	45.33	22.48	43.95	19.77
1973-74	540.73	26.27	532.80	27.67	52.86	11.45	51.77	11.82
1977-78	623.75	31.12	609.26	28.58	68.97	20.68	67.49	19.69
1983	825.30	34.66	814.70	35.33	111.97	14.19	110.00	16.07
1986-87	1,127.73	31.51	1,099.77	28.16	140.57	15.36	137.70	14.59
1987-88	1,285.17	34.23	1,260.97	32.12	156.71	14.68	153.55	13.22

TABLE 11B: ESTIMATES OF AVERAGES AND COEFFICIENTS OF VARIATION IN FPPHRP, PER CAPITA CEREAL CONSUMPTION AND CALORIE INTAKE

	Foodgrain Production Per Head ofRural Population		Per Capita Monthly Cereal Consumption		Calorie Intake Per Capita Per Diem	
Year	Statewise Rural Population Weighted Average (kg)	Coefficient of Variation (Per Cent)	Statewise Rural Population Weighted Average (kg)	Coefficient of Variation (Per Cent)	Statewise Rural Population Weighted Average (kg)	Coefficient of Variation (Per Cent)
1961-62	N.A.	N.A.	17.61	13.63	2,536.27	14.55
1972-73	197.15	51.60	15.62	14.98	2,337.17	19.20
1973-74	226.87	43.42	15.28	14.33	2,252.73	12.04
1977-78	255.59	48.12	15.42	12.06	N.A.	N.A.
1983	237.33	69.23	14.89	10.21	2,217.10	8.48
1986-87	247.10	71.10	14.37	12.60	N.A.	N.A.
1987-88	234.35	76.15	14.53	10.39	N.A.	N.A.

Source: Based on various NSS reports, and Chandhok and The Policy Group [1990].

TABLE 12A: ESTIMATES OF AVERAGES AND COEFFICIENTS OF VARIATION IN NAIPHUP AND URBAN AMPCTCE ACROSS STATES

Year	Non-Agricultural Income Per Head of Urban Population				Average Monthly Per Capita Total Consumer Expenditure			
	At Current Prices		At Current All-India Prices		At Current Prices		At Current All-India Prices	
	Statewise Urban Population Weighted Average (Rs)	Coefficient of Variation (Per Cent)	Statewise Urban Population Weighted Average (Rs)	Coefficient of Variation (Per Cent)	Statewise Urban Population Weighted Average (Rs)	Coefficient of Variation (Per Cent)	Statewise Urban Population Weighted Average (Rs)	Coefficient of Variation (Per Cent)
1961-62	N.A.	N.A.	N.A.	N.A.	30.80	15.58	30.37	9.58
1972-73	1,744.61	17.56	1,712.70	15.42	61.90	12.63	60.87	10.76
1973-74	1,953.31	16.30	1,924.76	13.09	69.93	10.25	69.10	8.13
1977-78	2,895.71	20.31	2,856.66	16.98	97.61	11.27	96.52	8.18
1983	4,789.85	18.24	4,745.32	16.77	166.93	10.68	165.34	7.98
1986-87	7,073.24	21.41	7,033.22	20.96	226.90	9.54	225.57	8.27
1987-88	7,966.53	18.87	7,907.90	17.38	241.48	10.02	240.08	8.42

TABLE 12B: ESTIMATES OF AVERAGES AND COEFFICIENTS OF VARIATION IN SPCFP, URBAN CEREAL CONSUMPTION AND CALORIE INTAKE ACROSS STATES

Year	State Per Capital Annual Foodgrains Output		Per Capita Monthly Cereal Consumption		Calorie Intake Per Capita Per Diem	
	Statewise Urban Population Weighted Average (kg)	Coefficient of Variation (Per Cent)	Statewise Urban Population Weighted Average (kg)	Coefficient of Variation (Per Cent)	Statewise Urban Population Weighted Average (kg)	Coefficient of Variation (Per Cent)
1961-62	-	-	12.55	11.00	2,063.57	8.23
1972-73	162.58	57.21	11.40	13.95	2,096.38	9.56
1973-74	181.76	44.04	11.49	12.71	2,136.86	5.40
1977-78	201.41	48.41	11.82	11.34	N.A.	N.A.
1983	181.44	72.06	11.44	10.66	2,083.95	3.41
1986-87	183.28	76.71	11.12	13.58	N.A.	N.A.
1987-88	177.69	78.88	11.26	10.30	N.A.	N.A.

Source: Based on various NSS reports, and Chandhok and The Policy Group [1990].

TABLE 13A: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: ANDHRA PRADESH RURAL

Commodity	Engel Elasticity				Engel Ratio (Per Cent)			
	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	0.820	0.781	0.511	0.480	32.77	30.61	25.22	21.21
Wheat	-	1.154	1.863	1.716	0.10	0.40	0.30	0.36
Jowar	(-)0.242	0.236	(-)0.341	(-)0.422	6.41	8.31	2.55	1.86
Bajra	(-)0.493	(-)0.043	(-)0.509	(-)0.699	0.80	1.08	0.46	0.23
Maize	0.843	(-)0.367	0.354	(-)0.015	0.70	1.86	0.27	0.13
Ragi	(-)0.705	0.211	(-)0.471	(-)0.619	2.83	2.99	0.91	0.62
Barley	-	-	-	-	-	-	-	-
Small millets	(-)0.282	0.506	(-)0.707	(-)0.716	1.14	0.85	0.20	0.32
Total cereals	0.527	0.578	0.398	0.384	44.95	46.11	29.95	24.76
Edible oil	0.910	1.000	0.854	0.814	2.83	3.57	4.10	5.00
Sugar	1.552	1.566	1.120	1.072	0.90	1.78	1.50	1.65
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.618	0.415	N.A.	-	-	-	-

TABLE 13B: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: ASSAM RURAL

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	0.678	0.569	0.575	0.454	42.38	43.74	39.76	33.03
Wheat	1.629	0.772	0.692	0.766	0.67	1.32	1.23	1.25
Jowar	-	-	-	-	-	-	-	-
Bajra	-	-	-	-	-	-	-	-
Maize	-	-	-	-	-	-	-	-
Ragi	-	-	-	-	-	-	-	-
Barley	-	-	-	-	-	-	-	-
Small millets	-	-	-	-	-	-	-	-
Total cereals	0.695	0.575	0.573	0.475	43.09	45.06	41.07	34.41
Edible oil	1.139	1.008	0.770	0.835	3.78	3.89	3.70	4.62
Sugar	1.304	1.236	1.000	1.032	2.70	2.50	2.04	2.27
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.598	0.533	N.A.	-	-	-	-

TABLE 13C: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: BIHAR RURAL

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	0.666	0.978	0.939	0.540	37.58	30.12	25.65	25.42
Wheat	1.144	0.776	0.586	0.419	7.26	12.23	14.21	11.10
Jowar	-	-	(-)1.411	-	-	-	0.27	-
Bajra	-	-	(-)1.164	-	-	-	0.32	-
Maize	0.331	(-)0.279	(-)0.277	(-)0.541	2.26	6.66	6.09	1.39
Ragi	0.145	(-)0.071	(-)0.893	-	1.00	1.19	0.53	-
Barley	(-)0.258	0.055	0.012	-	1.74	0.63	0.17	-
Small millets	-	(-)0.909	(-)1.361	-	-	0.27	0.43	-
Total cereals	0.656	0.712	0.615	0.475	53.63	52.31	48.09	38.84
Edible oil	0.997	1.087	1.001	0.981	2.74	3.11	3.68	5.02
Sugar	1.512	1.664	1.435	1.306	1.11	1.80	1.30	1.52
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.653	0.582	N.A.	-	-	-	-

TABLE 13D: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: GUJARAT RURAL

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	0.890	1.024	0.686	0.813	7.09	6.42	5.36	4.29
Wheat	1.258	0.693	1.135	0.719	5.36	8.55	5.29	7.21
Jowar	(-)0.095	0.462	(-)0.187	(-)0.048	6.42	5.57	2.21	1.45
Bajra	0.723	0.370	0.253	0.072	9.61	9.11	7.36	5.44
Maize	(-)1.085	(-)0.587	(-)0.584	(-)0.127	2.57	3.35	1.83	0.95
Ragi	(-)1.371	-	(-)1.845	-	0.53	-	0.08	-
Barley	-	-	-	-	-	-	-	-
Small millets	(-)1.119	-	(-)0.300	-	0.93	-	0.03	-
Total cereals	0.446	0.484	0.447	0.433	32.64	33.47	22.34	19.57
Edible oil	0.934	1.093	0.868	1.019	4.43	6.79	7.17	8.08
Sugar	1.243	0.860	0.739	0.720	5.98	6.87	4.83	4.81
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.527	0.474	N.A.	-	-	-	-

TABLE 13E: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: HARYANA RURAL

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	(-)0.001	0.378	0.516	0.905	3.39	2.04	1.99	1.64
Wheat	0.641	0.420	0.315	0.297	14.87	17.23	14.03	13.05
Jowar	-	-	-	-	-	-	-	-
Bajra	(-)0.506	0.325	0.231	0.276	1.71	4.18	1.79	0.55
Maize	(-)0.226	(-)0.149	1.556	-	2.56	0.94	0.33	-
Ragi	-	-	-	-	-	-	-	-
Barley	-	-	-	-	-	-	-	-
Small millets	-	-	-	-	-	-	-	-
Total cereals	0.421	0.406	0.363	0.384	25.61	25.89	18.36	15.73
Edible oil	0.951	0.490	0.759	0.379	2.26	1.24	3.70	2.65
Sugar	1.161	0.855	0.777	0.696	6.96	6.90	4.97	4.61
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.582	0.483	N.A.	-	-	-	-

Note: The estimates for the year 1961-62 are based on the data for the undivided Punjab and hence are not strictly comparable with the estimates for the remaining years.

TABLE 13F: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: JAMMU & KASHMIR RURAL

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	0.925	1.110	0.723	0.590	23.66	23.35	19.22	15.26
Wheat	0.006	(-)0.070	0.379	0.373	6.06	5.28	8.15	7.04
Jowar	-	-	-	-	-	-	-	-
Bajra	-	-	-	-	-	-	-	-
Maize	(-)0.047	(-)0.889	(-)0.221	(-)0.610	8.17	5.32	3.84	2.48
Ragi	-	-	-	-	-	-	-	-
Barley	-	-	-	-	-	-	-	-
Small millets	-	-	-	-	-	-	-	-
Total cereals	0.552	0.596	0.513	0.405	38.17	34.28	31.31	25.00
Edible oil	0.787	0.676	0.584	0.680	3.86	4.46	5.25	5.39
Sugar	1.057	0.666	0.767	0.781	2.11	2.16	1.86	1.71
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.605	0.438	N.A.	-	-	-	-

TABLE 13G: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: KARNATAKA RURAL

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	1.160	1.087	0.937	0.851	16.46	17.13	15.07	12.40
Wheat	1.151	(-)0.111	1.406	1.146	1.34	1.77	1.42	1.68
Jowar	(-)0.151	0.241	0.046	0.023	10.90	13.34	8.00	5.70
Bajra	-	(-)0.490	(-)0.227	(-)0.424	-	0.36	0.24	0.21
Maize	-	0.995	(-)0.095	0.185	-	1.44	0.09	0.15
Ragi	0.356	0.753	0.444	(-)0.002	7.42	11.86	5.10	3.93
Barley	-	-	-	-	-	-	-	-
Small millets	-	-	(-)0.838	(-)0.269	-	-	0.20	0.13
Total cereals	0.594	0.692	0.620	0.549	36.91	46.51	30.43	24.62
Edible oil	1.066	1.025	0.819	0.940	2.33	2.27	3.08	3.96
Sugar	1.056	1.032	0.808	0.868	2.72	3.46	3.00	3.30
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.599	0.537	N.A.	-	-	-	-

TABLE 13H: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: KERALA RURAL

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	0.581	0.789	0.451	0.368	30.99	30.67	23.01	16.91
Wheat	1.113	0.379	0.842	1.072	0.24	1.23	9.49	0.96
Jowar	-	-	-	-	-	-	-	-
Bajra	-	-	-	-	-	-	-	-
Maize	-	-	-	-	-	-	-	-
Ragi	-	-	-	-	-	-	-	-
Barley	-	-	-	-	-	-	-	-
Small millets	-	-	-	-	-	-	-	-
Total cereals	0.580	0.769	0.470	0.415	31.23	32.07	24.14	18.11
Edible oil	0.970	1.174	0.822	0.867	2.14	1.94	2.72	3.20
Sugar	1.055	0.925	0.718	0.660	1.76	2.49	2.02	2.17
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.674	0.524	N.A.	-	-	-	-

TABLE 13I: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: MAHARASHTRA RURAL

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	0.845	0.773	0.978	0.513	12.00	8.35	7.77	6.13
Wheat	1.198	0.447	1.221	0.798	3.72	7.34	3.75	3.84
Jowar	0.302	0.484	(-)0.073	(-)0.001	16.12	16.89	11.28	7.33
Bajra	0.931	0.556	0.106	0.153	1.76	2.97	1.90	1.36
Maize	-	0.187	0.169	-	-	1.01	0.07	-
Ragi	0.302	0.378	0.003	(-)1.018	1.71	1.42	0.56	0.27
Barley	-	-	-	-	-	-	-	-
Small millets	-	-	0.493	-	-	-	0.06	-
Total cereals	0.660	0.520	0.460	0.325	36.56	39.21	25.52	19.11
Edible oil	0.799	0.912	0.895	0.757	3.47	4.22	5.16	5.95
Sugar	1.038	0.827	0.732	0.606	3.77	4.68	3.67	3.84
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.469	0.381	N.A.	-	-	-	-

TABLE 13J: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: MADHYA PRADESH RURAL

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	0.448	0.225	0.389	0.214	19.39	23.26	18.70	15.06
Wheat	0.960	1.367	0.925	0.824	10.54	10.44	10.69	9.67
Jowar	0.350	0.124	(-)0.571	(-)0.245	5.13	5.70	2.97	2.23
Bajra	-	-	1.393	0.792	0.28	0.39	0.26	0.23
Maize	(-)0.823	(-)0.198	(-)0.343	(-)0.251	1.77	1.72	1.74	0.81
Ragi	-	-	-	-	-	-	-	-
Barley	(-)0.432	-	(-)0.973	-	0.75	-	0.16	-
Small millets	(-)0.709	(-)0.646	(-)1.165	(-)0.842	1.26	1.62	0.88	0.23
Total cereals	0.481	0.432	0.405	0.378	42.14	44.45	35.99	28.46
Edible oil	1.046	1.315	1.171	1.001	3.54	3.93	4.28	5.50
Sugar	1.473	1.629	1.249	1.139	3.08	3.44	2.99	3.28
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.521	0.485	N.A.	-	-	-	-

TABLE 13K: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: ORISSA RURAL

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	0.678	0.660	0.555	0.442	45.69	47.25	45.64	38.98
Wheat	2.133	0.890	0.837	1.648	0.23	2.60	3.04	1.44
Jowar	-	-	-	-	-	-	-	-
Bajra	-	-	-	-	-	-	-	-
Maize	-	-	-	-	-	-	-	-
Ragi	(-)0.508	(-)0.061	(-)0.140	(-)0.898	1.32	2.03	1.05	0.75
Barley	-	-	-	-	-	-	-	-
Small millets	-	-	-	(-)2.157	-	-	-	0.19
Total cereals	0.643	0.629	0.547	0.449	47.47	52.35	50.03	41.44
Edible oil	0.951	1.290	1.227	1.229	2.76	2.52	2.70	3.80
Sugar	1.497	1.735	1.463	1.499	1.61	1.89	1.57	1.65
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.638	0.503	N.A.	-	-	-	-

TABLE 13L: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: PUNJAB RURAL

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	(-)0.001	0.414	0.713	0.470	3.39	1.73	1.91	1.13
Wheat	0.641	0.474	0.412	0.260	14.87	12.03	11.83	9.21
Jowar	-	-	-	-	-	-	-	-
Bajra	(-)0.506	-	-	-	1.71	-	-	-
Maize	(-)0.226	(-)0.222	0.843	0.672	2.56	2.80	0.95	0.60
Ragi	-	-	-	-	-	-	-	-
Barley	-	-	-	-	-	-	-	-
Small millets	-	-	-	-	-	-	-	-
Total cereals	0.421	0.363	0.490	0.320	25.61	16.95	14.97	11.23
Edible oil	0.951	0.526	0.544	0.551	2.26	2.88	3.51	4.80
Sugar	1.161	0.695	0.654	0.600	6.96	10.04	6.33	5.86
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.537	0.558	N.A.	-	-	-	-

Note: The estimates for the year 1961-62 are based on the data for the undivided Punjab and hence are not strictly comparable with the estimates for the remaining years.

TABLE 13M: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: RAJASTHAN RURAL

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	0.869	1.771	1.043	1.011	1.06	0.83	0.79	0.47
Wheat	1.238	0.953	0.603	0.359	7.71	11.59	11.09	15.54
Jowar	(-)0.070	(-)0.227	(-)0.699	(-)0.638	1.41	3.20	0.57	1.18
Bajra	0.782	0.738	0.297	0.363	9.50	10.45	7.39	3.07
Maize	(-)0.522	(-)0.787	(-)0.762	0.226	6.98	5.58	2.96	0.89
Ragi	-	-	-	-	-	-	-	-
Barley	0.233	0.275	(-)0.418	0.352	5.62	5.26	1.30	0.53
Small millets	(-)0.919	-	-	-	0.55	-	-	-
Total cereals	0.467	0.445	0.281	0.321	35.99	38.50	24.50	21.79
Edible oil	1.305	1.018	0.973	0.951	3.36	2.77	3.63	4.79
Sugar	1.463	1.378	1.141	1.034	4.47	5.27	4.69	4.47
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.543	0.389	N.A.	-	-	-	-

TABLE 13N: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: TAMIL NADU RURAL

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	0.616	0.780	0.785	0.551	33.01	31.38	26.84	23.91
Wheat	0.647	0.339	1.016	1.700	0.28	0.21	0.83	0.45
Jowar	(-)0.170	(-)0.335	(-)0.468	(-)0.987	2.26	2.65	1.84	0.85
Bajra	0.458	0.131	(-)0.196	(-)0.166	1.29	2.55	2.03	0.97
Maize	(-)1.064	-	-	-	0.51	-	-	-
Ragi	0.328	(-)0.274	(-)0.246	(-)0.154	3.31	3.82	2.84	1.63
Barley	-	-	-	-	-	-	-	-
Small millets	0.185	-	(-)0.398	(-)1.072	0.64	-	0.37	0.11
Total cereals	0.514	0.535	0.572	0.458	41.30	41.59	34.90	28.10
Edible oil	1.068	1.047	0.945	0.839	3.36	3.47	3.31	3.97
Sugar	1.386	1.694	1.255	1.335	1.52	1.78	1.59	1.59
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.558	0.576	N.A.	-	-	-	-

TABLE 13O: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: UTTAR PRADESH RURAL

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	0.386	0.727	0.473	0.341	11.88	11.48	9.88	7.91
Wheat	0.935	0.597	0.384	0.324	11.26	18.92	17.30	15.00
Jowar	0.411	(-)0.361	(-)0.634	(-)0.670	1.10	1.31	0.40	0.27
Bajra	(-)0.162	(-)0.250	0.197	(-)0.197	1.36	2.18	0.86	0.41
Maize	0.439	(-)0.042	0.182	0.002	2.11	1.95	0.61	0.47
Ragi	0.119	-	0.792	-	0.48	-	0.06	-
Barley	(-)0.277	0.309	(-)0.749	(-)0.983	4.58	1.53	0.19	0.08
Small millets	0.126	-	0.249	-	0.44	-	0.09	-
Total cereals	0.449	0.494	0.392	0.320	37.79	39.31	29.95	24.62
Edible oil	0.988	0.920	0.945	0.826	2.90	3.93	4.50	5.41
Sugar	0.945	1.316	1.097	1.010	3.92	4.37	3.23	3.07
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.538	0.486	N.A.	-	-	-	-

TABLE 13P: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: WEST BENGAL RURAL

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	0.461	0.705	0.704	0.463	46.18	42.73	39.13	34.55
Wheat	0.650	0.012	0.076	0.383	1.06	7.59	5.56	2.70
Jowar	-	-	-	-	-	-	-	-
Bajra	-	-	-	-	-	-	-	-
Maize	-	-	(-)1.249	-	-	-	0.14	-
Ragi	-	-	-	-	-	-	-	-
Barley	-	-	-	-	-	-	-	-
Small millets	-	-	-	-	-	-	-	-
Total cereals	0.463	0.595	0.620	0.459	47.58	50.56	44.93	37.32
Edible oil	0.886	1.034	1.020	0.919	3.94	3.77	3.99	5.28
Sugar	1.566	1.555	1.305	1.171	1.87	2.37	1.65	1.68
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.673	0.628	N.A.	-	-	-	-

TABLE 13Q: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: ALL INDIA RURAL

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	0.519	0.491	0.540	0.326	23.29	20.69	18.65	15.74
Wheat	1.099	0.865	0.489	0.500	5.66	9.08	7.92	7.25
Jowar	0.067	0.229	(-)0.184	(-)0.238	9.70	3.85	2.08	1.41
Bajra	0.662	0.739	0.346	0.301	3.36	2.22	1.32	0.72
Maize	0.007	(-)0.046	(-)0.343	0.002	1.56	2.20	1.25	0.51
Ragi	0.109	0.167	(-)0.007	(-)0.450	1.33	1.36	0.67	0.39
Barley	(-)0.056	0.286	(-)0.428	0.419	1.47	0.77	0.14	0.06
Small millets	(-)0.234	(-)0.728	(-)0.969	(-)0.791	0.46	0.41	0.19	0.08
Total cereals	0.508	0.517	0.420	0.332	39.58	41.14	32.47	26.38
Edible oil	0.944	1.127	0.926	0.854	3.08	3.51	4.02	4.98
Sugar	1.320	1.417	1.144	1.058	2.95	3.76	2.80	2.85
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.596	0.475	N.A.	-	-	-	-

TABLE 14A: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: ANDHRA PRADESH URBAN

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	0.482	0.370	0.281	0.301	27.43	27.18	17.81	14.94
Wheat	1.328	1.013	1.056	1.088	1.27	1.86	1.28	1.14
Jowar	(-)0.921	(-)0.440	(-)0.551	(-)0.729	2.22	2.24	0.60	0.54
Bajra	-	-	(-)1.964	-	-	-	0.01	-
Maize	-	-	-	-	-	-	0.01	-
Ragi	(-)0.954	-	(-)0.750	(-)0.285	0.56	-	0.12	0.05
Barley	-	-	-	-	-	-	-	-
Small millets	-	-	(-)1.573	-	-	-	0.01	-
Total cereals	0.370	0.317	0.299	0.320	31.84	32.07	19.86	16.71
Edible oil	0.793	0.958	0.758	0.736	3.29	4.40	4.26	4.67
Sugar	1.137	1.114	0.785	0.768	1.55	2.17	1.59	1.56
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.481	0.378	N.A.	-	-	-	-

TABLE 14B: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: ASSAM URBAN

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	0.429	0.098	0.265	0.023	18.19	26.53	26.83	17.30
Wheat	0.045	0.520	0.570	0.763	1.91	2.04	2.13	1.89
Jowar	-	-	-	-	-	-	-	-
Bajra	-	-	-	-	-	-	-	-
Maize	-	-	-	-	-	-	-	-
Ragi	-	-	-	-	-	-	-	-
Barley	-	-	-	-	-	-	-	-
Small millets	-	-	-	-	-	-	-	-
Total cereals	0.395	0.130	0.291	0.104	20.13	28.59	29.07	19.32
Edible oil	0.852	0.775	0.659	0.639	4.23	4.35	3.84	4.20
Sugar	0.881	0.691	0.678	0.457	3.78	2.62	2.04	1.82
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.381	0.431	N.A.	-	-	-	-

TABLE 14C: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: BIHAR URBAN

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	0.175	0.414	0.343	0.231	18.51	20.35	19.35	16.40
Wheat	0.406	0.263	0.288	0.205	6.86	12.18	11.27	9.27
Jowar	-	-	(-)2.477	-	-	-	0.04	-
Bajra	-	-	(-)2.077	(-)2.474	-	-	0.04	0.06
Maize	-	-	(-)1.622	(-)0.170	-	-	0.51	0.27
Ragi	-	-	-	-	-	-	-	-
Barley	-	-	-	-	-	-	-	-
Small millets	-	-	-	-	-	-	-	-
Total cereals	0.217	0.305	0.281	0.227	25.97	34.67	31.27	26.50
Edible oil	0.694	0.994	0.906	0.846	3.15	4.42	4.47	5.62
Sugar	0.923	1.199	0.058	0.918	1.43	2.35	1.78	1.91
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.403	0.409	N.A.	-	-	-	-

TABLE 14D: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: GUJARAT URBAN

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	0.595	0.816	0.466	0.544	6.08	6.62	4.72	4.08
Wheat	0.557	0.469	0.442	0.416	9.23	13.15	7.62	6.61
Jowar	(-)0.705	(-)0.111	(-)0.575	(-)0.968	1.39	1.25	0.45	0.39
Bajra	(-)0.119	0.066	(-)0.609	(-)0.901	3.50	5.02	2.06	1.30
Maize	-	-	(-)0.798	(-)0.319	-	-	0.07	0.05
Ragi	-	-	-	-	-	-	-	-
Barley	-	-	-	-	-	-	-	-
Small millets	-	-	-	-	-	-	-	-
Total cereals	0.359	0.433	0.275	0.282	20.30	26.59	15.16	12.61
Edible oil	0.644	0.857	0.671	0.810	5.48	9.23	7.96	8.91
Sugar	0.680	0.829	0.467	0.480	4.73	6.10	3.44	3.25
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.713	0.399	N.A.	-	-	-	-

TABLE 14E: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: HARYANA URBAN

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	0.543	1.273	0.977	0.174	1.84	2.10	1.76	2.28
Wheat	0.059	0.390	0.127	0.162	17.42	15.41	11.02	9.48
Jowar	-	-	-	-	-	-	-	-
Bajra	-	(-)1.763	0.226	-	-	0.40	0.29	-
Maize	0.616	(-)1.106	-	-	0.58	0.33	-	-
Ragi	-	-	-	-	-	-	-	-
Barley	-	-	-	-	-	-	-	-
Small millets	-	-	-	-	-	-	-	-
Total cereals	0.176	0.409	0.233	0.188	21.87	18.75	13.38	12.11
Edible oil	0.497	1.189	0.675	0.405	4.07	4.25	4.42	5.31
Sugar	0.755	1.506	0.677	0.555	4.17	5.44	3.43	3.23
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.545	0.417	N.A.	-	-	-	-

Note: The estimates for the year 1961-62 are based on the data for the undivided Punjab and hence are not strictly comparable with the estimates for the remaining years.

TABLE 14F: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: JAMMU & KASHMIR URBAN

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	0.465	0.580	0.146	0.190	19.23	17.23	14.41	11.35
Wheat	0.527	0.304	0.411	0.445	5.31	4.27	6.94	5.97
Jowar	-	-	-	-	-	-	-	-
Bajra	-	-	-	-	-	-	-	-
Maize	(-)0.317	-	-	0.297	0.88	-	-	0.08
Ragi	-	-	-	-	-	-	-	-
Barley	-	-	-	-	-	-	-	-
Small millets	-	-		-	-	-	-	-
Total cereals	0.456	0.509	0.245	0.284	25.54	21.82	21.59	17.52
Edible oil	0.571	0.819	0.742	0.522	4.42	7.07	6.06	6.19
Sugar	0.974	0.806	0.848	0.564	2.49	3.30	1.64	1.45
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.417	0.358	N.A.	-	-	-	-

TABLE 14G: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: KARNATAKA URBAN

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	0.771	0.589	0.536	0.324	17.09	18.07	12.40	10.43
Wheat	0.668	0.650	0.920	0.753	2.17	2.47	2.52	2.41
Jowar	(-)0.449	0.420	(-)0.672	(-)0.513	5.84	6.39	2.90	2.35
Bajra	-	-	-	-	-	-	-	-
Maize	-	-	-	(-)0.088	-	-	-	0.11
Ragi	0.054	(-)0.100	0.112	0.080	2.83	2.78	1.50	1.04
Barley	-	-	-	-	-	-	-	-
Small millets	-	-	-	-	-	-	-	-
Total cereals	0.429	0.298	0.377	0.254	27.97	30.14	19.57	16.52
Edible oil	0.809	0.958	0.784	0.716	2.24	3.58	3.53	4.10
Sugar	0.768	0.750	0.581	0.599	2.83	3.21	2.30	2.50
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.422	0.437	N.A.	-	-	-	-

TABLE 14H: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: KERALA URBAN

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	0.395	0.510	0.372	0.312	25.74	22.56	18.17	12.26
Wheat	1.163	0.629	0.804	1.097	0.31	1.72	1.39	1.19
Jowar	-	-	-	-	-	-	-	-
Bajra	-	-	-	-	-	-	-	-
Maize	-	-	-	-	-	-	-	-
Ragi	-	-	-	-	-	-	-	-
Barley	-	-	-	-	-	-	-	-
Small millets	-	-	-	-	-	-	-	-
Total cereals	0.401	0.519	0.407	0.388	26.14	24.35	19.77	13.71
Edible oil	0.699	1.102	0.790	0.836	2.21	2.15	2.80	3.20
Sugar	0.809	0.882	0.633	0.578	2.32	2.82	1.89	1.92
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.580	0.564	N.A.	-	-	-	-

TABLE 14I: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: MAHARASHTRA URBAN

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	0.546	0.700	0.570	0.545	7.23	4.26	5.27	4.35
Wheat	0.634	0.169	0.531	0.523	5.10	7.66	6.30	5.35
Jowar	(-)0.730	(-)0.663	(-)0.802	(-)0.895	4.42	3.06	2.56	1.81
Bajra	(-)0.016	(-)0.133	(-)0.887	(-)0.896	0.27	0.79	0.31	0.25
Maize	-	-	-	-	-	-	-	-
Ragi	-	-	-	-	-	-	-	-
Barley	-	-	-	-	-	-	-	-
Small millets	-	-	-	-	-	-	-	-
Total cereals	0.227	0.116	0.279	0.289	17.24	16.33	14.47	11.91
Edible oil	0.652	0.727	0.715	0.687	4.34	5.63	5.53	6.15
Sugar	0.623	0.521	0.534	0.394	3.60	3.65	2.53	2.63
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.400	0.369	N.A.	-	-	-	-

TABLE 14J: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: MADHYA PRADESH URBAN

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	0.778	0.325	0.381	0.330	7.42	7.87	8.35	5.62
Wheat	0.440	0.305	0.265	0.124	13.71	14.11	11.49	8.76
Jowar	(-)1.019	0.843	(-)1.136	(-)1.240	1.50	2.04	0.56	0.29
Bajra	-	-	-	-	-	-	-	-
Maize	-	-	(-)1.199	(-)0.732	-	-	0.08	0.06
Ragi	-	-	-	-	-	-	-	-
Barley	-	-	-	-	-	-	-	-
Small millets	-	-	-	-	-	-	-	-
Total cereals	0.487	0.214	0.266	0.182	24.23	24.40	20.76	14.91
Edible oil	0.733	0.781	0.845	0.709	4.19	5.38	5.31	5.99
Sugar	0.773	0.781	0.688	0.547	3.75	4.31	3.02	2.97
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.370	0.334	N.A.	-	-	-	-

TABLE 14K: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: ORISSA URBAN

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	0.186	0.273	0.097	(-)0.003	21.77	26.37	26.54	18.66
Wheat	1.129	0.653	0.794	0.853	1.87	4.09	4.14	3.32
Jowar	-	-	-	-	-	-	-	-
Bajra	-	-	-	-	-	-	-	-
Maize	-	-	-	-	-	-	-	-
Ragi	-	-	(-)0.976	-	-	-	0.21	-
Barley	-	-	-	-	-	-	-	-
Small millets	-	-	-	-	-	-	-	-
Total cereals	0.250	0.170	0.187	0.133	23.91	29.21	30.97	22.08
Edible oil	1.011	0.945	0.970	1.040	3.26	3.74	3.81	4.92
Sugar	1.119	1.004	1.636	0.883	2.14	2.52	1.08	1.94
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.445	0.420	N.A.	-	-	-	-

TABLE 14L: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: PUNJAB URBAN

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	0.543	0.642	0.996	0.659	1.84	1.68	1.99	1.71
Wheat	0.590	0.157	0.207	0.187	17.42	11.27	9.28	7.83
Jowar	-	-	-	-	-	-	-	-
Bajra	-	-	-	-	-	-	-	-
Maize	0.616	(-)0.433	0.353	0.053	0.58	0.60	0.17	0.12
Ragi	-	-	-	-	-	-	-	-
Barley	-	-	-	-	-	-	-	-
Small millets	-	-	-	-	-	-	-	-
Total cereals	0.176	0.203	0.360	0.280	21.87	13.75	11.77	9.95
Edible oil	0.497	0.523	0.543	0.501	4.07	4.71	4.62	5.70
Sugar	0.755	0.542	0.442	0.426	4.17	6.70	3.93	4.00
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.589	0.449	N.A.	-	-	-	-

Note: The estimates for the year 1961-62 are based on the data for the undivided Punjab and hence are not strictly comparable with the estimates for the remaining years.

TABLE 14M: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: RAJASTHAN URBAN

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	1.221	1.106	0.872	1.081	1.80	1.60	1.11	1.03
Wheat	0.599	0.397	0.304	0.191	15.94	14.62	12.91	12.15
Jowar	-	(-)0.400	(-)0.799	0.117	-	0.89	0.12	0.11
Bajra	(-)0.196	(-)0.326	(-)0.134	(-)0.371	3.25	3.48	1.99	0.55
Maize	(-)1.478	(-)0.512	(-)0.877	(-)0.768	0.69	1.14	0.46	0.11
Ragi	-	-	-	-	-	-	-	-
Barley	(-)0.327	(-)0.230	0.335	(-)0.968	2.11	1.75	0.11	0.10
Small millets	-	-	-	-	-	-	-	-
Total cereals	0.366	0.217	0.254	0.221	26.56	23.52	16.83	14.08
Edible oil	0.700	0.778	0.696	0.947	4.11	5.64	5.23	6.72
Sugar	0.807	0.936	0.765	0.756	3.98	4.99	3.67	3.46
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.412	0.391	N.A.	-	-	-	-

TABLE 14N: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: TAMIL NADU URBAN

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	0.294	0.264	0.312	0.227	26.66	24.64	20.37	15.92
Wheat	1.438	1.460	0.854	1.054	0.47	0.72	1.23	0.97
Jowar	(-)0.333	(-)1.108	(-)0.886	-	0.67	0.30	0.25	-
Bajra	-	-	(-)1.177	-	-	-	0.14	-
Maize	-	-	-	-	-	-	-	-
Ragi	-	(-)0.987	(-)1.684	(-)0.456	-	0.41	0.35	0.11
Barley	-	-	-	-	-	-	-	-
Small millets	-	-	-	-	-	-	-	-
Total cereals	0.284	0.255	0.287	0.259	28.31	26.23	22.45	17.12
Edible oil	0.802	0.886	0.824	0.853	2.89	3.50	3.25	3.90
Sugar	1.052	0.922	0.817	0.990	1.78	2.37	1.57	1.71
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.494	0.761	N.A.	-	-	-	-

TABLE 14O: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: UTTAR PRADESH URBAN

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	0.456	0.658	0.454	0.463	6.46	6.72	5.57	4.43
Wheat	0.408	0.251	0.153	0.100	15.47	17.55	13.29	10.64
Jowar	-	0.650	(-)1.349	-	-	0.34	0.06	-
Bajra	-	(-)1.252	(-)0.633	-	-	0.60	0.14	-
Maize	-	(-)1.147	(-)0.158	-	-	0.54	0.11	-
Ragi	-	-	-	-	-	-	-	-
Barley	(-)0.927	-	-	-	0.75	-	-	-
Small millets	-	-	-	-	-	-	-	-
Total cereals	-	0.290	0.240	0.227	-	26.41	19.45	15.35
Edible oil	0.806	0.830	0.833	0.736	3.78	4.99	4.89	5.64
Sugar	0.853	0.670	0.666	0.671	3.35	4.07	2.96	2.90
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.436	0.378	N.A.	-	-	-	-

TABLE 14P: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: WEST BENGAL URBAN

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	0.032	0.183	0.193	0.104	17.80	15.35	16.17	14.40
Wheat	0.336	0.046	0.263	0.263	3.12	6.52	5.07	3.57
Jowar	-	-	-	-	-	-	-	-
Bajra	-	-	-	-	-	-	-	-
Maize	-	-	-	-	-	-	-	-
Ragi	-	-	-	-	-	-	-	-
Barley	-	-	-	-	-	-	-	-
Small millets	-	-	-	-	-	-	-	-
Total cereals	0.080	0.145	0.214	0.137	21.06	22.00	21.39	18.03
Edible oil	0.590	0.683	0.733	0.660	3.62	4.16	4.10	4.62
Sugar	0.917	0.568	0.670	0.721	1.93	2.67	1.57	1.48
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.452	0.375	N.A.	-	-	-	-

TABLE 14Q: ESTIMATES OF ENGEL ELASTICITIES AND RATIOS FOR SELECT COMMODITIES: ALL-INDIA URBAN

	Engel Elasticity				Engel Ratio (Per Cent)			
Commodity	1961-62	1972-73	1983	1987-88	1961-62	1972-73	1983	1987-88
Rice	0.370	0.262	0.299	0.195	13.38	12.19	10.90	8.57
Wheat	0.416	0.322	0.326	0.298	6.80	8.40	6.56	5.47
Jowar	(-)0.509	(-)0.390	(-)0.654	(-)0.667	1.65	1.37	0.73	0.49
Bajra	0.094	(-)0.194	(-)0.316	(-)0.531	0.52	0.66	0.30	0.14
Maize	(-)0.855	(-)0.730	(-)0.937	(-)0.326	0.10	0.33	0.08	0.04
Ragi	(-)0.559	(-)0.615	(-)0.283	(-)0.250	0.26	0.24	0.16	0.08
Barley	(-)1.043.	-	-	-	0.16	-	-	-
Small millets	(-)2.204	-	-	-	0.03	-	-	-
Total cereals	0.281	0.208	0.259	0.202	23.27	23.64	18.94	14.96
Edible oil	0.754	0.810	0.793	0.732	2.95	4.85	4.66	5.29
Sugar	0.795	0.771	0.675	0.621	3.76	3.60	2.36	2.34
Total Consumption	1.000	1.000	1.000	1.000	100.00	100.00	100.00	100.00
Calories	N.A.	0.434	0.438	N.A.	-	-	-	-

TABLE 15A: DECILE GROUPWISE CONSUMPTION DISTRIBUTION OF SELECT COARSE CEREALS BY SELECT STATES: RURAL (1987-88)

State	Andhra Pradesh		Bihar		Gujarat					
Commodity	Jowar		Maize		Jowar		Bajra		Maize	
Decile Group	Consumption Share (Per Cent)	Monthly Per Capita Consumption (kg)	Consumption Share (Per Cent)	Monthly Per Capita Consumption (kg)	Consumption Share (Per Cent)	Monthly Per Capita Consumption (kg)	Consumption Share (Per Cent)	Monthly Per Capita Consumption (kg)	Consumption Share (Per Cent)	Monthly Per Capita Consumption (kg)
0-10	12.02	1.90	16.52	1.31	8.88	0.92	8.91	3.21	19.08	1.37
10-20	14.16	2.24	14.46	1.14	13.52	1.41	9.39	3.38	14.26	1.03
20-30	13.34	2.11	12.26	0.97	11.75	1.22	9.54	3.43	8.39	0.60
30-40	11.79	1.86	8.73	0.69	10.06	1.05	9.55	3.44	7.15	0.51
40-50	10.07	1.59	7.81	0.62	8.08	0.84	9.66	3.48	8.38	0.60
50-60	8.74	1.38	7.18	0.57	8.08	0.84	10.17	3.66	8.89	0.64
60-70	8.44	1.33	8.53	0.67	8.62	0.90	9.73	3.50	9.41	0.68
70-80	8.14	1.29	9.95	0.79	11.61	1.21	10.90	3.92	9.96	0.72
80-90	7.03	1.11	7.92	0.63	9.13	0.95	11.28	4.06	8.17	0.59
90-100	6.26	0.99	6.64	0.52	10.28	1.07	10.88	3.92	6.32	0.46
0-100	100.00	1.58	100.00	0.79	100.00	1.04	100.00	3.60	100.00	0.72

TABLE 15B: DECILE GROUPWISE CONSUMPTION DISTRIBUTION OF SELECT COARSE CEREALS BY SELECT STATES: RURAL (1987-88)

State	Jammu & Kashmir		Karnataka				Maharashtra			
Commodity	Maize		Jowar		Ragi		Jowar		Bajra	
Decile Group	Consumption Share (Per Cent)	Monthly Per Capita Consumption (kg)	Consumption Share (Per Cent)	Monthly Per Capita Consumption (kg)	Consumption Share (Per Cent)	Monthly Per Capita Consumption (kg)	Consumption Share (Per Cent)	Monthly Per Capita Consumption (kg)	Consumption Share (Per Cent)	Monthly Per Capita Consumption (kg)
0-10	18.48	4.27	9.92	4.21	8.53	2.69	10.09	6.67	6.34	0.68
10-20	10.32	2.38	11.19	4.76	9.83	3.10	10.57	6.99	8.10	0.87
20-30	11.00	2.54	9.55	4.06	10.96	3.45	10.53	6.96	10.70	1.16
30-40	17.86	4.13	9.15	3.89	10.55	3.32	10.41	6.88	12.89	1.39
40-50	6.80	1.57	9.42	4.00	11.15	3.51	10.39	6.87	8.89	0.96
50-60	10.53	2.43	8.27	3.51	9.61	3.03	10.96	7.24	12.20	1.32
60-70	7.45	1.72	9.15	3.89	11.49	3.62	9.56	6.32	9.44	1.02
70-80	6.29	1.45	11.08	4.71	10.61	3.34	9.36	6.19	8.49	0.92
80-90	4.81	1.11	11.99	5.10	9.30	2.93	9.60	6.35	11.68	1.26
90-100	6.44	1.49	10.29	4.38	7.99	2.52	8.52	5.63	11.27	1.22
0-100	100.00	2.31	100.00	4.25	100.00	3.15	100.00	6.61	100.00	1.08

TABLE 15C: DECILE GROUPWISE CONSUMPTION DISTRIBUTION OF SELECT COARSE CEREALS BY SELECT STATES: RURAL (1987-88)

State	Madhya Pradesh		Rajasthan					
Commodity	Jowar		Jowar		Bajra		Maize	
Decile Group	Consumption Share (Per Cent)	Monthly Per Capita Consumption (kg)	Consumption Share (Per Cent)	Monthly Per Capita Consumption (kg)	Consumption Share (Per Cent)	Monthly Per Capita Consumption (kg)	Consumption Share (Per Cent)	Monthly Per Capita Consumption (kg)
0-10	14.95	2.77	16.62	1.73	2.89	0.64	6.51	0.46
10-20	10.58	1.96	13.34	1.39	8.17	1.81	6.08	0.43
20-30	10.53	1.95	12.97	1.35	9.63	2.14	11.64	0.83
30-40	9.24	1.71	9.16	0.95	9.68	2.15	10.06	0.71
40-50	8.77	1.62	8.90	0.93	12.77	2.83	9.87	0.70
50-60	9.24	1.71	8.59	0.89	13.37	2.97	10.13	0.72
60-70	4.55	0.84	11.07	1.15	11.71	2.60	11.83	0.84
70-80	16.84	3.12	10.87	1.13	11.02	2.45	13.55	0.96
80-90	6.53	1.21	4.56	0.47	10.50	2.33	13.27	0.94
90-100	8.77	1.62	3.92	0.41	10.27	2.28	7.07	0.50
0-100	100.00	1.85	100.00	1.04	100.00	2.22	100.00	0.71

TABLE 15D: DECILE GROUPWISE CONSUMPTION DISTRIBUTION OF SELECT COARSE CEREALS BY SELECT STATES: RURAL (1987-88)

State	Tamil Nadu					
Commodity	Jowar		Bajra		Ragi	
Decile Group	Consumption Share (Per Cent)	Monthly Per Capita Consumption (kg)	Consumption Share (Per Cent)	Monthly Per Capita Consumption (kg)	Consumption Share (Per Cent)	Monthly Per Capita Consumption (kg)
0-10	27.04	1.51	10.64	0.70	9.19	1.03
10-20	13.22	0.74	8.70	0.57	13.35	1.49
20-30	9.78	0.55	14.07	0.93	11.53	1.29
30-40	10.71	0.60	7.88	0.52	10.45	1.17
40-50	11.20	0.63	11.56	0.76	9.88	1.11
50-60	9.53	0.53	15.17	1.00	11.10	1.24
60-70	5.64	0.32	12.20	0.81	8.99	1.01
70-80	5.10	0.29	7.67	0.51	11.04	1.24
80-90	5.12	0.29	6.24	0.41	8.08	0.91
90-100	2.66	0.15	5.87	0.39	6.38	0.71
0-100	100.00	0.56	100.00	0.66	100.00	1.12

TABLE 15E: DECILE GROUPWISE CONSUMPTION DISTRIBUTION OF SELECT COARSE CEREALS: ALL INDIA RURAL (1987-88)

Commodity	Jowar		Bajra		Maize		Barley		Small Millets		Ragi	
Decile Group	Consumption Share (Per Cent)	Per Capita Consumption (kg)	Consumption Share (Per Cent)	Per Capita Consumption (kg)	Consumption Share (Per Cent)	Per Capita Consumption (kg)	Consumption Share (Per Cent)	Per Capita Consumption (kg)	Consumption Share (Per Cent)	Per Capita Consumption (kg)	Consumption Share (Per Cent)	Per Capita Consumption (kg)
0-10	13.71	1.62	7.13	0.36	10.66	0.39	10.00	0.04	21.46	0.15	15.38	0.49
10-20	11.64	1.37	8.13	0.41	11.62	0.43	17.60	0.07	15.66	0.11	12.66	0.41
20-30	10.88	1.28	9.20	0.47	10.02	0.37	8.90	0.04	11.11	0.08	11.19	0.36
30-40	10.47	1.24	9.32	0.48	8.80	0.33	5.00	0.02	9.30	0.07	10.63	0.34
40-50	10.14	1.20	9.89	0.50	8.57	0.32	6.70	0.03	8.57	0.06	10.20	0.33
50-60	9.79	1.16	11.57	0.59	9.96	0.37	10.00	0.04	8.04	0.06	9.26	0.30
60-70	9.10	1.07	10.96	0.56	10.56	0.39	10.00	0.04	5.81	0.04	9.16	0.29
70-80	8.69	1.03	11.51	0.59	9.85	0.36	12.70	0.05	4.40	0.03	8.36	0.27
80-90	8.40	0.99	12.29	0.63	9.73	0.36	11.90	0.05	5.71	0.04	7.31	0.23
90-100	7.17	0.85	10.00	0.51	10.23	0.38	7.20	0.03	9.93	0.07	5.86	0.19
0-100	100.00	1.18	100.00	0.51	100.00	0.37	100.00	0.04	100.00	0.07	100.00	0.32

TABLE 16A: DECILE GROUPWISE CONSUMPTION DISTRIBUTION OF SELECT COARSE CEREALS BY SELECT STATES: URBAN (1987-88)

State	Andhra Pradesh		Gujarat				Karnataka			
Commodity	Jowar		Jowar		Bajra		Jowar		Ragi	
Decile Group	Consumption Share (Per Cent)	Monthly Per Capita Consumption (kg)	Consumption Share (Per Cent)	Monthly Per Capita Consumption (kg)	Consumption Share (Per Cent)	Monthly Per Capita Consumption (kg)	Consumption Share (Per Cent)	Monthly Per Capita Consumption (kg)	Consumption Share (Per Cent)	Monthly Per Capita Consumption (kg)
0-10	18.72	1.09	14.13	0.58	16.24	2.01	15.04	3.49	7.29	0.83
10-20	18.54	1.08	16.43	0.67	14.62	1.81	14.03	3.26	9.24	1.05
20-30	13.79	0.80	24.88	1.02	15.89	1.97	14.27	3.31	5.88	0.67
30-40	8.90	0.52	13.34	0.55	12.49	1.55	9.44	2.19	14.04	1.60
40-50	7.61	0.44	6.65	0.27	10.51	1.30	9.97	2.31	13.82	1.58
50-60	6.40	0.37	5.37	0.22	8.06	1.00	10.61	2.46	11.89	1.36
60-70	7.98	0.46	5.99	0.25	6.64	0.82	10.09	2.34	10.04	1.14
70-80	9.27	0.54	4.24	0.17	8.30	1.03	6.86	1.59	8.76	1.00
80-90	4.98	0.29	6.18	0.25	4.23	0.52	5.50	1.28	11.08	1.26
90-100	3.80	0.22	2.80	0.11	3.03	0.38	4.20	0.97	7.96	0.91
0-100	100.00	0.58	100.00	0.41	100.00	1.24	100.00	2.32	100.00	1.14

TABLE 16B: DECILE GROUPWISE CONSUMPTION DISTRIBUTION OF SELECT COARSE CEREALS BY SELECT STATES: URBAN (1987-88)

State	Maharashtra		Rajasthan		All India	
Commodity	Jowar		Bajra		Jowar	
Decile Group	Consumption Share (Per Cent)	Monthly per Capita Consumption (kg)	Consumption Chare (Per Cent)	Monthly Per Capita Consumption (kg)	Consumption Share (Per Cent)	Monthly Per Capita Consumption (kg)
0-10	25.37	6.01	8.35	0.34	20.90	1.17
10-20	16.28	3.86	8.47	0.35	15.57	0.87
20-30	13.61	3.23	14.84	0.61	11.66	0.65
30-40	13.47	3.19	19.09	0.78	10.66	0.60
40-50	8.39	1.99	17.84	0.73	11.27	0.63
50-60	6.87	1.63	.68	0.27	8.76	0.49
60-70	4.94	1.17	4.14	0.17	7.79	0.44
70-80	4.79	1.14	9.06	0.37	5.36	0.30
80-90	3.70	0.88	9.32	0.38	5.09	0.28
90-100	2.56	0.61	2.20	0.09	2.94	0.16
0-100	100.00	2.37	100.00	0.41	100.00	0.56

HIGHER EDUCATION UNDER STRUCTURAL ADJUSTMENT*

Jandhyala B G Tilak

In this paper the effects of adjustment policies on higher education in India are briefly analysed, and with the help of limited data available for a short period, it has been shown that the adjustment policies tend to result in severe budget cuts or significant reduction in rates of growth in budget expenditure on higher education and, more importantly, in major shifts in policies relating to state financing of higher education (e.g., student fees, student loan programmes and privatisation in general) in undesirable directions, which have serious long term implications, as they tend to be irreversible. It is argued here that since the success in adjustment policies requires highly skilled manpower, it is necessary to safeguard the whole education system, including higher education, from the adverse effects of adjustment policies.

'Economic reforms and market liberalisation are not ends in themselves but are means to achieve the goals of development... If the latter cannot be achieved by market reforms, supplementary positive action must be adopted, and their financing must be provided for in any plan allocation of investible resources' [Planning Commission, 1996, p. 13].

'... to compete in the world industrial economy, it is essential to have higher educational institutions, scientists, technologists and engineers. Universal primary and secondary education is a worthy goal in its own right, but alone it does not provide the wherewithal to compete in the international market' [Singh, 1994, p. 180].

1. *Global Economic Crisis and Adjustment*

The now well known adjustment policies adopted everywhere in the developing world, including in India, have both short term and long term serious implications for almost all sectors of the economy. The adjustment policies include major policy reforms and consist of two distinct strands of a single package: (a) short term stabilisation policies attributable to the International Monetary Fund (IMF) and (b) long term structural adjustment policies associated with the World Bank (IBRD). Both signal a new wave of policy-oriented loans, and constitute an important type of non-project lending of the Brettonwoods institutions. Stabilisation policies, essentially viewed as a short-term demand oriented device to reduce macro economic imbalances, rely on demand management and include sustainable reductions in budgetary (fiscal and revenue) deficits, and current account of the balance of payments, and reduction in inflationary gaps through devaluation of local currency, reduction in government expenditure, reduction in public subsidies, control of bank credits, tax reforms, controls on wage increases, dismantling of price controls and allowing the market to determine prices, etc. The most direct consequence of all this would be cuts in government spending leading to drastic reduction in public subsidies across the board, though the reduction need not necessarily be, and is most often not, uniform across all the sectors. Actually, the cutbacks in government expenditures are expected to be focused on unproductive or less productive sectors [Tanzi, 1989, p. 25], and not necessarily on human capital development sectors, like education and health. These short term stabilisation policies, including the austerity measures of the IMF, came into conflict with the long term policy requirements as viewed by the World Bank. The structural adjustment loans were, in a sense, the World Bank's response to this conflict, and with this, the World Bank, as Mosley and Weeks described, 'broke new intellectual ground with its claim that developing countries could adjust to adverse macroeconomic conditions via measures to boost the supply side of the economy' [Mosley and Weeks, 1994, p.

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319]. The 'gigantic experiment in development policy' signifies the World Bank's new lending and investment strategies, which aim at correcting fundamental long term weaknesses in borrowing countries, focus on macro economy, and include non-sector specific policy reforms, and are not intended to address sectoral concerns, which are addressed by sectoral adjustment loans. The conditions that are attached to structural adjustment loans are macro economic and some are common to the stabilisation policies, such as reduction of fiscal imbalances and deficits, macro economic efficiency, containment of wage bill and employment freeze, besides trade liberalisation, involving abolition or liberalisation of foreign exchange and import controls, hospitality to foreign investment, etc. These loans, however, aim at providing finances much more quickly than conventional loans to assist the economy on a long term basis. They provide at the same time scope for even more intervention by the World Bank in the domestic economy in that they address the need perceived by the World Bank for comprehensive economic reforms across the board. Thus, in contrast to the short term stabilisation policies of the IMF, the structural adjustment policies, on the other hand, aim at long term structural reform, including improvement in productivity of resources, improvement in allocation of resources, increase in economic efficiency and flexibility of the economy, increase in competition, and thereby expansion of the economy [see Michalopolous, 1987; World Bank, 1988; Tanzi, 1989, Pp. 13-32; and Thomas and Chhibber, 1989]. More importantly, they also imply reduced role of the state and increased role of the market mechanism or privatisation and dismantling of state apparatus in the name of de-bureaucratization. It is generally argued that but for the adjustment policies, distortions in allocations would take place and inefficiency at macro level might increase.

In principle as well as in practice, both stabilisation and structural adjustment policies are related: 'If you do not solve the problems of stabilisation, then you cannot, by definition, start the process of restructuring your economies. If there is widespread excess demand in the system, if inflation is not brought under control, if government deficits keep on growing year after year fanning inflational expectations, in that sort of environment, it is very difficult to assume that you adopt structural policies ...' [Singh, 1992, p. 108; see also World Bank, 1990]. Both are viewed as a single indivisible package of reforms and they are also related thus in practice: the adjustment loans are required to be preceded by stabilisation policies, though both are found to be going on simultaneously in many cases, achieving neither macro economic stability nor restoration of sustainable growth [Bajpai, 1993, Pp. 990-94; 1995, p. 113].

The objectives of the overall adjustment policies have been, thus to (a) stabilize the economy, (b) to improve allocation of resources, and thereby raise the level of output and income and (c) to achieve higher levels of savings and a more efficient use of investment resources, in order to raise the rate of economic growth. These goals are to be achieved through (a) privatisation and (b) globalisation. Privatisation implied reduced role of the state, and placing the market at the centre of the society. Thus the policy is, as Emmerij rightly noted, 'noninterventionist [by the government] in spirit' and 'concentrates on increasing the efficiency of market signals as a guide to an improved allocation of resources' [Emmerij, 1987, Pp. 3-4]. Thus, privatisation is a powerful phenomenon that puts markets and market concerns ahead of the state and policies and concerns of the state. For the same reason, most of the economic reforms introduced since 1980 in many countries can best be described as 'market reforms', as against 'redistributive reforms' of the earlier decades [Lipton, 1995, Pp. 1-35]. And globalisation is found to be a very powerful force, which places the world economy ahead of national economy and, accordingly, domestic policies have to be subdued to international policies and national economies are to be thrown into an international blender. Thus, the role of the state is reduced particularly in the domestic economy and is found important only in promoting private sector and globalisation.

The World Bank started disbursement of such adjustment loans in 1980, and it is reported that more than 80 developing countries have taken so

far such loans, and have undergone or have been undergoing the process of structural adjustment. Second generation structural adjustment loans are now being designed by the World Bank and by governments of various countries. Thus there are very few developing countries which have not experienced in varying degrees with adjustment policies. In this sense, the whole developing world is in the process of adjustment, and one can simply refer to this as a 'global adjustment' period. The 1980s and the 1990s are, in short, a period of economic crisis and adjustment all over the globe.

The adjustment programmes have been found to have mixed effects on the national economies - both on social and economic sectors - and have given rise to a few winners and many losers. The World Bank's own evaluations themselves were not very favourable to adjustment programmes [Leftwich, 1994, Pp. 363-386]. With respect to economic growth, only a few countries have been found to have 'done well whilst most have not only not done well but their performance has actually deteriorated, in some cases, quite severely, compared to the pre-reform period' [Sobhan, 1992, p. PE72]. As per the Latin American experience, structural adjustment reform produces 'at best very limited positive results ... despite a number of potential sources of bias in its favour; and such benefits, as they are, are overshadowed by the very strong negative effects' on investments and economic growth [Woodward, 1992]. All these consequences have led many to question whether these reform policies are 'for growth or for decay' [Colclough and Green, 1988].

Kakwani has found that countries that have adopted structural adjustment programmes have not performed better than non-adjusting countries with respect to levels of living of the population [Kakwani, 1995, Pp. 469-502]. In fact, in a large number of cases, they did find themselves in a worse situation than non-adjusting countries [see also Lindenberg, 1993]. Actually, the poor are worse affected, as structural adjustment reform programme 'has organised a drastic shift in class power to the benefit of wealthy and privileged' [Vieux and Petras, 1996, p. PE28]. For, these economic reform policies inherently justify social hierarchy and inequality, and indeed aim at reversing the state efforts towards social equality [Laxer, 1993, p. 13]. Structural adjustment programmes and anti-poverty programmes are not consistent with each other, often harming poor groups [Killick, 1995, Pp. 305-331]. Internal contradictions, conflicts and pressures generated by the structural adjustment programmes along with increasing debt burden, necessitating authoritarian responses from the governments, abdication of basic welfare responsibilities by the state, etc., result in destabilisation of the political systems and in several democratic and ethnic tensions, as in the case of Africa [Cornia et al., 1992; Walton and Seddon, 1994; Adekanye, 1995, Pp. 355-374]. Thus, problems associated with adjustment policies seem to be varied, serious and complex, particularly in large countries. Perhaps structural adjustment reforms 'hold good only under very restricted assumptions, perhaps only for small economies and not for large ones' [Bajpai, 1995, p. 113].

To conclude, in general, structural adjustment policies have been found favourable at best to export-oriented growth, and the external account; their effect on aggregate investment is almost everywhere negative; their influence on national income and on financial flows from overseas is, on the balance, neutral; their effects on distribution are also at best neutral, and their effects on living standards of the poor are adverse [Mosley, *et al.*, 1991, Pp. 301-302].

2. *Indian Economy Under Adjustment*

In the context of analysing the impact of the World Bank/International Monetary Fund adjustment policies on levels of living, Kakwani *et al.*, [1990] classified 86 developing countries of the world - Africa, Asia, Europe and middle East, and the Latin America - into five categories, based on their adoption of adjustment policies: (a) 'intensely adjusting' countries, that have relatively long periods of experience with the adjustment policies and processes, having taken three or more structural adjustment loans by 1989, and having started in or before 1985 (25 countries), (b) 'pre-1986 adjusting countries' that have received less than three structural

adjustment loans, but were included in the programme before 1985 (11 countries), (c) 'post-1985 adjusting countries' that received adjustment loans between 1986-88 (19 countries), (d) 'non- adjusting' countries (of type I), that *did not need* IMF/World Bank type of adjustment measures and had an increase in average annual growth in GDP per capita during 1980-87 (17 countries), and (e) 'non-adjusting countries' (of type II), that were 'potential candidates' for World Bank adjustment loans with a decline in the average annual growth in per capita GDP during 1980-87 (14 countries). Kakwani later extended the analysis to cover the period up to 1990 [Kakwani, 1995, Pp. 469-502]. India was classified in category (d). That is, as late as in 1990, India was recognised as a country that did not need adjustment measures of the kind suggested by the World Bank and the IMF; it was also not regarded as a 'potential candidate' for such loans. It is not only the World Bank research, but also others were highly optimistic about India's economic growth in the 1990s. E.g., Adams concluded: 'India remains well poised to continue its rapid growth through the 1990s' [Adams, 1990, p. 9; see also Rosen 1991, Pp. 75-95]. Within a year, the situation had changed completely. India had become suddenly an adjusting country with the introduction of a package of sweeping policy reforms in July 1991, and it is feared that it might become 'an intensely adjusting' country soon.

While on the one hand, optimists hope that structural adjustment policies would transform India into a rapidly industrialising economy like the East Asian tigers, on the other hand, the adverse effects of these policies are being widely noted on various productive sectors. After the reform policies were introduced, i.e., during the 1990s agricultural production was found to have declined [Rao, 1994, Pp. 1,005-1,010]; industrial production grew at a meagre rate of growth of 1.6 per cent [Sinha, 1994, Pp. 945-952]; imports continue to increase faster than exports and the country was found becoming a 'severely indebted country' [Datt, 1996, Pp. 7-10] and entering into a debt trap. India has to borrow even to pay interest on the earlier loans, the interest payments accounting for 94 per cent of the new borrowings [Dandekar, 1994, Pp. 983-991]; and so on.

During the period of adjustment, an increasing rate of unemployment was forecasted [Mundle, 1992, Pp. 25-40; Singh, 1993, Pp. 279-285; Toye, 1995]. The annual rate of growth in employment in organised public sector came down from 1.23 per cent during 1988-90 to 0.71 per cent during 1991-93; in private sector also corresponding rates of growth declined from 1.29 per cent to 1.14 per cent. The calculations are based on Institute of Applied Manpower Research (IAMR) [1995, p. 175]. In general, unemployment of the educated seems to increase, with increasing number of job seekers registering in the employment exchanges (Table 1). Particularly, the number of unemployed engineers seems to be increasing at an increasing rate of growth, as shown in Table 2.

TABLE 1. GROWTH IN THE NUMBER OF APPLICANTS ON LIVE REGISTERS OF EMPLOYMENT EXCHANGES BY EDUCATIONAL LEVEL

(in 000's)

	Matricu-lates	Under Graduates	Graduates	Post-Graduates	Total
1971	1,286.8	605.2	354.4	39.2	2,285.6
1976	2,828.6	1,255.2	926.2	94.8	5,104.8
1981	5,878.1	2,325.5	1,542.9	141.9	9,888.4
1986	8,682.0	3,806.0	2,306.6	293.1	15,087.7
1991	13,110.9	5,516.4	3,387.5	419.7	22,434.5
1992	13,528.5	5,572.7	3,450.1	455.0	23,006.3
Growth Rates					
1991-86(%)	10.2	9.0	9.4	8.6	9.7
1992-91	3.2	1.0	1.8	8.4	2.5

Source: Institute of Applied Manpower Research (IAMR) [1995].

TABLE 2. GROWTH IN THE UNEMPLOYED ENGINEERS (DEGREE LEVEL ONLY) IN SELECTED STATES

States						Rates of Growth(%)				
	1989	1990	1991	1992	1993	90-89	91-90	92-91	93-92	93-89*
Maharashtra	541	912	927	1,351	1,952	68.6	1.6	45.7	44.5	40.1
Assam	135	138	148	154	372	2.2	7.2	4.1	141.6	38.8
Rajasthan	231	231	236	227	532	0.0	2.2	-3.8	134.4	33.2
Kamataka	3,241	2,574	2,399	3,184	5,473	-20.6	-6.8	32.7	71.9	19.3
Andhra Pradesh	1,894	2,143	2,120	1,974	3,060	13.1	-1.1	-6.9	55.0	15.1
Kerala	760	789	759	819	1,211	3.8	-3.8	7.9	47.9	13.9
Madhya Pradesh	1,011	1,115	1,136	954	1,187	10.3	1.9	-16.0	24.4	5.1
Gujarat	385	399	398	455	441	3.6	-0.3	14.3	-3.1	3.7
Delhi	225	249	257	258	252	10.7	3.2	0.4	-2.3	3.0
Orissa	159	139	142	149	174	-12.6	2.2	4.9	16.8	2.8
Tamil Nadu	2,621	3,537	4,393	4,117	2,112	34.9	24.2	-6.3	-48.7	1.0
Uttar Pradesh	947	884	971	867	942	-6.7	9.8	-10.7	8.7	0.3
Bihar	914	984	1,049	1,045	898	7.7	6.6	-0.4	-14.1	-0.0
Haryana	129	97	86	87	113	-24.8	-11.3	1.2	29.9	-1.3
Chandigarh	102	89	84	82	85	-12.7	-5.6	-2.4	3.7	-4.3
West Bengal	561	562	556	550	463	0.2	-1.1	-1.1	-15.8	-4.4
Punjab	155	153	161	161	126	-1.3	5.2	0.0	-21.7	-4.5

Note: * average of all rates of growth.
Source: Based on IAMR [1995].

During the last few years, revenue expenditure increased faster than capital expenditure and non-plan expenditure increased faster than plan expenditure. In fact, developmental expenditure seems to have been cut and the cuts have been very serious, causing damage to development projects [Bhagwati and Srinivasan, 1993; Sengupta, 1995, Pp. 19-27; see also several papers in Parikh and Sudarshan, 1993]. The states seem to be suffering more, as the transfer from the central government to states declined. As per the indications given in the 1995-96 union budget, central transfers might further decline in the near future, and as a result, states would be under increasingly severe pressure. The overall financial power of the states would deteriorate. These trends are already clear. The share of development expenditure in the total expenditures of the states fell from 69.5 per cent in 1990-91 to an estimated level of 65.1 per cent in 1994-95. Among the several development projects, social sectors suffered more. The combined outlays of the centre and the states on rural development and social services as a proportion of GDP in 1994-95 were significantly lower than in the pre-reform years [Guhan, 1995, Pp. 1,095-1,101]. Development expenditure on social services declined from 5.3 per cent of GDP in 1989-90 to 4.9 per cent in 1994-95 (budget estimates) [World Bank, 1995b, p. 42]. Further, as the Planning Commission has stressed, the incidence of poverty has increased (as per the estimates of the expert group), and the rate of growth of state income in most states has been less in the post-reform period, compared to pre-reform period [Planning Commission, 1996, Pp. 11-30]. The effects on health care, food intake and nutrition are also found to be high and the effects are found to be severe in the case of the poor and women [White, 1995, Pp. 124-147]. Thus, much of the research on India on adjustment policies and their impact has been confined to international trade, economic growth, physical capital sectors and, in a limited way, to poverty related problems, but it was rarely extended to education.

3. *Effects of Adjustment on Education*

What are the effects of these policies on education? A few major surveys are available that reviewed the effects of adjustment policies on education in developing countries [for example, Noss, 1991; Kakwani *et al.*, 1990; Tibi, 1989, Pp. 100-126; Bestecher and Carr-Hill, 1990; Sanyal, 1992, Pp. 105-17; Reimers, 1994, Pp. 1,784-1,789; Unesco, 1993; Fuller and Abte, 1992; Ilon, 1994, Pp. 95-108; and Tilak, 1989, Pp.

125-46; 1990a, Pp. 470-486; 1992b, Pp. 407-422; 1996]. But most of the surveys referred to human development or social sectors and, within education, to basic education in particular, and rarely focussed their attention on higher education or on other levels of education. The likely effects of adjustment policies on human development in general and on education in particular, specifically on primary education in India, have been briefly reviewed in the literature [Gupta and Sarkar, 1994, Pp. 741-751; Prabhu, 1994, Pp. 1,011-1,028; 1995, Pp. 27-43].

Educational development and adjustment seem to be antithetical. The adjustment policies stress that 'society can no longer afford social democracy, so expensive social and education programs must be curtailed' [Laxer, 1993, p. 13]. As macro economic adjustment and education are closely related through the budgetary mechanism, this becomes easy. Budget restructuring as a strategy of economic adjustment, leads to reduction in public spending on education; and declining budgets for education may affect the quantity and quality of the graduates of the education system, which will have a negative impact on macro economic growth and adjustment. Not only the macro economic choices, the meso and micro choices were significantly influenced by adjustment policies, and the influence has been on the whole negative [see Cornia and Stewart, 1990].

Noss described the process of adjustment measures influencing education as follows: 'Adjustment measures (undertaken with or without World Bank assistance) affect education through changes at the macro and micro levels of the economy. Adjustment at the macro level often implies a combination of budget containment measures for the public education system, limited access to post-primary public education, and higher user fees for education services at the secondary and tertiary levels. At the micro level, changes in household incomes and prices (user fees and reduced student subsidies) directly influence the demand for education by altering the opportunity cost of attending school... Household incomes also affect health and nutrition status, and thus indirectly influence attendance and learning ability. Finally, adjustment affects education through changes in markets and infrastructure (resulting from currency devaluation, fiscal and monetary restraint, and price liberalisation) that affect supply of education services and the opportunity cost of attending school ...' [Noss, 1991, p. 4].

Why and how do education budgets suffer under 'adjusting' processes? Public investments in education decline significantly, in absolute and/or relative terms, in the adjusting countries, because the debt burden in the adjusting countries increases dramatically and, correspondingly, the debt service payments, and the governments have to necessarily reduce the public spending. It is easier to reduce the expenditure on education than expenditure on other sectors. Hence, the axe falls more severely on education, while it may fall on most other sectors as well, though the World Bank [1990] feels that the cuts need not necessarily be inflicted on all sectors.

Balancing the balance of payments becomes an important goal of the national economies, and currency devaluation becomes an important instrument to achieve this under adjustment programmes. As Noss noted, the currency devaluation may induce shifts in the allocation of public budgets towards sectors that are more import- or foreign exchange-intensive, and as education does not belong to either category, it suffers in the form of reallocation of public resources away from education [Noss, 1991, p. 23].

Lastly, the incomes and prices are affected by adjustment policies, and the demand for education is influenced by the incomes and prices. As incomes and living conditions get seriously affected during the process of adjustment, demand for education falls. This would be more true in the case of weaker sections. Demand for education may further fall, due to changes in labour market - increased levels of unemployment, reduced levels of wage earnings and increased earnings differentials, and corresponding increase in the need for participation in the labour market, and increased costs of education.

These effects may be only for a short term. In the long term, as some hope, the adjustment policies may help all sectors, including education,

leading to improvement of efficiency in education. For example, Kakwani argues, 'the effects of structural adjustment programmes on social indicators can be fully realised only in the long run; it may be too early to measure such effects now' [Kakwani, 1995, Pp. 495-496]. But education is a long term activity, and perhaps cannot be brought back to rails in a short time period when funds are available, once it is off of the tracks due to paucity of funds. Further, the world experience is also so short, that long-term results (of adjustment policies) are yet to be observed. Some of the adverse consequences may be due to the fact that policy changes under adjustment are guided by political rather than efficiency considerations [Noss, 1991, p. 3]. But, in all, short run expediency dominates the public policy making during the adjustment process, and the long term socioeconomic benefits of public investment do not seem to carry any weight. In this sense, the policies suffer from lack of a broader long term vision and development strategy [see also EPWRF, 1994, Pp. 1049-1053].

4. *How Does Higher Education in India Respond to Adjustment Measures?*

First, it must be noted that the very success of economic reform programmes critically depend upon higher education. As with globalisation and international competition, the need for more educated labour force would be strongly felt. With illiterates and ill-educated work force, the reform programmes cannot even take-off properly. In this sense, higher education becomes *'even more important in the new context of a global economy'* [Stewart, 1995, emphasis original]. But the policies of adjustment seem to go against the growth of higher education.

While the Indian experience with the adjustment policies is relatively short so far, some effects are already being clearly felt, and with respect to some other effects, the signals are becoming clear. The recent budget cuts for higher education in the union government's annual budgets, and also of the budgets of the state governments, the Supreme Court's *de facto* reversal of its own judgement against capitation fee colleges in India[1] [see Tilak, 1992a, Pp. 129-136; 1994], the objectives of the government in constituting committees with a request to recommend methods of mobilising private funds for higher education [e.g., UGC, 1993; AICTE, 1994], and the efforts to introduce Bills in Parliament in favour of opening of private universities - all can be viewed as short term and even as 'myopic' responses to the structural adjustment policies, with serious long term implications. The consequent trends in (i) budget cuts, (ii) shifts in policies and (iii) other trends that highlight the increasing neglect of higher education are discussed here.

i) *Decline in Budget Allocations*

What are the recent trends in government expenditure on education that are believed to be associated with the adjustment policies? It may be noted at the outset, that since it is only in 1991, the adjustment reforms have been introduced in India, the experience is very short, and the data are available only for three or four years of adjustment period;[2] and the limited available data are also subject to revisions, as some of the data are 'revised/budget' estimates, and are not actual expenditures. Hence, conclusions made here should be treated as tentative. It may also be noted that even though adjustment policies *per se* were introduced actually since July 1991, the adjustment process has indeed started earlier, with the introduction of corresponding budgetary reforms earlier in anticipation of the adoption of the adjustment policies. Hence, comparisons are made here of budgetary allocations between 1989-90 and later years. Further, as all required data are not available in detail, some phenomena are explained with the help of specific data on higher education, and some with the data on the whole education sector. It can, however, be expected that such trends observed in the case of total education sector will hold good in the case of higher education as well.

Total public expenditure on education in current, and more specifically in real prices is found to have declined in many countries during adjustment. The declines are more pronounced in terms of per student expenditures. The relative priority given to education in the development

framework - expenditure on education as per cent of GNP, and as a per cent of total government expenditure - has also been found to decline in a large number of countries. India is not an exception.

Share of public expenditure on education in GNP is one of the most standard indicators of the priority a nation accords to education. Ever since the acceptance of the recommendation of the Kothari Commission, the Government of India has been repeatedly promising to allocate six per cent of national income for education in India [Kothari, 1966]. From a level of 1.2 per cent in 1950-51, it could barely touch a level of only four per cent by 1993-94. According to the tentative (budget) estimates available for 1994-95, it might fall below four per cent, as given in Table 3. Given these long term and current trends, one would be skeptical about the government's promise to allocate six per cent of national income during the ninth five year plan (1997-2002), unless questionable strategies [e.g., Kolhatkar, 1989, Pp. 104-127] are adopted [see Tilak, 1990b, Pp. 62-69].

TABLE 3. GOVERNMENT EXPENDITURE ON EDUCATION AND RESEARCH AND DEVELOPMENT AS A PER CENT OF GNP

Year	Education	Higher Education	Research & Development
1989-90	3.8	0.43	0.93
1990-91	3.6	0.39	0.85
1991-92	3.4	0.37	0.84
1992-93	4.1	0.43	0.83
1993-94 R	4.1	0.42	..
1994-95 B	3.9	0.39	..

Note: In all the tables, R and B denote revised estimates and budget estimates, respectively.
Source: Based on Ministry of Human Resource Development (MHRD) (a) and Research and Development (R & D), Department of Science and Technology (DST) [1993b]

Probably, government expenditure on education as a proportion of the total government expenditure might be a better gauge of the governmental efforts and intentions. This, viz., the share of education in the total budgets of the centre and state governments also declined in the recent past. The share of education in central government budget is small, and it declined further - from 3.5 per cent in 1989-90 to 3.3 per cent of the revenue budget in 1994-95. More sharply, the relative share of education in the state governments' revenue budget also declined from 25.4 per cent to 23.0 per cent during the same period, as shown in Table 4. Thus, the overall share of education in government expenditure declined from 14.2 per cent to 13.4 per cent in a short span of five years. These trends are consistent with the experience of other adjusting countries [see Noss, 1991; Unesco, 1993].

TABLE 4. GOVERNMENT EXPENDITURE ON EDUCATION AS A PER CENT OF TOTAL GOVERNMENT EXPENDITURE (REVENUE ACCOUNT)

Year	Centre	State	Total
1989-90	3.5	25.4	14.2
1990-91	3.3	24.7	14.0
1991-92	3.0	22.6	13.1
1992-93	3.1	22.7	13.2
1993-94 R	3.2	23.1	13.2
1994-95 B	3.3	23.0	13.4

Source: MHRD (a).

During the 1990s the total government expenditure on education in India declined very often in real prices, and/or a significant decline could be noted in the rate of growth of the expenditure, as shown in Table 5. The annual rate of growth in total (central and state governments) expenditure on education between 1989-90 and 1990-91 was 2.9 per cent. After experiencing decreases and increases, the rate of growth touched a low level of 0.7 per cent between 1993-94 and 1994-95. The overall rate of growth during the 1990s was 1.7 per cent compared to 8.6 per cent in the 1980s and 5.6 per cent during the four decades, 1950-51 to 1989-90 [Tilak, 1995c, p. 23]. Such trends in expenditure levels can be noted in the case of both, central government expenditure and also the expenditure of the state governments. If these trends are related to increase in student numbers in the corresponding period, it would be obvious that per student expenditures have declined more steeply during this period.

TABLE 5. BUDGET EXPENDITURE ON EDUCATION

(Rs Crore)

	In Current Prices			In 1980-81 Prices		
Year	Centre	States	Total	Centre	States	Total
Plan Expenditure						
1989-90	1340.2	2332.1	3672.3	660.7	1149.6	1810.3
1990-91	1333.0	1914.9	3247.9	592.1	850.6	1442.7
1991-92	1392.9	2354.0	3746.9	539.4	911.6	1451.0
1992-93	1691.0	2318.0	4009.0	601.9	825.0	1426.9
1993-94 R	2229.5	3438.9	5668.4	724.1	1116.9	1840.9
1994-95 B	2592.8	4362.6	6955.4	758.5	1276.3	2034.8
Non-Plan Expenditure						
1989-90	925.9	13352.0	14277.9	456.4	6582.0	7038.4
1990-91	1086.4	16156.9	17243.3	482.6	7176.8	7659.4
1991-92	1088.7	17758.2	18846.9	421.6	6876.9	7298.5
1992-93	1163.1	19858.2	21021.3	414.0	7067.9	7481.9
1993-94 R	1316.1	22300.0	23616.1	427.4	7242.4	7669.8
1994-95 B	1318.4	24466.1	25784.5	385.7	7157.7	7543.4
Total Expenditure						
1989-90	2266.1	15684.1	17950.2	1117.1	7731.6	8848.7
1990-91	2419.4	18071.8	20491.2	1074.7	8027.4	9102.0
1991-92	2481.6	20112.2	22593.8	961.0	7788.5	8749.5
1992-93	2854.1	22176.2	25030.3	1015.8	7892.9	8908.7
1993-94 R	3545.6	25738.9	29284.5	1151.5	8359.2	9510.7
1994-95 B	3911.2	28828.7	32739.9	1144.2	8434.0	9578.2
Annual Rate of Growth (%)						
Plan Expenditure						
1990-91/89-90	-0.5	-17.9	-11.6	-10.4	-26.0	-20.3
1991-92/90-91	4.5	22.9	15.4	-8.9	7.2	0.6
1992-93/91-92	21.4	-1.5	7.0	11.6	-9.5	-1.7
1993-94/92-93	31.8	48.4	41.4	20.3	35.4	29.0
1994-95/93-94	16.3	26.9	22.7	4.8	14.3	10.5
1994-95/89-90	14.7	15.7	15.0	3.5	4.3	3.6
Non-Plan Expenditure						
1990-91/89-90	17.3	21.0	20.8	5.7	9.0	8.8
1991-92/90-91	0.2	9.9	9.3	-12.6	-4.2	-4.7
1992-93/91-92	6.8	11.8	11.5	-1.8	2.8	2.5
1993-94/92-93	13.2	12.3	12.3	3.3	2.5	2.5
1994-95/93-94	0.2	9.7	9.2	-9.8	-1.2	-1.6
1994-95/89-90	7.5	13.0	12.6	-3.0	1.8	1.5
Total Expenditure						
1990-91/89-90	6.8	15.2	14.2	-3.8	3.8	2.9
1991-92/90-91	2.6	11.3	10.3	-10.6	-3.0	-3.9
1992-93/91-92	15.0	10.3	10.8	5.7	1.3	1.8
1993-94/92-93	24.2	16.1	17.0	13.4	5.9	6.8
1994-95/93-94	10.3	12.0	11.8	-0.6	0.9	0.7
1994-95/89-90	11.8	13.0	12.8	0.8	1.8	1.7

Note: To convert the expenditure figures into real (1980-81) prices, GDP deflators are used in this and other tables.
Source: Based on MHRD (a) and (d).

The central government budget for education seems to have been very seriously affected [Tilak, 1995d, Pp. 15-20]. The budget allocations since 1989-90 have been either declining or stagnant in real prices. The budget allocation in 1994-95 is a little less than the expenditure in 1993-94, and is not much different from the expenditure incurred in 1989-90. The budget expenditures of the states have registered a modest increase during this period.

During the process of adjustment, when the government expenditure has be to be reduced, it seems to be relatively easier to cut plan (development) expenditure than non-plan (maintenance) expenditure. Non-plan expenditure cannot be reduced significantly, since most of the non-plan expenditure consists of salary expenditure of the existing staff. One can note the plan programmes in education getting sacrificed in the recent past. As Bhagwati and Srinivasan noted in the case of other economic sectors in general, the reduction in developmental expenditure appears to be taking the brunt of the successful effort to cut the budget deficit, and this could create difficulties down the road, affecting major development projects [Bhagwati and Srinivasan, 1993, p. 20]. This is clearer in the case of higher education, in particular. The share of higher education in the total education outlay in the eighth Five Year Plan was estimated to be a meagre seven per cent, the lowest proportion in the last forty years, compared to 14 per cent (actual expenditure) in the seventh Plan (Table 6). Similarly, allocation for science and technology in the eighth Plan was 2.1 per cent, compared to 2.3 per cent in the seventh Plan. It should be noted that plan expenditure sets directions for future development and links directly to the long term health of the system, and hence, cuts in plan expenditure would be costly in the long run.

TABLE 6. HIGHER EDUCATION IN FIVE YEAR PLANS

(Rs Crore)

	In Current Prices	In 1980-81 Prices	Per cent to Total Education Expenditure
Sixth Five Year Plan (1980-85)	530	449.5	18
Seventh Five Year Plan (1985-90)	1201	501.4	14
Annual Plans (1990-92)	595	239.7	11
Eighth Five Year Plan (1992-97)	1516	593.1	7

Source: Based on Tilak [1995c].

TABLE 7. GROWTH IN HIGHER EDUCATION INSTITUTIONS

	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94
Universities	144	146	146	153	164	169
Institutions Deemed to be Universities	27	28	28	30	33	34
Institutions of National Importance	10	10	10	13	10	10
Research Institutions	48	48	49	49	55	55
Colleges						
Arts & Science	4,670	4,755	4,862	5,058	5,334	5,639
Engineering & Technology	267	277	282	279	299	308
Medical	130	129	130	133	133	233
Teacher Training	485	485	474	538	557	584

Source: MHRD (e)

TABLE 8. GOVERNMENT EXPENDITURE (CENTRAL+STATE) ON HIGHER EDUCATION IN INDIA (REVENUE ACCOUNT)

(Rs Crore)

Year	In Current Prices			In 1980-81 Prices			Per cent to Total Plan/ Non-Plan Education Expenditure
	Centre	States	Total	Centre	States	Total	
Plan Expenditure							
1989-90	150.1	141.0	291.1	74.0	69.5	143.5	12.1
1990-91	128.6	116.4	245.0	57.1	51.7	108.8	11.5
1991-92	160.7	103.7	264.5	62.2	40.2	102.4	11.2
1992-93	149.6	117.8	267.4	53.2	41.9	95.2	6.7
1993-94 R	159.5	172.8	332.3	51.8	56.1	107.9	5.9
1994-95 B	218.4	201.0	419.4	63.9	58.8	122.7	6.0
Non-Plan Expenditure							
1989-90	336.2	1582.6	1918.8	165.7	780.2	945.9	15.2
1990-91	346.9	1720.0	2066.9	154.1	764.0	918.1	13.7
1991-92	334.5	1844.4	2178.9	129.5	714.2	843.8	13.3
1992-93	355.3	2077.3	2432.6	126.5	739.3	865.8	11.5
1993-94 R	379.3	2324.4	2703.7	123.2	754.9	878.1	11.4
1994-95 B	363.5	2470.7	2834.2	106.3	722.8	829.2	11.0
Total Expenditure							
1989-90	486.3	1723.6	2209.9	239.7	849.7	1089.4	14.7
1990-91	475.5	1836.4	2311.9	211.2	815.7	1026.9	13.4
1991-92	495.2	1948.1	2443.4	191.8	754.4	946.2	13.0
1992-93	504.9	2195.1	2700.0	179.7	781.3	961.0	10.8
1993-94 R	538.8	2497.2	3036.0	175.0	811.0	986.0	10.4
1994-95 B	581.9	2671.7	3253.6	170.2	781.6	951.9	9.9
Annual Rates of Growth (%)							*Change*
Plan Expenditure							
1990-91/89-90	-14.3	-17.5	-15.8	-22.8	-25.6	-24.2	-0.6
1991-92/90-91	25.0	-10.9	7.9	9.0	-22.3	-5.9	-0.3
1992-93/91-92	-6.9	13.6	1.1	-14.5	4.4	-7.1	-4.5
1993-94/92-93	6.6	46.7	24.3	-2.7	33.9	13.4	-0.8
1994-95/93-94	36.9	16.3	26.2	23.3	4.8	13.7	0.1
1994-95/89-90	9.5	9.6	8.7	-1.5	-1.0	-2.0	-1.2
Non-Plan Expenditure							
1990-91/89-90	3.2	8.7	7.7	-7.0	-2.1	-2.9	-1.5
1991-92/90-91	-3.6	7.2	5.4	-15.9	-6.5	-8.1	-0.4
1992-93/91-92	6.2	12.6	11.6	-2.4	3.5	2.6	-1.8
1993-94/92-93	6.8	11.9	11.1	-2.6	2.1	1.4	-0.1
1994-95/93-94	-4.2	6.3	4.8	-13.7	-4.2	-5.6	-0.4
1994-95/89-90	1.7	9.3	8.2	-8.3	-1.4	-2.5	-0.8
Total Expenditure							
1990-91/89-90	-2.2	6.5	4.6	-11.9	-4.0	-5.7	-3.9
1991-92/90-91	4.1	6.1	5.7	-9.2	-7.5	-7.9	-3.0
1992-93/91-92	2.0	12.7	10.5	-6.3	3.6	1.6	-3.1
1993-94/92-93	6.7	13.8	12.4	-2.6	3.8	2.6	-10.8
1994-95/93-94	8.0	7.0	7.2	-2.7	-3.6	-3.5	-10.4
1994-95/89-90	3.7	9.2	8.1	-6.5	-1.6	-2.6	-6.2

Source: Based on MHRD (a)

Further, the capital budgets tend to get sacrificed in favour of recurrent budgets. Investment in buildings, physical furniture, and equipment, etc., might be traded off in favour of investment in additional teachers. Within the recurrent budgets, the real expenditures on education decline steeply, as education is a labor-intensive sector, with a very high proportion of the education budgets being allocated for salaries of the teachers. But due to the pressures of the teachers' unions, etc., the teachers' wage bills tend to be less affected. Even when fiscal retrenchment is effected, salaries of the teachers and other staff cannot be cut due to various reasons; in fact, they may still increase. Because of the inflationary tendencies of the adjustment programmes, the wages of the teachers may increase in nominal terms in current market prices, though at a rate much less than inflation. More and more colleges and universities may continue to be opened, as the figures in Table 7 indicate, but without even necessary infrastructure - buildings, equipment and teachers.

Further, the plan expenditure on higher education has declined in current prices from Rs 291 crore in 1989-90 to Rs 267 crore in 1992-93. In real prices, both plan and non-plan expenditure declined sharply, as shown in Table 8. The central plan expenditure on higher education declined by 1.5 per cent per annum and the non-plan expenditure by 8.3 per cent, during 1989-90 to 1994-95. While in 1989-90 higher education received 12.1 per cent of the total plan expenditure on education, the corresponding share is less than half in 1993-94 and 1994-95. In case of non-plan expenditure, the share of higher education came down to 11.0 per cent from 15.2 per cent in 1989-90. These reductions in real expenditures, viewed along with increase in enrolments, as shown in Table 9, suggest that decline is more severe in the case of per student real expenditures on higher education. Since reliable data on enrolments are not available in required detail, per student expenditures are not estimated here.

The relative priority given to higher education in the total expenditure on education suffered severely during the 1990s. In 1989-90, the central government spent on higher education nearly one-third of its total revenue expenditure on education, which came down to less than one-fourth by 1993-94 and 1994-95. Similarly, the share of higher education in the expenditure of the states on education declined from 12.7 per cent to 10.8 per cent during the same period (Table 10). On the whole, the share of higher education in the total revenue expenditure of the centre and the states on education declined from 14.7 per cent in 1989-90 to 9.9 per cent in 1994-95 (Table 10), and the share of higher education in GNP from 0.43 per cent to 0.39 per cent, as already shown in Table 3.

TABLE 9. GROWTH IN ENROLMENT IN HIGHER EDUCATION INSTITUTIONS

	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94
Enrolment in Thousands						
Ph.D. etc.	31.4	27.8	32.5	31.2	30.7	30.7
MA/MSc/MCom/BA/BSc/BCom	3,429.1	..	3,640.0	3,893.7	3,944.7	4,115.1
BE/BArch/BSc-Engg.	205.3	..	241.4	230.5	263.1	270.0
MBBS	80.2	84.3	84.4	83.2	79.6	88.2
BEd/BT	91.0	92.7	92.2	97.3	100.0	101.9
Total*	3,837.0	..	4,090.5	4,335.9	4,418.1	4,605.9
	1989-90/ 88-89	1990-91/ 89-90	1991-92/ 90-91	1992-93/ 91-92	1993-94/ 92-93	1993-94/ 88-89
Annual Rate of Growth (%)						
Ph.D. etc.	-11.46	16.91	-4.00	-1.70	0.10	-0.45
MA/MSc/MCom/BA/BSc/BCom	..	..	6.97	1.31	4.32	4.00
BE/BArch/BSc-Engg.	..	..	-4.52	14.14	2.64	6.31
MBBS	5.11	0.12	-1.42	-4.33	10.78	1.99
BEd/BT	1.87	-0.54	5.53	2.77	1.89	2.39
Total*	..	..	6.00	1.90	4.25	4.01

Note: * includes only the above categories.
.. indicates errors in original print.
Source: MHRD (e).

TABLE 10. PERCENTAGE OF EXPENDITURE ON HIGHER EDUCATION TO TOTAL EXPENDITURE ON EDUCATION (REVENUE ACCOUNT)

Year	Centre	States & UTs	Total
1989-90	32.16	12.74	14.69
1990-91	28.94	11.81	13.44
1991-92	28.92	11.43	13.03
1992-93	28.09	11.45	10.80
1993-94 R	24.61	11.30	12.41
1994-95 B	24.04	10.79	9.91

Source: MHRD (a) and (d).

One may have to note that two different proportions are relevant here: (a) share of education in total government expenditure and (b) share of higher education in total expenditure on education. A significant increase in (a) is important so that all sectors of education might be better-off with increased level of budgetary allocations. Given an increase in (a), even a decline in (b) may still mean much higher resources for higher education, though one may have to be concerned about the decline in the relative priority accorded to higher education in total education expenditures. But we have already noted in Table 4 that the share of education in total government expenditure has also declined, in addition to a decline in (b) as shown in Table 10.[3]

An important aspect that has to be noted is that during the last 4-5 years, central transfers to states have been reduced severely, which resulted in budgetary cuts at the state level. In as many as ten major states, the share of education in the revenue budget in 1994-95 is less than the corresponding share in 1989-90 (Table 11). Even in most other states, one finds significant decline between 1990-92 and 1993-95. Hardly two or three states could maintain the same levels, or could modestly increase their shares during this period.

TABLE 11. PERCENTAGE OF EXPENDITURE ON EDUCATION TO TOTAL STATE BUDGETS (ALL DEPARTMENTS) (REVENUE ACCOUNT)

States	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	Change 1994-95/ 89-90
Andhra Pradesh	25.7	22.2	22.3	24.4	24.3	25.9	0.2
Assam	24.4	24.9	26.0	29.1	27.3	26.9	2.5
Bihar	28.8	26.8	23.9	23.2	22.1	24.5	-4.3
Gujarat	24.1	24.1	23.0	20.7	23.0	24.0	-0.1
Haryana	19.9	18.8	18.0	21.0	15.7	12.4	-7.5
Himachal Pradesh	21.3	19.2	19.4	21.9	24.3	23.9	2.6
Jammu & Kashmir	15.7	15.7	12.1	13.9	20.1	16.9	1.2
Karnataka	22.0	21.5	20.7	21.2	22.7	22.4	0.4
Kerala	30.2	29.9	28.6	28.0	29.6	30.1	-0.1
Madhya Pradesh	24.7	25.3	25.9	24.1	23.4	25.0	0.3
Maharashtra	22.4	22.3	23.4	22.1	23.2	20.0	-2.4
Orissa	24.9	20.7	23.2	23.6	23.9	21.2	-3.7
Punjab	26.7	21.4	14.4	18.8	19.6	20.9	-5.8
Rajasthan	25.6	24.6	23.0	23.1	22.6	22.9	-2.7
Tamil Nadu	23.9	24.4	17.9	21.0	24.5	24.9	1.0
Tripura	22.9	22.4	22.4	26.0	24.3	22.1	-0.8
Uttar Pradesh	25.7	23.4	20.6	21.9	21.3	21.2	-4.5
West Bengal	24.6	28.6	24.8	25.8	25.7	27.7	3.1

Note: 1992-93: Revised; and 1993-94: Budget estimates.
Source: MHRD (a and d).

In current prices, expenditure on higher education increased in several states, as shown in Table 12. These figures are not in real prices. But the increases do not seem to be adequate enough to counterbalance (a) the effect of inflation, on the one hand, and (b) increase in enrolments, on the other. As a result, per student expenditures in several states could be expected to have fallen steeply in many states during the 1990s.

TABLE 12. GOVERNMENT EXPENDITURE ON UNIVERSITY AND HIGHER EDUCATION (PLAN AND NON-PLAN EXPENDITURE) (REVENUE ACCOUNT)

States	Rs Crore (in Current Prices)						Annual Rate of Growth (%)					
	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1990-91 /89-90	1991-92 /90-91	1992-93 /91-92	1993-94 /92-93	1994-95 /93-94	1994-95 /89-90
Andhra Pradesh	231.2	210.7	244.0	290.8	306.3	311.9	-8.9	15.8	19.2	5.3	1.8	6.7
Assam	53.9	48.0	44.8	53.7	49.8	53.6	-11.0	-6.6	19.8	-7.2	7.6	0.5
Bihar	134.2	128.9	129.6	137.6	139.8	143.2	-3.9	0.6	6.2	1.6	2.4	1.4
Gujarat	90.9	88.7	94.7	109.7	117.2	128.0	-2.4	6.8	15.9	6.8	9.2	7.2
Haryana	47.4	45.8	52.9	57.0	65.4	69.5	-3.3	15.4	7.8	14.7	6.3	8.2
Himachal Pradesh	12.2	14.7	15.4	17.1	18.3	21.5	20.7	4.9	10.7	7.0	17.5	12.2
Jammu & Kashmir	16.4	16.4	17.1	17.1	33.6	34.2	0.0	4.5	0.0	96.4	1.8	20.5
Karnataka	103.6	111.8	154.7	148.1	166.3	193.9	7.9	38.3	-4.2	12.3	16.6	14.2
Kerala	82.1	93.1	123.0	154.4	186.7	212.8	13.4	32.1	25.5	20.9	14.0	21.2
Madhya Pradesh	91.1	99.0	106.9	130.6	143.5	148.7	8.7	8.0	22.2	9.9	3.6	10.5
Maharashtra	155.0	214.7	214.3	235.9	254.5	262.2	38.5	-0.2	10.1	7.9	3.0	11.9
Orissa	66.5	64.0	79.7	86.1	99.6	107.6	-3.7	24.5	8.0	15.7	8.0	10.5
Punjab	67.1	72.2	79.3	86.3	92.2	98.4	7.5	9.9	8.8	6.8	6.7	8.0
Rajasthan	63.4	73.0	77.6	86.2	99.9	107.9	15.2	6.2	11.1	15.9	8.0	11.3
Tamil Nadu	169.5	131.1	131.7	152.0	174.6	185.0	-22.7	0.5	15.4	14.9	6.0	2.8
Tripura	6.5	5.2	6.8	7.9	7.3	7.4	-19.7	29.5	16.5	-7.6	1.4	4.0
Uttar Pradesh	142.1	164.2	147.8	169.4	228.4	242.2	15.5	-9.9	14.6	34.8	6.0	12.2
West Bengal	131.7	181.3	150.9	173.1	210.9	236.3	37.6	-16.7	14.7	21.8	12.0	13.9

Note: 1993-94: Revised estimates; 1994-95: Budget estimates.
Source: MHRD (a).

A few more details on the expenditure of the central government on higher education are worth noting. Budget allocations - both plan and non-plan - of the central government to the University Grants Commission (UGC) have continuously declined in real prices since 1990-91, year after year. Even in current prices, the budget allocations of the union government to the UGC and to the institutes of higher learning suffered significantly in some years after the adjustment process was launched. The allocations to the UGC and institutions of higher learning came down obviously also in real prices (Table 13). While the plan allocation to institutions of higher learning continue to decline, the plan allocations to the University Grants Commission could be restored only in 1993-94 to 1991-92 level in current prices.

The central government's assistance to the UGC and universities together has sharply declined in real terms between 1989-90 and 1993-94. In 1993-94, allocations to the UGC and universities on Plan account was only 69 per cent of the allocation made in 1989-90. There is some improvement in the allocation in 1994-95 budget estimates, but still the allocation in 1994-95 is much less than the 1989-90 level. Non-plan expenditure also declined, though the rate of decrease is less (Table 14).

TABLE 13. BUDGET ALLOCATION TO HIGHER EDUCATION

(Rs Crore)

Year	In Current Prices			In 1980-81 Prices		
	Plan	Non-Plan	Total	Plan	Non-Plan	Total
Central Government Allocation to UGC						
1990-91	112.5	244.2	356.7	50.0	108.5	158.4
1991-92	141.7	260.0	401.7	54.9	100.7	155.6
1992-93	124.9	306.5	431.4	44.5	109.1	153.5
1993-94 R	141.5	337.0	478.5	46.0	109.4	155.4
1994-95 R	169.0	343.2	512.2	49.4	100.4	149.8
1995-96 R	189.3	450.8	640.1	..	..	..
Annual Rate of Growth (%)						
1991-92/90-91	25.9	6.5	12.6	9.8	-7.2	-1.8
1992-93/91-92	-11.8	17.9	7.4	-19.0	8.3	-1.3
1993-94/92-93	13.3	10.0	10.9	3.4	0.3	1.2
1994-95/93-94	19.4	1.8	7.0	7.6	-8.3	-3.6
1995-96/94-95	12.0	31.4	25.0	..	..	..
1993-94/90-91	8.6	12.7	11.4	-2.7	0.3	-0.6
1995-96/90-91	13.7	16.9	15.9			
Central Government Allocation to Institutes of Higher Learning						
1989-90	0.64	1.38	2.03	0.32	0.68	1.00
1990-91	0.34	1.77	2.11	0.15	0.79	0.94
1991-92	0.97	1.60	2.57	0.38	0.62	1.00
1992-93 R	0.78	1.94	2.72	0.28	0.69	0.97
1993-94 B	0.78	2.16	2.94	0.25	0.70	0.95
Annual Rate of Growth (%)						
1990-91/89-90	-46.9	28.3	3.9	-52.1	15.6	-6.3
1991-92/90-91	185.3	-9.6	21.8	148.7	-21.2	6.2
1992-93/91-92	-19.6	21.3	5.8	-26.1	11.4	-2.7
1993-94/92-93	0.0	11.3	8.1	-8.8	1.6	-1.4
1993-94/89-90	5.5	14.1	11.2	-4.9	0.8	-1.1

Source: MHRD (b and c) and Ministry of Finance (MOF) [1995, 1996].

The most serious causality of all these cuts may be the quality of education, as investment in those inputs that have stronger relationship with quality, such as text books, and other teaching-learning materials is reduced. The axe falls heavily on the petty amounts being invested in teaching-learning materials, including classroom materials in primary schools, books and journals in the libraries, consumable material in the laboratories, and other quality improvement programmes in secondary schools, colleges and universities. There is reason to believe that provision of inputs of such kind will fall more than the overall budgets and this would cause greater damage to education development. As Fuller and Abte confirm, efforts to increase recurrent spending on text books are 'stymied at times by overall spending ceilings negotiated with IMF or World Bank economists' [1992, p. 4]. Quality of education may deteriorate with increased number of students per teacher, with reduced number of books in libraries, etc. Internal efficiency of the system declines, contrary to claims of improved efficiency, because of budget restructuring and other adjustment policies.

TABLE 14. ASSISTANCE OF THE CENTRAL GOVERNMENT (DEPARTMENT OF EDUCATION) TO UNIVERSITIES (INCLUDING UGC) IN INDIA

(Rs Crore)

Year	In Current Prices			In 1980-81 Prices		
	Plan	Non-Plan	Total	Plan	Non-Plan	Total
1989-90	140.0 (93.3)	210.2 (62.5)	350.3 (72.0)	69.0	103.6	172.7
1990-91*	117.7 (91.5)	253.4 (73.1)	371.1 (78.1)	52.3	112.6	164.8
1991-92	148.3 (92.2)	330.9 (98.7)	479.1 (96.7)	57.4	128.1	185.5
1992-93	137.3 (91.8)	315.7 (88.8)	453.0 (89.7)	48.9	112.4	161.2
1993-94 R	146.2 (91.7)	347.7 (91.0)	491.2 (91.2)	47.5	112.9	159.5
1994-95 B	197.1 (90.3)	331.0 (91.1)	528.2 (90.8)	57.7	96.8	154.5
Rates of Growth (%)						
1990-91/89-90	-15.9	20.5	5.9	-24.2	8.6	-4.5
1991-92/90-91	26.0	30.6	29.1	9.8	13.8	12.6
1992-93/91-92	-7.4	-4.6	-5.5	-14.9	-12.3	-13.1
1993-94/92-93	6.5	10.1	8.4	-2.8	0.5	-1.1
1994-95/93-94	34.8	-4.8	7.5	21.4	-14.2	-3.1
1994-95/89-90	8.8	10.4	9.1	-2.1	-0.7	-1.9

Note: Figures in ( ) are percentages to total expenditure on university/higher education.
* For this year only, the information on assistance to UGC and universities is available separately. Here the figures are added together.
Source: MHRD (a).

Since salaries cannot be cut, salary budgets could be reduced only by not filling the vacant faculty positions, a measure many universities in India have had to resort to in the recent past, as a response to physical directions of the Ministry of Finance not to fill up the vacant posts and/or as an unavoidable response to financial restructuring and reduced budgets. Alternatively, temporary teachers are recruited or guest faculty are appointed. The budgets on libraries, laboratories and similar facilities are also very severely affected. Devaluation, and the accompanying price rise, has led to an enormous increase in prices of books and journals and, as a result, many universities have had to inflict very serious cuts on library budgets. For example, only 67 per cent of the number of journals subscribed to by the University of Delhi in 1990 could be renewed in 1991; and in 1992 only 55 per cent of the journals subscribed to in 1991 could be continued. That is, in a short span of two years of reform period, the number of journals subscribed to came down to 39 per cent from 2,327 in 1990 to 863 in 1992 in the University [Ghosh, 1993, p. 1,562]. Similar, if not worse, trends could be noted in case of several other universities.

During the process of economic liberalisation, investment priorities tend to switch from non-tradable goods and services to tradable ones. As a result, the priority shifts in favour of physical capital goods, at the cost of intangible human capital formation. Within higher education, revenue generating courses would receive priority over less or non-revenue generating but otherwise valuable courses, not only in social sciences and humanities but also in physical and biological sciences. Short duration education and crash courses get preferred to long duration education programmes and short term training programmes to long term training. Shifts take place in favour of tradable disciplines like engineering and hotel management, as against social sciences and research. But in stead of proper disciplines of study, the priority shifts in favour of cheap marketable skill-oriented courses, like the computer courses being offered by computer shops. Budget allocations to research confirm this phenomenon. The central

government's plan expenditure on research has come down from a low level of Rs 5.35 crore in 1989-90 to 4.6 crore in 1994-95. In real terms, it declined by 11 per cent every year. Non-plan expenditure on research also declined in real terms. This is in the case of research in general education. Research in technical education suffered more severely; even in current prices, the plan expenditure declined by 60 per cent and non-plan expenditure by 82 per cent. Obviously the decline in real prices is higher (Table 15). This shift in allocation away from research activities could be largely attributed to the myopic conception that research is not as easily tradable as other areas like computers, fashion technology and hotel management.

TABLE 15. EXPENDITURE ON RESEARCH BY DEPARTMENT OF EDUCATION, GOVERNMENT OF INDIA

(Rs Crore)

	General			Technical		
Year	Plan	Non-Plan	Total	Plan	Non-Plan	Total
In Current Prices						
1989-90	5.35	5.10	10.45	28.30	22.87	25.70
	(9.2)	(1.2)	(10.2)	(2.1)	(16.1)	(9.2)
1990-91	4.51	6.96	11.48	3.01	2.42	5.43
	(8.2)	(2.1)	(12.9)	(1.9)	(1.6)	(1.8)
1991-92	5.51	7.05	12.56	6.70	4.40	11.10
	(8.7)	(3.4)	(15.0)	(4.2)	(2.8)	(3.5)
1992-93	4.28	7.15	11.43	3.09	2.50	5.59
	(9.5)	(.)	(.)	(1.8)	(1.4)	(1.7)
1993-94 R	5.25	7.95	13.20	4.01	7.51	11.52
	(.)	(.)	(.)	(1.8)	(1.9)	(1.9)
1994-95 B	4.60	8.01	12.61	11.35	4.15	15.50
	(.)	(.)	(.)	(5.1)	(2.0)	(3.6)
In 1980-81 Prices						
1989-90	2.63	2.52	5.15	13.95	11.27	12.67
1990-91	2.00	3.09	5.10	1.34	1.07	2.41
1991-92	2.13	2.73	4.86	2.60	1.70	4.30
1992-93	1.52	2.55	4.07	1.10	0.89	1.99
1993-94 R	1.71	2.58	4.29	1.30	2.44	3.74
1994-95 B	1.35	2.34	3.69	3.32	1.21	4.53
Real Rate of Growth (%)						
1990-91/89-90	-23.9	22.9	-1.1	-90.4	-90.5	-81.0
1991-92/90-91	6.5	-11.8	-4.6	94.1	58.8	78.4
1992-93/91-92	-28.6	-6.7	-16.3	-57.6	-47.8	-53.7
1993-94/92-93	11.9	1.4	5.4	18.4	174.1	88.0
1994-95/93-94	-21.1	-9.2	-13.9	155.0	-50.2	21.2
1994-95/89-90	-11.0	-0.7	-6.1	23.9	8.9	10.6

Note: Figures in ( ) are percentages to total expenditure on general/technical education.
(.) not estimated due to errors in totals in print.
Source: MHRD (a).

On the whole, the basic pursuits of universities, viz., advancement of learning, knowledge and scholarship give place to objectives such as revenue generation. All universities compete with each other to run revenue yielding training programmes and courses. Thus, the fine distinction between higher education and training is getting lost. Higher education has to perform the role of creation and dissemination of knowledge, while the purpose of training is to impart job-relevant skills. Some of the recent shifts in emphasis in higher education and on disciplines of study in higher education institutions, in particular, suggest that this distinction is being ignored and higher education is being equated with training. The original purpose of higher education goes into back seat and even the principle of comparative advantage

will not be cared for. As Béteille summed up, 'hotel management and computer science are no doubt important in their own right, but they do not belong to the core of the university as a repository of knowledge and a centre of learning. Indeed, such practical and applied subjects can be more efficiently handled in specialized institutions outside the universities. ... The universities in India must continue to do what they were established to do - the advancement of learning - and what they are best capable of doing' [1995, Pp. 403-404].

The real rates of growth in expenditure on specialised human capital [Schultz, 1988, Pp. 339-352], viz., research and development during the 1990s are much less than the rates of growth during the second half of the 1980s, as the figures in Table 16 reveal. All this has resulted in decline in the production of scientific and technical manpower. According to a recent study by the National Institute of Science and Technology and Development Studies, since 1991 there has been a steady decline in the out-turn of M.Sc., and Ph.D. graduates in sciences and engineering disciplines [Maliakan, 1994, p. 3]. Further, it is not only the human and financial inputs into human capital that get sacrificed, but the output of the human capital sector available to the domestic economy may also get affected, given high levels of educated unemployment. With liberalisation of the economy, it might result in increased levels of brain drain -- outflow of the educated manpower, specifically including scientific and technical manpower, on the one hand, and escalation of qualifications for jobs on the other [Lourie, 1987, p. 170].

TABLE 16. REAL RATES OF GROWTH IN EXPENDITURE ON R&D PER ANNUM (PER CENT)

Year	Centre	States	Private Industry	Total
1985-86 to 1989-90	4.2	8.3	7.7	5.0
1990-91 to 1993-94	1.3	4.7	1.4	1.6

Source: Based on Department of Science and Technology [1993a and b].

ii) *Shifts in Higher Education Policy*

With primary education suffering severely as a result of structural adjustment reforms, and as a response to demand for 'adjustment with a human face' [Cornia et al., 1987, 1988], the World Bank launched 'social safety net' programmes [World Bank, 1990a] that deliberately protect primary education from budget cuts and, in fact, might result in increase in the budgets for primary education, though some doubt the safety of social safety nets [e.g., Vivian, 1995, Pp. 1-25]. In fact, it is increasingly realised that basic education should be kept completely out of adjustment programmes [e.g., Sanyal, 1992, 105-17; Tilak, 1993c]. In India, the social safety net programme in education has been launched under the broad umbrella of the District Primary Education Programme (DPEP) in several states. As a consequence, primary education gets somewhat protected from budget cuts under adjustment,[4] and higher education sector suffers severely. The suffering of higher education increases further with the adoption of policies that involve reduction of public subsidies and increase in the role of private sector in higher education.

The short term and long term responses of the higher education system in India to the adjustment policies are indeed disturbing. While the major policy responses in case of higher education are varied, a major type of response relates to the role of the state in financing higher education. The adjustment policies directly and indirectly contribute to restoration of market mechanism in general, and privatisation of education in particular - directly, as adjustment policies specifically include privatisation or marketisation, and indirectly, through reduction in the government subsidies. As public budgets for education get shrunk, privatisation will be on an increase, with all its ill-effects [Tilak, 1991, Pp. 227-239]. Private enrolments and private investments will increase, but the increase will not balance the decrease in public investments and, as a result, social investments in education will be sub-optimal, as we have already noted in

the case of expenditure on research and development (in real prices) in Table 16.

These economic policies also lead to polarization of otherwise weak arguments into a strong force. For instance, Rao argued for withdrawal of government subsidies in higher education to the extent of about 50 per cent [1992, Pp. 211-222]. Dandekar has strongly pleaded for a model according to which students would be required to bear the full costs of higher education, and the role of the government is minimized to provide minimum physical facilities [1991, Pp. 2,631-2,637]. Though the UGC [1993] and the All India Council for Technical Education (AICTE) [1994] argued for committed state support for higher and technical education in the country, their suggestions for increase in fees, and other methods of mobilisation of private resources receive more attention. The changes in the policies, *inter alia*, with respect to (a) student fees, (b) student loan programmes, (c) privatisation, and (d) overall neglect of higher education system seem to be a response to the adjustment policies, and they are briefly discussed here. They are not necessarily distinct: mobilisation of non-governmental resources for public higher education can also be seen as a form of privatisation of higher education [Tilak, 1991, Pp. 227-239]. Explicit policies favouring privatisation of education are a direct response to adjustment policies.

a) *Student Fees*

An important outcome of the adjustment policies is introduction of increased measures of cost recovery. Given the tendencies of increased cost recovery, equity will also be affected. Cost recovery measures, such as students fees, were introduced even at the primary level in some developing countries, though recent discussions on cost recovery confine to post-primary levels of education.[5] Student fees and student loans are the two most vehemently argued measures of cost recovery. Some even suggest full cost recovery, particularly at tertiary level of education. As cost recovery measures are introduced, and direct and indirect subsidies in education are subject to cuts, access to education may be seriously restricted, and inequities may increase in terms of lower enrolment rates of women and other socio-economic weaker sections.

The Government of India [1994] indicated that subsidisation of higher and technical education has to be reduced. Reduction in state subsidies also necessitates mobilisation of resources through fees, and other channels. Increase in student fees has been one of the most frequently made strong arguments in this context. The World Bank [1986, 1994] has been strong and consistent in arguing the same. Very few people paid attention to the fact that fee revenue in higher education in India constitutes about 15 per cent of the recurring costs of higher education, a proportion favourably comparable with other developing and developed countries, including the USA, and that it would be neither desirable nor feasible to aim at increasing this proportion significantly, unless equity considerations were to be sacrificed [Tilak, 1993b, Pp. 7-35; 1995b]. The UGC [1993] and also the AICTE [1994] have also strongly advocated increase in tuition fees and other charges. Though these committees have suggested to aim at *gradually* raising the fee and other non-governmental resources to recover about 20 per cent of the costs, the said proportion is being attributed to fee only and is interpreted as a minimum level and not as a maximum level. Quite a few universities and institutes of technology and management have already enhanced their user charges steeply for admission, entrance examination, tuition, examination, hostel, and miscellaneous services, like application forms, brochures, etc. Application/registration fee for admission in many public, not to speak of private institutions, has been fixed at above Rs 500, which used to be available earlier for 1/50th to 1/10th of the same price, if not free of cost. It is feared that this itself would prevent many to seek admission in higher education. Dual pricing mechanism in private institutions (e.g., capitation fee colleges) allows charging of exorbitantly high fees (nearly equivalent to full cost pricing) from about half the students and reasonably high charges from the remaining half [Tilak, 1994, Pp. 348-350]. All these regressive policies will have a deterring effect on social demand for higher education, as

the policies principally aim at squeezing as much money as possible from students, irrespective of other considerations.

While all those who advocate increase in fees also argue for sufficient protective measures for weaker sections, any increased efforts being made in the form of scholarships to weaker sections, etc., are yet to be seen. Additional budgets for scholarships and other student welfare schemes are least forthcoming during the periods of declining overall budgets. For example, the budgetary allocations to scholarships by the Government of India have declined drastically during the reform period. In current prices, plan allocations for scholarships declined from Rs 2.4 crore in 1989-90 to Rs 1.2 lakh in 1994-95 (budget estimates). Non-plan allocations also declined from Rs 3.9 crore to Rs 2.2 crore during the same period. This is all in current prices. In real prices, plan and non-plan allocations together declined at a rate of 22.5 per cent per year on average during this period, as given in Table 17. All this will drastically affect the demand for higher education at a time when the demand for higher educated labour force is likely to increase significantly and, more importantly, the composition of students in universities will change in favour of the rich.

TABLE 17. CENTRAL GOVERNMENT (DEPARTMENT OF EDUCATION) EXPENDITURE ON SCHOLARSHIPS IN ALL LEVELS OF GENERAL EDUCATION IN INDIA

(Rs Ten Lakh)

	In Current Prices			In 1980-81 Prices		
Year	Plan	Non-Plan	Total	Plan	Non-Plan	Total
1989-90	23.56 (4.0)	38.72 (8.8)	62.27 (6.1)	11.61	19.09	30.70
1990-91	5.18 (0.9)	20.77 (6.2)	31.05 (2.9)	2.30	9.23	13.79
1991-92	17.80 (2.8)	18.19 (8.8)	35.99 (4.3)	6.89	7.04	13.94
1992-93	19.50 (.)	21.70 (7.1)	41.20 (.)	6.94	7.72	14.66
1993-94 R	5.20 (3.6)	21.80 (8.1)	27.00 (6.5)	1.69	7.08	8.77
1994-95 B	1.2 (0.6)	21.8 (8.1)	23.00 (5.0)	0.35	6.38	6.73
Rate of Growth (%)						
1990-91/89-90	-78.0	-46.4	-50.1	-80.2	-51.7	-55.1
1991-92/90-91	243.6	-12.4	15.9	199.6	-23.6	1.1
1992-93/91-92	9.6	19.3	14.5	0.7	9.6	5.2
1993-94/92-93	-73.3	0.5	-34.5	-75.7	-8.3	-40.2
1994-95/93-94	-76.9	0.0	-14.8	-79.2	-9.9	-23.3
1994-95/89-90	5.0	-7.8	-13.8	-7.0	-16.8	-22.5

Note: Figures in ( ) are percentages to total expenditure on general education.
(.) not estimated due to errors in print in totals.
Source: MHRD (a).

b) *Student Loans*

The World Bank [1986, 1994] has been arguing for development of credit market in higher education to float student loan schemes, so that higher education becomes self financing in the long run, and also to ensure that weaker sections can be protected from the effects of privatisation and high user charges, though the World Bank research [1994] has clearly shown that the student loan programme has not been satisfactorily working in any developed or developing country, with very high rates of non-recovery and default costs. The 1994-95 budget of the Government of India responds to this by providing concessions to educational loans. The AICTE [1994] recommended setting up of an Educational Development Bank of India to float student loans to the needy students and also to institutions. Many commercial banks have already started

offering loans to students. In addition to the problems generally well known with respect to student loan programmes in India [see Tilak, 1992c, Pp. 389-404], monetary contractions and liberalisation of the financial and capital markets with attendant rise in interest rates, credit rationing, etc., will not provide an overall environment conducive to the revival or revitalization of student loan programmes, that will help the weaker sections. As Easton [1995] observed in the case of USA, 'since borrowing and saving are easier for the more affluent, we can expect the 'education mortgage' approach to further undermine any commitment to access for low-income and some minority students'. Obviously this would be more relevant for India. Hence, 'it would be irresponsible not to emphasize the real danger that the prospect of high debt may discourage vulnerable population groups from participating in higher education' [Baum, 1996, p. 35]. Tilak [1995b] has discussed at length the problems and consequences of loan programmes. At least one point that has to be noted is that the optimism that is being claimed that the student loan programmes would ease the financial burden of the government considerably, and in the long run higher education would become completely self financing, is not borne out of empirical evidence available from other countries and even India.

c) *Privatisation*

The World Bank's economic reform policies and privatisation are rightly felt to be synonymous by many. Rather privatisation or a movement towards privatisation has become the most significant agenda of the Bank [Richardson and Haralz, 1995]. The underlying philosophy of these policies is that any aspect related to public sector is inefficient, and any aspect related to private sector is, *ipso facto*, efficient and desirable. Accordingly, privatisation is being pursued in all sectors of the economy, including higher education as an effective measure of improving efficiency and as a measure of easing financial crisis. But overall efficiency of the system may indeed suffer and financial gains may not be sizeable. It 'is likely to do very little for efficiency while actually deteriorating the government's budget in an inter-temporal sense' [Rodrik, 1990, p. 9421].

In the case of higher education in India, privatisation takes several forms [Tilak, 1991, Pp. 227-239]. *Inter alia*, two forms are important: (a) privatisation of the institutions through increased private financing, such as fees, and (b) privatisation of the system through increased number of private institutions and stagnant number and declining proportion of public institutions in the total. Both types of privatisation seem to take place rapidly in India. The Government of India observed, 'higher education needs to be extended in an equitable and cost effective manner mainly by large scale expansion of distance education and increased involvement of *voluntary and private agencies*' (emphasis added) [1993, p. 204]. It is interesting to note that it is only now during the process of adjustment, favourable reference to private agencies in higher education is made explicitly by the Government of India. None of the earlier reports on education, including the Education Commission [Kothari, 1966], and the *National Policy on Education* 1968 or 1986, has advocated in favour of increased role of private agencies in higher education.

The governments and the private enterprise feel that this is the best time to sell any argument in favour of privatisation. As a result, even ethically and constitutionally illegal institutions, e.g., the capitation fee colleges, receive approval and support [Tilak, 1992a, Pp. 129-136; 1994, Pp. 348-350]. There may be some forces with vested interests that try to exploit the situation characterised by adjustment policies, and the growth of the capitation fee colleges may be attributed to these forces. The private university Bill introduced in the Parliament gives further legitimisation to capitation fee phenomenon, as private universities envisaged in the Bill and the existing capitation fee colleges seem to be treated alike in several features [Government of India, 1995b, Pp. 290-308]. Both rely extensively on fees; both are not only based on the principle of full-cost pricing, but also the Bill does not prohibit profit making by private institutions.

Secondly, similar forces also help in the growth

of private education institutions that rely mostly not on private finances, but on the finances from the public exchequer, which can be described as pseudo private institutions [Tilak, 1991, Pp. 227-239]. Most such private institutions rely upon government finances to the extent of 95 per cent of the recurring and even development expenditures. Even the strong advocates of privatisation might feel that privatisation of education of this form with price controls and cost underwriting through state grants is a system worse than other forms of privatisation [Ravishankar, 1989, quoted in Sen 1993, p. 182]. The voluntary or non-governmental organisations that rely heavily on government funds also belong to this category. These institutions are also found contributing to distortions in allocation of public resources, by capturing a disproportionate share of the budgetary resources and leaving very little amounts for state-run institutions. In a sense, private enrichment and public pauperisation seem to take place in higher education, through aid mechanism. In this context, it may have to be noted that every new college recognised and affiliated to a university, whether it receives state finances or not, not only cannot be subject to quality control and fair practices of management, but also that every such institution has a legitimate voice in the running of the university system in the country. The role of the private institutions - both state supported and self financing - is extremely limited in the development of higher education in India, and in financing of higher education in particular, if the four decades of experience is any guide.

d) *Neglect of Higher Education*

Though it is not necessarily an important policy shift, another aspect may be briefly noted in this context that reflects the overall neglect of higher education by the government and other public bodies. The neglect is clear from the absence of any discussion on higher education in important official documents. For example, in the recent past no reference at all to higher education can be found in the *Economic Survey* in the chapters on education [Government of India, 1995a, 1996]. The whole discussion, whether it is relating to quantitative or qualitative achievements or budget allocations, is concentrated on elementary education and literacy programmes. While discussion on literacy and elementary education is important, it does not mean that higher education can be altogether ignored. More importantly, even the Five Year and Annual Plan documents of the Planning Commission do not provide explicit information on allocations to higher education. At best ex-post expenditure levels are mentioned, but not ex- ante allocations [e.g., Planning Commission, 1992]. Thirdly, it is quite surprising that even basic statistics like enrolments in higher education are not available for the recent period. Perhaps they are not being properly collected. Publications of the UGC that used to provide detailed information of this kind, now give only estimates on enrolments from 1987-88 onwards [e.g., UGC, 1994]. In the absence of such basic vital statistical information, policy formulation on important issues and planning of education cannot be sound, and much scope arises for committing serious blunders, that would be dangerous to the society in the long run.

4. *Concluding Observations*

Under structural adjustment, education sector is also subject to reforms. But as Lipton noted, '"educational reform" used to mean universal schooling, primary first, free at least to the poor; now it is coming to mean primarily financial stabilisation and recovery of costs from users' [1995, p. 2]. This statement sums up the whole approach towards educational reforms in developing countries under adjustment. In this paper, the effects of adjustment policies on higher education in India, specifically, short term trends in budget allocations for education and reforms in education in the form of shifts in educational policies, are briefly analysed. With the help of limited data available for a short period, it has been shown that the adjustment policies tend to result in severe budget cuts or significant reduction in rates of growth in budget expenditure on higher education and, more importantly, these policies result in major shifts in policies relating to state financing of higher education in

undesirable directions. It has also been felt that countries that have not adopted adjustment programmes, are likely to maintain relatively high levels of public spending on education, than countries that adopted such policies and programmes. However, it may be probable that the cuts inflicted on the education budgets would be more severe, but for the adjustment policies, as these policies are resorted to, due to severe economic problems. As Bhagwati and Srinivasan [1993] argued, there was no option for the Government of India but to adopt stabilisation and adjustment policies. In other words, one might argue that, the severe economic difficulties have forced the government to drastically cut its spending on education, and that the adjustment policies helped in reducing the cuts and 'without some form of adjustment, the situation would have been worse' [Cornia et al., 1987].[6] This is only a hypothesis, yet to be empirically checked. However, it may be tenable to argue that adjustment may not be the exact cause of the problem of declining budgets, but also may not be the solution to the problem. But what is clear is a strong association between adjustment policies and declining public budgets for higher education and shifts in policies relating to financing of higher education.

An important contradiction in the adjustment policies relating to higher education is that while the success of adjustment programmes that include globalisation and international competition in markets require more and more highly skilled manpower, the policies are likely to have tremendous adverse effects on the growth of higher education that produces the human capital in general and specialised human capital in particular [Tilak, 1995e]. The underlying assumption that the success of adjustment programmes does not require public investments in human capital, including specialised human capital, can be proved to be a wrong and even a suicidal assumption. The demand for skilled manpower increases rapidly with the opening up of the economy and the entry of multinational firms, as the experience of the East Asian counties [World Bank, 1993] and even as the short Indian experience shows. In other words, globalisation and adjustment programmes reward countries that have the highly skilled human capital to exploit, and penalise those that do not have it [see Stewart, 1995]. But as the state support for higher education declines, the supply of skilled manpower might fall, producing shortages of skilled manpower, thereby affecting the overall economic growth. Thus, it is important to note the inter-relation between adjustment and higher education. Higher education may be an important determinant of success of economic reforms; in turn, the level of resources available for education may be linked to the success of the macro economic reforms, and lack of success may lead to further deterioration in spending on education.

The growth of private sector in production also increases the demand for skilled manpower, and given the stagnant, or declining supply of manpower, private sector might attract with attractive wages and incentives, the skilled manpower from public sector, thereby affecting the public sector adversely, resulting in fall in the efficiency levels of public sector further, as for example, happening in the case of Indian airlines industry.

Further, public investments in higher education should also increase, as globalisation might also result in increase in brain drain of the specialised human capital, leading to shortages of manpower and, thereby, hampering economic growth domestically.

The very approach to higher education has not been clear. The conflicting approaches and policies lead many to observe that higher education in India is at crossroads [e.g., Tilak, 1995a, Pp. 185-195]. During the periods of economic austerity, including present adjustment process, there is a danger that short term compulsions lead us to accept without any verification some of the otherwise questionable presumptions [Tilak, 1993a, Pp. 133-146]. One such particular presumption is about its expansion. There is a strong presumption that higher education system in India has overexpanded and that there is need to contract the demand for it. While the enrolment in higher education is of the order of about five million, it should be noted that it forms only about five per cent of the relevant age-group. Looking at the enrolment ratios in developing and developed

countries, it seems tenable to argue that 20 per cent enrolment ratio should be regarded as a threshold level ratio in higher education, as in no developed country the enrolment ratio is less than 20 per cent [see Tilak, 1995g]. All this suggests that the present level of enrolment in higher education is India can be described as sub-optimal and that there is need to expand it.

The policy measures that are being formulated and implemented with regard to fees in higher education, student loans, and privatisation at large have significant potential to damage the equity, quality and quantity dimensions of higher education. These measures cannot solve the problems arising out of cuts in public budgets. In other words, adjustment measures along with the policy measures in education will result in sub-optimal investments in education, producing serious problems for the economy.

'Higher education determines its (India's) economic and technological progress. (Therefore), the State or Government funding must continue to be an essential mandatory requirement for support to higher education. The Government/State must continue to accept the major responsibility for funding the essential maintenance and developmental requirements of the universities' [UGC, 1993, p. 18 and p. 107]. While it is good to protect primary education from the adverse effects of adjustment, it is not adequate; the whole education system, including higher education, in developing countries need to be safeguarded from impeding budget cuts. Further, critical reviews of alternative methods of funding higher education [e.g., Colclough, 1991, Pp. 197-213; Tilak, 1995b] have shown that the most efficient and equitable way of financing higher education in developing countries continues to be state financing out of general and specific tax revenues. This will be true in the era of structural adjustment and liberalisation as well.

NOTES

1. In the 1992 judgement on capitation fee colleges, the Supreme Court ruled that the capitation fee phenomenon is 'patently unreasonable, unfair and unjust ... [it is] wholly abhorrent to the Indian culture and heritage'. Specifically, it was also stated that private colleges 'set up with Government permission' could not charge fees higher than the fees charged in government colleges. In contrast, in the subsequent judgment in 1993, the Supreme Court *de facto* legalised the capitation fee phenomenon, by introducing differential fee system in private colleges, according to which half the places in these colleges are referred to as 'free' seats which should be made available to meritorious students at fees equivalent to fees in government colleges, and the remaining half seats as 'payment' seats which could be made available to less meritorious students at high rates of fees (equivalent to or more than full costs), which could, in fact, be 20-50 times higher than the fees in government colleges. [The two judgements of the Supreme Court were reproduced in the *Journal of Higher Education*, Vol. 16 (1), Autumn 1992, Pp. 73-86, and Vol. 16 (2), Spring 1993, Pp. 303-328, respectively. See also Tilak 1995f, Pp. 215-236].

2. For the same reason, empirical data base for much of research on effects of adjustment in India available so far refers actually to the pre-adjustment period [e.g. Ravallion and Subbarao, 1992, Pp. 55-79; Prabhu, 1994, 1995; Gupta and Sarkar, 1994, Pp. 741-751; Jalan and Subbarao, 1995, Pp. 313-26; Parikh and Sudarshan, 1993; ILO, 1992; Upendranadh, 1994, Pp. 273-312].

3. When one speaks of about intra-sectoral priorities, specifically the relative priority for higher education here, it has become normal to view it, as if one is arguing in favour of increase in the share of higher education at the expense of, say, primary education. But there is no need to view 'education in a truncated fashion and set one sector against another.... (After all everyone agrees that) while it is mandatory that the nation achieves universal elementary education and total literacy, at the same time it cannot afford to neglect and relegate to a neglected position our quest to achieve global standards in higher education' [UGC, 1993, p. 18].

4. Recent analyses suggest that, contrary to massive claims by the government, public expenditure on primary education as a proportion of GDP had fallen from 1.68 per cent in 1989-90 to 1.51 per cent in 1992-93 and, according to budget estimates in 1993-94, it was estimated to increase to 1.60 per cent [World Bank, 1995b, p. 126]. Secondly, the share of elementary education in total expenditure on education has not improved significantly in the recent period. It has remained the same, between 45 and 50 per cent for the last two decades. According to the budget estimates (1994-95), the proportion might decline to below 40 per cent.

5. This is not likely to continue to be confined to higher education. For example, the World Bank began arguing, rather explicitly, for introduction of fees and mobilisation of private resources for primary education in developing countries, in general [World Bank, 1995a, p. 132], and in India in particular [World Bank, 1995b, p. 120].

6. For the same reason, Squire [1991, p. 182] argues that any analysis of the effects of structural adjustment must compare the outcomes not with the pre-adjustment period, but with the outcomes that could be expected from altemative policies that would have been economically and politically feasible under the difficult economic conditions.

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PROMOTIONAL MARKETING: IMPERATIVES FOR FERTILISER INDUSTRY UNDER THE CHANGING POLICY ENVIRONMENT

Amita Shah and D.C. Sah

Until recently, the fertiliser policy in India was quite conducive for development of micro level processes that are essential for attaining balanced growth of fertiliser consumption. It provided an environment whereby micro level agencies, both in public as well as private realm, could work in harmony. As a result, it also created substantial space for the industry's initiatives for promotional activities. However, the recent policy changes have shaken up the harmonious relationship among the various agencies which might have particularly affected the industry's developmental role. The following analysis demonstrates how, under the earlier policy regime, a synergy between the state's developmental objectives and the industry's commercial interests was created. This is followed by a discussion on the alternative scenarios that are likely to emerge with respect to the industry's promotional role.

I. THE BACKGROUND

Until recently, the policy environment for the fertiliser sector in India was marked by stability and consistency, essential for efficient production and its balanced use across farms, crops and regions. The comprehensive package of policies influencing almost all the important sub-systems of the fertiliser sector had created an environment conducive to evolving a cohesive institutional network. Consequently the regulated policy regime, till before August 1991, had largely succeeded not only in ensuring availability of fertiliser at macro level but it had also nurtured a plethora of micro level agencies, both in the public as well as the private realm. As visualized in the heuristic framework,[1] these micro level agencies could contribute significantly towards the two processes, namely, (a) converting agronomic potential into farmers' effective demand (Process III), and (b) ensuring availability of fertilisers at the right time and place (Process IV).

One of the striking features of development of these micro level agencies has been the link between input supply and credit under the village level co-operative network which, during the initial stage, had emerged as the single largest agency for fertiliser sales. By the late seventies, the cooperative sector was contributing more than 60 per cent of the total sales of fertilisers in the country. Moreover, scientific information about fertiliser use, a crucial pre-condition for creating effective demand, is being generated and disseminated almost entirely through the public systems. But they have operated independent of the credit and sales network.

In view of the extensive government support system, it can be argued that the Indian fertiliser industry and the micro level agencies might have to play only a limited role in these two processes. For, given the regulatory policies and the limited incentives, the industry is more likely to assume a secondary role to the public systems. Consequently, to a large extent the industry's interventions seem to have been influenced by the developmental objectives and the functioning of the government support system. What is however required for ensuring effective functioning of the above two processes is: (a) well integrated credit-extension and sales activities and (b) complementarity among the agencies involved in these processes. The industry's role in fertiliser diffusion needs to be seen in this perspective.

Ideally, the state should have assumed the responsibility of coordinating various support systems under the government as well as the industry's initiatives. However, no systematic efforts have been made to define clearly the interface among the different activities and agencies. Perhaps, it was envisaged that the industry would take up the task of filling the gaps in the public support system. While gaps in the co-operative sales network were more apparent in terms of inadequate and uneven spread of sales outlets, the information, credit and other sales related services might have also developed

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certain deficiencies. It could therefore be expected that the fertiliser industry would help in mitigating some of these shortfalls in the public systems. The Sivaraman Committee had recommended demonopolization of fertiliser distribution in order to overcome shortfalls of the co-operative network [Sivaraman, 1965]. Consequently, the domestic manufacturers were given more freedom to sell their produce through their own or private channels. Subsequently, the policies, at different points of time, had created appropriate room for the industry's initiatives in terms of sale as well as promotional activities. For instance, the retention price system had made special provision for carrying out the promotional activities as part of the cost norms applicable to different manufacturers.

Although, the industry's response to these incentives has been quite positive, its efforts have remained scattered, without getting integrated into the marketing strategy. To a large extent, these activities were focussed on campaigning for increasing fertiliser use in a small cluster of villages/districts, without linking it up with the widespread distributional network under the co-operative or private channels. Incidentally, some of the major programmes have been sponsored under the foreign or Indian governments. Similarly, the activities initiated by the industry remained in isolation of the promotional activities taking place with the state's support.

An important exception to this trend is the Farm Information Centres (FICs) set up by one of the leading manufacturers in Gujarat (i.e., the Gujarat State Fertiliser Company - GSFC). Adopting the 'single window service' approach, these micro level promotional agencies have been providing information support, counselling services and a wide range of agricultural inputs. By and large, this approach of extension-linked sales did help the GSFC in creating a sustainable marketing network [Sah and Shah, 1992]. However, the changing policy environment has shaken up significantly the supply mechanism, especially the functioning of these micro-level agencies. The earlier policy regime, especially since the mid-seventies, was characterised by regulating prices as well as distribution of fertilisers. This mainly included control of uniform farm-gate prices, enabling price policy (under the retention price system) to enhance investments in domestic production, regulating aggregate supply (including imports) through fertiliser pool, ensuring state-level availability through biannual supply-plans, establishing multi-agency distribution network with close links with co-operative credit structure, and infrastructural support for storage and transportation [Desai and Rustagi]. These polices, pursued consistently for about two decades, were suddenly changed in 1991. The main features of the new policy were (a) increase in farm-gate prices of major nitrogenous fertilisers; (b) decontrol of phosphatic and potassic fertilisers; and (c) decanalisation of imported phosphatic fertilisers (implying that anyone could import without need for a licence). Thus, the policy of partial decontrol had altered fundamentally the operating environment, from supply oriented policy support to demand driven market orientation, thereby calling for a fresh look at the industry's role in promoting fertiliser use.

The pertinent questions in this context are: Whether it would be feasible for the industry to sustain a service oriented comprehensive marketing strategy under the new operating environment; and whether the industry's initiatives will be in consonance with the developmental objectives of promoting efficient fertiliser use across farms and crops. This paper tries to address these issues in the light of the important lessons emerging from the past experiences of the GSFC's Farm Information Centres in Gujarat. The next section recapitulates FICs' performance in terms of extension linked sales network. This has been followed in Section III by a discussion on the future role of the industry in facilitating the diffusion process.

II. GENESIS AND PERFORMANCE OF FICS

The GSFC set up Farm Information Centres as key element of its long term marketing strategy even before commencing production in 1969. The main objectives of FICs were: (a) diffusion of improved farm practices; and (b) promotion of the GSFC's fertilisers. These objectives are accomplished through various extension and

sales related support services. The underlying rationale is that dissemination of information (regarding proper application of fertiliser and related farm practices) is a crucial precondition for generating effective demand for fertilisers. Similarly, ensuring timely supply of fertilisers through widespread sales outlets is also equally important for effectively promoting the sales.

This kind of a comprehensive strategy was particularly essential during the initial phase when Indian agriculture had yet to experience technological transformation. Use of fertilisers was not widely known to the farmers, and at the same time the extension services were not fully developed under the state's support. Moreover, the state level policies were quite conducive to the industry's promotional activities in spite of their major emphasis on co-operative distribution network. Not only were fertiliser manufacturers free to set up their own outlets, they were also encouraged to have a close interface with the credit and distribution system in the co-operative sector [Nampoothiri and Desai, 1994]. Thus, at the time when FICs started exploring initial market for fertilisers, the market structure as well as the policy environment were particularly conducive for the GSFC.

However, the market scenario changed significantly after adoption of the retention price system in 1977. Under the retention price system, product-wise prices were fixed in such a manner as to provide 12 per cent post-tax return on net worth if the plant utilised 80-90 per cent of its installed capacity. This provided in-built incentives for investments, with the result that an increasingly large number of manufacturers started entering the fertiliser industry. Thus along with rapidly expanding area under irrigation and the high-yielding varieties of crops, fertiliser market in the state became more dynamic. Obviously, this changed the special status of the GSFC, which till then was the only major manufacturer (particularly of phosphatic fertilisers) in Gujarat. In this context, the following factors were important: (i) The Indian Farmers' Fertiliser Cooperative Co. Ltd. (IFFCO), started its plant in Gujarat for producing complex fertilisers. This reduced the GSFC's share (though, not magnitude) in total allocation in the state. Being a co-operative unit, IFFCO had special advantages in terms of linkages with the co-operative credit, storage and distribution. The arrangement of patronage and quantity rebate provided special leverage to 'push' its products under the emerging environment of increasing aggregate supply [Gupta and Kumar, 1992]. (ii) With the increase in the number of local manufacturers, a ceiling was imposed on sales through industry's own retail outlets. Accordingly, the GSFC's FICs could not sell more than 20 per cent of its total allocation in the state. Obviously, this would set a limit on FICs' efforts especially for direct sales; indirect sales through co-operatives had already become more difficult than before. (iii) With the rapidly expanding market and assured margins, private agencies started entering the fertiliser market. As the co-operatives held about 80 per cent of the total allocation in the state, the private agencies were sharing primarily the remaining part of the allocation (with FICs) which was already quite limited. (iv) A large agricultural extension network was evolved under the state supported training and visit (T&V) system. Inducing proper use of fertiliser was among the important tasks of the extension network. The emphasis was on creating generic demand, irrespective of the brand names. This counteracted the industry's effort to promote a specific brand.

The above forces gave rise to a developed and relatively more competitive marketing structure whereby the GSFC's share in the total sales allocation in Gujarat declined considerably. The GSFC's share in total sales of fertilisers in Gujarat fell from 70 per cent in 1969 to 50 per cent in 1979, and further to 30 per cent in 1983. Consequently, FICs' role in terms of extension-linked sales was also reduced as compared to the initial phase. Nevertheless, in spite of the declining market share, FICs continued to exist because of certain inherent strengths, namely, ability to move into unexplored areas, professional management ethos, unlike political interference in the case of co-operatives, scope for influencing farmers' brand preference- crucial for survival under adverse market conditions, better management of inventories through a large number of

decentralized storage points, and finally, better qualified field staff which functioned as a 'lead agency' in support of the T&V network.

In the subsequent analysis, the performance of FICs between 1978 and 1987 has been examined, during which period the fertiliser marketing scenario in Gujarat had developed fast. By the mid-eighties there were three major manufacturers in Gujarat and also a well developed co-operative distributional network which contributed over 50 per cent of the total sale of fertiliser in the state. More specifically, the following questions have been looked into, namely, (i) whether FICs have worked as a complementary agency to the co-operative sales network; (ii) the extent to which FICs' extension activities contributed to promoting the GSFC's sales on a sustainable basis; and (iii) the relative efficiency of FICs' extension services *vis-a-vis* the mainstream T&V system.

Data Base

The analysis draws mainly on the evidence of FICs' sales and extension activities for the district as well as talukas in Gujarat. The perceptions of FIC - functionaries as well as the beneficiary farmers have been taken into account. This is based on primary data generated through a sample survey of over 800 farmers selected from the 14 FICs [Shah and Sah, 1989].

Geographical Spread and Complementarity with Co-operative Sales

Right from the initial phase, FICs were spread over all the districts in Gujarat regardless of their level of fertiliser consumption (Table 1). By 1987, the total number of FICs was 198 which covered 146 out of 184 talukas in Gujarat. Considering the overall spread of the co-operative network in Gujarat, FIC's coverage is quite impressive in spite of the unevenness of their spread at the taluka level. There are 39 talukas with two or more than two FICs, a majority of which were in high consumption districts (Table 2). Against this, 38 talukas did not have any FIC, a large proportion of which belonged to low consumption districts (Tables 3a and 3b). Nevertheless, a majority (i.e., 52 per cent) of all the low consumption talukas had been covered by the FIC network.

TABLE 1. INITIAL GROWTH OF FARM INFORMATION CENTRES (FICS)

(numbers)

Districts	1967-70	1971-76	1977-87	All FICs
Ahmedabad	6	3	-	9
Banaskantha	2	3	3	8
Baroda	1	3	4	18
Bharuch	6	4	-	10
Dangs	1	-	-	1
Kheda	13	6	2	21
Mehsana	2	5	3	10
Panchmahals	4	7	-	11
Sabarkantha	5	7	1	13
Surat	8	4	1	13
Bulsar	5	5	-	10
Amreli	6	4	1	11
Bhavnagar	7	4	-	11
Jamnagar	3	3	2	8
Junagadh	5	9	1	15
Kutch	-	4	1	5
Rajkot	6	6	3	15
Surendranagar	2	4	-	6
Gandhinagar	-	3	-	3
Total	92	84	22	198
% to all FICs	46.5	42.4	11.1	100

Source: Compiled from various regional offices, Gujarat State Fertiliser Company.

TABLE 2. DISTRIBUTION OF TALUKAS HAVING MORE THAN ONE FICs, BY DISTRICT

District	No. of Talukas			Talukas Without FICs	Total Talukas In District
	With Two	With Three	Total		
Ahmedabad	2	-	2	-	7
Banaskantha	1	1	2	6	11
Baroda	3	2	5	-	12
Bharuch	2	-	2	3	11
Dangs	-	-	-	-	1
Kheda	3	3	6	-	10
Mehsana	-	-	-	2	11
Panchmahals	1	1	2	3	11
Sabarkantha	3	1	4	2	10
Amreli	3	-	3	2	10
Bhavnagar	1	-	1	2	12
Jamnagar	1	-	1	3	10
Junagadh	2	-	2	2	15
Surendranagar	-	-	-	4	9
Rajkot	2	1	3	1	13
Surat	3	-	3	3	13
Valsad	2	-	2	1	8
Gandhinagar	-	1	1	-	1
Kutch	-	-	-	4	9
All Districts	29	10	39	38	184

Source: As in Table 1.

TABLE 3A. FICs' MARKET SHARE: DISTRICTS WITH DIFFERENT LEVELS OF FERTILISER USE

(per cent)

	FICs' Share of the Market (1979)	FICs' Share of the Market (1983)
A. Districts with Low Level of Fertiliser Consumption		
1. Banaskantha	9.23	6.14
2. Bharuch	20.90	16.62
3. Dangs	100.00	21.43
4. Kutch	18.61	11.42
5. Panchmahals	36.21	16.49
6. Surendranagar	19.42	17.57
Total	20.09	13.06
B. Districts with Medium Level of Fertiliser Consumption		
1. Ahmedabad	8.25	6.35
2. Valsad	20.86	11.97
3. Jamnagar	8.27	6.37
4. Mehsana	8.45	5.94
Total	9.95	7.05
C. Districts with High Level of Fertiliser Consumption		
1. Amreli	10.81	13.39
2. Baroda	13.62	9.83
3. Bhavnagar	18.12	11.90
4. Gandhinagar	12.39	8.77
5. Junagadh	12.88	9.11
6. Kheda	5.57	6.84
7. Rajkot	8.06	4.69
8. Sabarkantha	7.57	6.76
9. Surat	8.85	5.43
Total	9.78	7.86

Source: As mentioned in Table 1.

The economic rationale, besides the equity considerations for not confining merely to a few high consumption areas, could be to tap the market which is relatively less developed. This was verified by working out FICs' market share in areas with different levels of fertiliser consumption. The evidence emerging from both district as well as taluka level analyses (Tables 3a and 3b, respectively) indicated that their market share is higher among the low consumption areas as compared to medium and high consumption areas.

TABLE 3B. MARKET SHARE OF FICS IN TALUKAS ACROSS DIFFERENT CATEGORIES

Soil-Crop Zones	FICs' Market Share (%) in Talukas Classified on the Basis of Development Indicators											
	Extent of Irrigation (GIA as % to GCA)			Fertiliser Use Potential (Kg/Ha)			Fertiliser Consumption (Kg/Ha)			Number of Fertiliser Sale Outlets		
	<25	25-50	>50	<100	100-200	>200	<25	25-50	>50	<30	30-50	>50
I	11.27	4.61	30.83	17.99	7.51	-	50.55	12.29	4.26	17.21	14.07	4.55
II	16.11	7.90	7.57	20.83	6.32	6.27	25.51	17.36	6.89	17.14	8.27	11.88
III	22.94	4.88	-	20.29	5.51	-	29.65	20.25	4.88	26.95	8.31	11.53
IV	20.79	15.46	5.93	5.12	9.44	-	22.24	10.64	6.79	19.54	8.89	8.32
V	27.13	7.66	5.47	8.49	8.72	-	18.70	8.46	2.20	24.74	7.92	6.79
VI	19.38	12.97	2.55	15.34	29.07	6.50	17.55	17.69	2.55	29.07	20.72	8.64
VII	8.12	7.93	-	9.11	6.94	10.33	20.91	10.35	5.44	11.10	7.10	8.11
Total	11.56	7.94	6.16	11.41	7.84	8.77	21.40	11.05	5.38	15.49	8.98	7.57

GIA= Gross Irrigated Area; GCA= Gross Cropped Area.
Notes: a. Estimates Refer to 1981-82. b. The zones are classified on the basis of soil-crop characteristics of each taluka in Gujarat. The seven soil-crop Zones are:
I Residual Soil - Maize
II Residual and Deep Black Soil - Cotton
III Residual and Littoral Soil -Paddy
IV Sandy Loam Soil - Bajra/Tobacco
V Loamy Sand Soil - Bajra/Cotton/Pulses
VI Clay Alluvial and Littoral Soil - Cotton/Dry Wheat
VII Residual Littoral Soil - Groundnut
Source: As in Table 1.

Since higher market share of FICs by itself does not suggest that these areas were relatively neglected by the co-operatives, it is not possible to infer about the complementary or competitive nature of sales by these two channels. Ideally, this could be ascertained by looking into the functioning of primary agricultural credit societies (PACs) in terms of geographical spread, storage facilities, supply during the peak months, range of products available, etc. However, such data was not available at the taluka level. Therefore, the total number of fertiliser outlets (more than 75 per cent of which tend to be PACs) in the taluka had been used as a proxy indicator. About 30 per cent of the FICs were located in talukas where the number of fertiliser outlets was less than 30 (Table 4). It would therefore appear that FICs tried to explore markets where cooperatives were weak or thinly spread, and were complementary to the cooperatives. This finding is further supported by the fact that, overall, market share of FICs is negatively correlated with the co-operative sales at the taluka level (where the value of correlation co-efficient is - 0.792; see Table 5). These findings suggest that by and large FICs tried to complement the sales efforts of the cooperatives. This not only served the immediate interests of promoting the corporate sales, but also helped farmers, especially in low consumption rainfed areas, by providing various extension services.

TABLE 4. DISTRIBUTION OF FICS ACROSS TALUKAS ACCORDING TO NUMBER OF FERTILISER OUTLETS

Soil Crop Zones	Number of Fertiliser Outlets						
	<5	5-14	15-29	30-50	50-75	>75	Total
	Number of FICs						
I	-	3	5	4	5	2	19
II	-	11	5	12	3	-	31
III	2	3	3	6	2	-	16
IV	-	-	2	13	12	-	27
V	2	3	4	11	8	3	11
VI	-	-	2	8	3	-	13
VII	-	2	14	18	24	3	61
Total	4	22	35	72	57	8	198
% to Total	2.02	11.11	17.67	36.36	28.79	4.04	100

Source: Compiled from the *Report of the Working Group on Fertiliser Distribution System in Gujarat, 1983.*

TABLE 5. CORRELATION COEFFICIENTS AMONG DIFFERENT VARIABLES BY SOIL CROP ZONES

Name of the Variables	Soil Crop Zones							
	I (n=19)	II (n=33)	III (n=14)	IV (n=27)	V (n=31)	VI (n=13)	VII (n=57)	All Zones (n=194)
Agricultural Development and Extension Activities (a)	0.106	-0.2299	0.0615	0.0424	0.4861*	-0.2220	-0.0745	0.1426
Extension Activities and Irrigation Intensity (b)	0.1116	-0.1573	-0.0914	0.6844*	0.6730*	0.0659	-0.0284	0.0104
Extension Activities and FIC-Sales per GCA	0.2958	0.2813	-0.7576*	0.6545*	0.2182	0.0636	0.3680*	0.2086*
Agricultural Development and FIC-Sales per GCA	0.5924*	0.4401*	0.2641	0.2193	0.3776**	-0.4908**	-0.0721	0.0845
Fertiliser Sales by Co-operatives (c) and FICs' Market Share	-0.8527*	-0.8893*	-0.8594	0.3005	-0.8366*	-0.6535*	-0.7718*	-0.7918*
FIC-Sales per GCA and Irrigation Intensity	0.5879*	0.4291*	0.9614*	-0.6093*	0.4796*	0.7304*	0.2301**	0.0956
Cooperative Sales and Agricultural Development	0.6001*	0.6208*	0.9376*	0.6190*	0.7084*	0.7400*	0.4291*	NE

NE= Not Estimated; * Significant at 1 per cent; ** Significant at 5 per cent.
Sources: a. Based on taluka level index of agricultural development. For details see Government of Gujarat, 1984. b. Worked out from the FIC-level data made available by the GSFC. c. Derived by subtracting FICs' sales from the total supply.

Sales and Extension: Interlinkages

The empirical findings on the correlates of FICs' sales clearly indicate a positive association between the index of extension activities and sales at the aggregate taluka level.[2] Interestingly, at the aggregate level, no other traditional demand related variable, e.g., irrigation, or level of agricultural development emerged as an important factor associated with the FICs' direct sales (Table 5). The co-operative sale was found to be significantly correlated with agricultural development in all the seven zones. What perhaps explained this phenomenon was the fact that while the mainstream distributional channel had to succumb to the pressures of heavy demands from the high consumption areas, the industry's channel could be diverted to the relatively less explored areas where the key to success was effective extension work and perhaps better supply management. This was confirmed by the relatively better status of extension activities (index) in the case of FICs located in the low *vis-a-vis* high consumption talukas (Table 6).

TABLE 6. PROFILE OF SAMPLE FICS

Soil Crop Zones	Name of the Taluka of Sample	FICs' Fertiliser Consumption	FICs' Sale (NPK kg/ GCA) a	FICs' Market Share b	Index of Market Extension Activities c
I	Idar	High	1.89	1.93	240
	Limkheda	Low	1.33	28.09	144
II	Bardoli	High	9.40	3.85	195
	Mangrol	Low	1.00	13.8	227
III	Navsari	High	4.73	4.57	181
	Songadh	Low	1.58	78.72	238
IV	Nadiad	High	0.83	1.03	283
	Kapadvanj	Low	3.22	13.12	284
V	Prantij	High	1.81	4.24	495
	Anjar	Low	0.29	20.59	190
VI	Halvad	High	8.04	24.84	192
	Dhandhuka	Low	0.74	17.75	254
VII	S.Kundla	High	2.80	7.24	456
	Chotila	Low	2.39	22.7	652

NPK= Nitrogen, Phosphate and Potash.
Sources: (a) Complied from data available with the GSFC. (b) Indicated percentage share of FICs' sales to total fertiliser supply. (c) The methodology adopted to work out the composite index is described in end note 2.

However, the harmony between extension and sales activities could be maintained so long as the market (and all the channels within that) operates according to the norms. If the internal consistency of the distributional system is disturbed, the harmony is also lost, at least in the short run. This was witnessed during the drought period in 1987 when increasing competitive pressures had led FICs to shift the emphasis in favour of sales at the cost of extension work (see Table 7).

TABLE 7. FICS' EXTENSION ACTIVITIES IN GUJARAT

Major Extension Activities	Number of Activities Arranged Per FIC			
	1993		1987	
	Actual	Targets*	Actual	Targets*
Demonstrations	3	4-5	2	NA
Night Meetings	7	10-12	4	NA
Soil Samples	108	80-100	97	NA
Krishi Jiwan Enrolment	148	200-250	155	NA
Village Meetings	47	50-60	29	NA

* Generally these targets remain unchanged across regions and over time.
Source: Unpublished information made available by the GSFC.

But in the long run the harmony must persist. This was clearly reflected in the perception of the FIC functionaries who reported that extension activities were essential for maintaining their market share. It was through these activities that they could keep in direct contact with the farmers which eventually helped their direct sales.

Sustainability of FIC - Network

Notwithstanding these shortfalls in terms of extension support, FICs' - network yielded certain distinct advantages for the GSFC. First it provided a widespread storage facility across 146 talukas in Gujarat. These storage points worked as effective suppliers to the local level agencies, in co-operative as well as private sectors, since nearly one-third of the GSFC's fertiliser was being supplied through FICs in Gujarat. Secondly, the extension linked approach had helped in creating brand preference which was found to be higher (95 per cent) among the FICs - participants *vis-a-vis* non-participants (81 per cent). Interestingly, the two most important factors influencing the brand preference were 'superior quality' and 'smooth availability', which positively influenced the direct interaction between farmers and the FIC - functionaries. These promotional measures led to economic viability, breaking even at the aggregate FIC - level.

More than economic viability, the importance of FICs was recognised as the sales network, especially when the demand was low (due to frequent droughts in Gujarat), and the firm was facing severe competition from the co-operative sector having better linkages between production and distribution. For instance, during the drought period, FICs had contributed as large as 44 per cent (as against the usual allocation of 17-20 per cent) of the GSFC's actual sales in Gujarat.

Better Extension Services: Role of a Lead Agency

Given the catchment area of about 15-20 villages, FICs tried to provide intensive extension services to the farmers of all categories. Although the basic approach and the activities carried out by FICs were almost similar to those under the T & V system, the aim was to make the activities relatively more effective or result-oriented. In doing so they had two main advantages over the T & V system: (a) the performance of extension activities was judged in terms of their tangible impact on sales promotion; hence, effectiveness became the rule for survival: and (b) having better qualifications and financial reward (i.e., salaries), the FIC - functionaries could be better motivated in terms of performing the given task. Of course, it is difficult to isolate FICs' impact in a situation where multiple agencies are operating. Nevertheless, the survey - data suggested that FICs were considered to be the most important source of information, more so in the less developed regions.

To the extent FICs could provide better extension services, it helped overcoming some of the lacuna in the mainstream extension network. However the question remained as to whether the industry could evolve an equally widespread network of extension to support the T & V system. And if not, how best could the better skills of their functionaries be utilized to make both the systems perform more effectively? The question is all the more relevant in view of the fact that despite relatively better performance of FICs, a significant information gap continued to persist. Table 8 reveals that farmers, even in the villages with better impact of FICs, did not have the right kind of awareness about some of the crucial aspects of fertiliser technology. This resulted in low level of adoption of fertiliser use even among the farmers who were participants in FICs' extension programmes (Table 9). This reflects certain deficiencies in the present approach towards extension activities. For instance, field programmes are not only thinly spread but they lack follow up action. Moreover, interaction with the farmers is often unidirectional. The approach is unidirectional because there is hardly any effort on the part of the FICs to closely observe, experiment and follow the adoption process which is subsequently documented and sent to the R & D centres for scientific analysis. The focus is more on increasing the quantum of fertiliser use than on adoption of related farm practices. Consequently, the recommendations (though, probably better communicated as compared to the

extension workers under T & V system) do not capture farm-specific situations and remain general in nature. This was particularly reflected in terms of low participation in an important activity like soil testing services; only 193 out of the 617 farmers knew about this activity of the FICs. Thus, it would seem that given the fixed pattern of time budgeting, the extension activities of FICs have become more a matter of routine. Very little is left to be explored through the innovative initiatives of the FIC functionaries, implying thereby, sub-optimal use of their skills. What is also of concern is the absence of a supporting R & D system which could receive feed back from FIC-functionaries and in turn help them generate farm-specific recommendations. As mentioned earlier, what is needed is co-ordination of efforts among T & V functionaries, research stations and industry where the latter could assume the role of a 'lead' agency. What is implied by 'lead agency' is a catalyst which can (i) link as well as give direction to the activities of other agencies, and (ii) fill in the gaps in providing a comprehensive extension network. Although the lead agency role is not explicitly recognized by the GSFC officials, the underlying rationale for proposing this hypothesis is two-fold. First, the FIC-functionaries are better qualified and better paid and therefore could cover only a limited area; and second, their marginal contribution could still be greater if they are able to generate and disseminate more precise information in the villages they serve. At present this is not done for it requires commitment on the part of various agencies and also government intervention.

TABLE 8. DISTRIBUTION OF FARMERS WHO REPORTED FEARS REGARDING ADVERSE IMPACT OF FERTILISER USE

(per cent*)

Size-class of Holdings	Participants				Non Participants			
	Pest	Weed	Soil Ferti-lity	Texture	Pest	Weed	Soil Ferti-lity	Texture
Marginal	48	73	71	77	41	64	72	76
Small	44	64	81	77	49	67	81	81
Large	39	64	74	82	41	67	73	78
All	42	65	76	80	44	66	76	78

*Farmers reporting a particular fear are shown as per cent of total fertiliser users in respective categories.

TABLE 9. ADOPTION OF FARM PRACTICES

(per cent)

Farm Practices*	Participants in FIC-Activities	All Farmers knowing about FICs
1. Optimum	50	30
2. Balanced	38	23
3. FYM-Fert.	46	28
4. Basal	45	28
5. Crop-Row	17	11
6. Drill	12	11
7. Before	27	16
8. Irrigation	42	27

* Details of the improved farm practices:
1. Increase in yield resulting from optimum doses of fertilisers.
2. Balanced use of nutrients.
3. Mixed use of chemical fertilisers and farm yard manure.
4. Impact of basal dose on crop.
5. Distance between crop rows.
6. Use of seed-fertiliser drill.
7. Application of basal dose along with sowing.
8. Proper timings of irrigation.

The experience of FICs in Gujarat can thus be summarized as follows: (i) despite the widespread institutional network for fertiliser distribution, the industry could still make useful contribution for promoting balanced growth of fertiliser consumption. This was partly attained by complementing the co-operative network, and exploring relatively neglected areas. (ii) Effective extension was a key to successful sales promotion. The two activities work in a mutually reinforcing manner. (iii) Significant information gap, in spite of relative success among the participant farmers, reflected deficiencies in the present approach of information dissemination. (iv) Instead of merely duplicating the efforts of the T & V system, the FICs could work as catalysts which could co-ordinate with the existing extension as well as R & D system. More of location-specific information could be generated, essential for the fine tuning of fertiliser use. With better skills of the field level functionaries, the industry could play the role of a lead agency.

Two striking features emerge from the analysis. First, positive influences of extension services on sales were realized more effectively if the two services were brought under a single umbrella. Second, instead of confining merely to the high consumption areas, the sales objectives could be fulfilled by spreading to the low consumption area unexplored by the mainstream distributional channels under the co-operative network. Since a large proportion of the future growth of fertiliser consumption has to come from these areas, it calls for increasing involvement of micro level agencies in conversion of potential into effective demand and timely supply of fertilisers at places which are closer to the final users (Processes II and IV). Insofar as this leads to harmonizing the diverse objectives of various participants of fertiliser sub-system (i.e., the institutional support agencies and the industry's promotional network), sustainable growth in fertiliser consumption may be attained faster. The moot question is whether the new policy environment will nurture these harmonious relationships.

III. INDUSTRY'S RESPONSE IN THE CHANGED ENVIRONMENT

Earlier, the industry-supported micro level agencies were the outcome of a package of policies which had created conducive environment for various sub-systems at the macro as well as micro level. Rapid growth of domestic production supplemented by timely import created a sustained pressure, from the supply side, on those processes that helped expanding fertiliser distribution network, as well as, increasing the demand for fertiliser. This environment has been severely distorted under a series of policy reforms which were introduced since August 1991 whereby the industry, especially manufacturers of phosphatic fertilisers, were forced to face uncertain market forces, almost without any policy support.

The most crucial elements in the previous policy regime were: (i) certainty and in-built nutrient balance in aggregate supply at the national as well as state level; (ii) price parity between different nutrients; (iii) interlocking of interests between producers and distributors; and (iv) provision of expenditure for carrying out promotional activities under the retention price system. If these elements of policy cease to operate and commercial considerations emerge as the only guiding factor, the industry's promotional as well as distributional activities might undergo significant changes.

For instance, the two important policy changes, namely, reduction in fertiliser subsidy and decontrol as well as decanalisation of imported fertilisers have already exerted disequilibrating effects with respect to the industry's initiatives in the two processes. The most worrying aspects of the changed policy scenario are: (a) breaking down of the domestic production of phosphatic fertiliser because of the withdrawal of price support through subsidies; as an immediate result, 24 units producing single super phosphate were closed down and several other units producing complex fertilisers (like diammonium phosphate) drastically cut down their production; (b) involvement of private trading agencies other than fertiliser manufacturers for distribution of imported fertiliser. This has led to a situation where some of the distribution agencies have

entered the market without having stakes in the sale of their own products. Since aggregated supply is no more insulated from uncertainties in the international market, decanalisation might lead to overall deficiency in the availability of phosphatic and potassic fertilisers along with sulphur which is mainly derived from single super phosphate [Desai, 1994]; (c) fall in overall consumption due to over 100 per cent increase in the prices of phosphatic fertilisers. Although, simultaneous rise in output prices might compensate the effect of increased fertiliser prices, it may however, not protect those farmers who do not produce marketable surplus; (d) increased imbalance in fertiliser use because of the drastic changes in the relative prices of the three nutrients. With more than doubling of prices of the major phosphatic and potassic fertilisers and only marginal changes (within the range of ±20 per cent) in the price of urea (the major source of nitrogenous fertilisers), consumption of the former two has undergone a significant decline, whereas the use of urea has increased. This has resulted in increased imbalance in the nutrient use; the NPK ratio changed from 5.9:2.4:1 to 9.8:3:1 between 1991-92 and 1993-94 [Singh, 1995].

Arriving at a new equilibrium is a complex process, for the sector has been suddenly jerked up from a long sustained and pervasive regulatory environment to face the market mechanism which is still in a rudimentary stage [Desai and Rustagi]. While need for correcting distortions in fertiliser use through improved support system (in terms of extension, credit and distributional network) is clearly realised in the industry circles, the modalities are yet to be worked out. The picture is still quite hazy with respect to the industry's initiatives for promoting micro level agencies.

Alternative Market Scenarios

The immediate reaction from the industry's quarters could be that those firms which produce mainly nitrogenous fertilisers may not have much incentives to take up promotional marketing, for the favourable changes in the price ratio (between N and P) are likely to generate increasing demand for their products. On the other hand, the firms, primarily producing phosphatic fertilisers may either be driven out of production (as it happened during the kharif season of 1993), or may be left with limited resources, that may not permit promotional activities on a large scale.

Alternatively, three scenarios could be visualized with respect to producers of complex fertilisers who, in fact, are facing the brunt of the recent policy changes. In the first scenario, decontrol and decanalisation of phosphatic fertilisers would create price disparity, which would place domestic producers in a disadvantageous position as producers or distributors of imported phosphatic fertilisers (a scenario which more or less prevailed during 1992-93). In this situation, the industry will not have much incentives to undertake promotional activities, as argued above. In the second scenario, the industry will be given special preference for marketing of the imported fertilisers. In this case, the industry will have to convince farmers to demand more fertilisers even at a higher than the 1991 prices. But, the promotional activities in this scenario might be significantly different from the earlier situation because instead of being manufacturers of these products, these firms now will operate mainly as traders. Relatively, their stakes will be limited to promoting sustainable growth of fertiliser consumption, more so if the international market continues to be turbulent and pay-offs on speculative operations are substantial.

Finally, a more favourable scenario could be visualized whereby the domestic industry is able to recoup partly the production of phosphatic fertilisers, though market prices may continue to remain at higher than the 1991 levels. Hence the important task for the industry would be to promote efficient use of fertilisers through concentrated efforts in terms of research, extension and credit support. But, the industry facing severe resource constraints (due to increasing uncertainty *vis-a-vis* the retention price system where profit margins were assured and also insulated from international competition) might find it difficult to provide such support. It is quite likely that instead of entering into difficult areas (where the demand is more price elastic and infrastructure is not much

developed), the industry, even in the long run, may opt for strategies which depend more on market segmentation and price discrimination. For instance, the fertiliser industry has tried to define primary and secondary zones for the purpose of marketing. The primary zone is still profitable where promotional programmes may be concentrated; the secondary zone is viewed as unstable and economically not viable for undertaking promotional activities [Singh, 1995].

One of the strategies under the third scenario might be to promote more remunerative crops and areas by providing credit, marketing support and technical know-how to the farmers. This could imply that the industry might operate in an oligopolistic market whereby aggregate supply might remain restricted at a level below agronomic potential. Another option for the industry could be to resort to product as well as price discrimination by promoting low quality and low cost products in the low potential regions. Unlike in a competitive market structure, where sequential spread of micro level agencies in the low potential regions is a slow but smooth process, the industry under imperfect market structure might linger with these strategies for a long time.[3] As a result, industry's promotional efforts will remain restricted, unlike in the case of a developed market economy, where it takes a lead not only in terms of evolving a widespread distribution and sales network, but also in terms of mobilizing investments in R & D, irrigation and agro-processing, besides credit and extension support.

The initial signals coming from the industry during the post-decontrol period, marred by a fluid situation on the policy front, indicate sluggishness in the industry's promotional activities[4] [Kute and Majmudar, 1992]. This reinforces our earlier observation that if there are disturbances in the macro level processes (e.g., in aggregate supply or price ratios between N and P), the industry's promotional activities might also get distorted; instead of focusing on generating knowledge-based demand the emphasis might get shifted to tampering with prices or unhealthy inter-firm competition, thus catering more to the commercial interest [Singh, 1995].

The above discussion indicates that the industry may not be able to play a very significant role in terms of the two processes, namely, creating effective demand and ensuring smooth supply, unless some of the crucial objective conditions with respect to production and pricing are restored. Conversely, the role of the public system becomes crucial especially because the supply side forces, that were mainly responsible for the past growth in fertiliser consumption, have been put in the back gear under the new policy environment. The aggregate supply will now be governed by the fluctuating international market, often beyond the control of the domestic fertiliser manufacturers as well as the distribution agencies. It is therefore pertinent that the major impetus for future growth in fertiliser use will have to come from the processes operating on the demand side. While this calls for a fresh round of investment in agricultural research and development, also in irrigation and credit institutions, extension support that may help in adjusting the use of fertilisers under a changing environment is equally important. A recent study of farmers' response to increase in fertiliser prices on some of the irrigated crops in Gujarat has clearly demonstrated that, in the long-run, farmers do tend to take rational decisions to sustain yield and maintain overall profitability of crop production [Sah and Shah, 1993]. The process of arriving at a new equilibrium level can certainly be facilitated by providing counselling services to farmers. The need for such support is all the more crucial because of the depleting groundwater availability and shifting cropping pattern (e.g., from wheat to mustard and from cotton to castor) caused by increased market avenues or pest problems and mono-cropping, as experienced in Gujarat. With the rapidly changing prices and other operating environment in different regions, there is no option but to provide location - specific extension messages based on large scale demonstrations on farmers' fields. Similarly, strengthening the institutional credit support would go a long way in promoting balanced fertiliser use, particularly in the dryland regions, where use of fertilisers, especially phosphatic fertiliser, is risky. Essentially, what is implied is a need to adopt different strategies

across crops and regions with different levels and balance of nutrient use.

The imperative for industry is to realise that its long run interest lies in promoting efficiency of fertiliser use, preferably by linking closely with the widespread extension system in the public realm. This is essential for ensuring profitability to farmers and thereby sustaining the demand for fertilisers. What is implicit is that, instead of concentrating mainly on production and distribution systems, the industry will now have to focus more on enhancing economic viability (rather than merely pushing the quantum) of fertiliser use. In this context FICs' experiences of extension-linked sales network gains special relevance.

The Task Ahead

With a near full achievement of agronomic potential in the irrigated areas, the task of increasing fertiliser consumption mainly through dryland agriculture is a more complex process than in the initial phase. With recent changes in the policy environment the situation has been further aggravated. In this context, some of the important challenges facing the micro level agencies might be as follows: (a) Fertiliser use on dryland crops is already low and tilting against phosphatic fertilisers [Sah and Shah, 1994]. The new price ratio (between N and P_2O_5) will further increase the gap. This needs to be corrected. (b) Among irrigated crops, the levels of fertiliser use had already overshot the required doses; the recent increase in the cost of fertilisers may help check this trend of excessive use. However, with decontrol and decanalisation of phosphatic and potassic fertilisers, the private distributional agencies might try to push more fertilisers into irrigated tracts with a message of *more* rather than *efficient* use of fertilisers. (c) The initial set-back in fertiliser consumption might have destabilised the credit and supply network under the cooperative sector. It might become increasingly difficult (both for cooperatives, as well as, private channels) to enter into low potential areas in the dryland region. Hence, the distributors' credit support should be revamped and special incentives should be provided to enter into relatively less explored regions. (d) With the increased cost of fertilisers, need for credit support might be further enhanced. If cooperatives are to continue as the most important source of credit (for fertiliser), it is essential that they should also contribute towards improving the farmers' ability to obtain better yields on the applied fertilisers so as to increase their repayment capacity. A closer link between extension and credit is more necessary, than ever before. (e) The public system for research and extension is already inadequate to cope with the need for location - specific recommendations. To arrive at new messages and their dissemination without much of a time lag, is the new challenge. The industry's existing resources for R & D and extension could be strengthened to work as a lead agency, somewhat on the lines suggested for the GSFC's FICs.

If the public support system is to take up these challenges, it will need drastic reorganization of the existing R & D, extension and cooperative credit and sales network. And yet the questions remain as to: (a) whether the public system alone can shoulder all these responsibilities. (b) To what extent could the industry's resources be tapped to serve some of the most difficult regions? And (c) what kind of supporting measures might be essential to bring back the industry's promotional role, with its inherent strengths, under the new policy environment? These issues need immediate analysis and discussion.

NOTES

1. This approach visualizes growth of fertiliser use as an outcome of the four processes: increasing agronomic potential (Process I), aggregate fertiliser supply (Process II), effective demand (Process III) and distribution system (Process IV) [Desai and Stone, 1987].

2. For working out Index of Extension Activities, five major activities have been considered. Ranks were given to each activity, across all the FICs in a particular zone. The ranks for all the five activities of the FICs were added, assuming equal weights. Sum of these ranks is treated as index of extension activities.

3. The pace and spatial spread of development of micro level diffusion agencies in a developed market economy can be analysed in the light of the Market and Infrastructure Perspective on Innovation Diffusion [Brown, 1981].

4. The policy environment is experiencing continuous changes, going back and forth from control and decontrol of different fertilisers. In the process, regulations like state level allocation are also being applied from the back door even on the decontrolled products. For instance, to get special subsidy on phosphatic fertilisers, manufacturers have to obtain quota in the state allocation.

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DOCUMENTATION

The purpose of this section is to make available to the readers official documents such as reports of committees, commissions, working groups, task forces, etc., appointed by various ministries, departments, and agencies of central and state governments which are not readily accessible either because they are old, or because of the usual problems of acquiring governmental publications, or because they were printed but not published, or because they were not printed and remained in mimeographed form. It will be difficult and probably not worthwhile to publish the documents entirely. We shall publish only such parts of them as we think will interest our readers. The readers are requested to send their suggestions regarding official documents or parts thereof for inclusion in this section.

In the present section we publish:

(1) *Health Bulletin*, No. 23 of 1937, Nutrition Research Laboratories, Indian Research Fund Association, Coonoor, published by the Manager of Publications, Government of India, Delhi.

(2) Report of the University Education Commission, Dec. 1948 - Aug 1949 (Chairman, Dr. S. Radhakrishnan), Government of India, Delhi, 1950, Chapter II, The Aims of University Education.

(3) Report of the Education Commission, 1964-66 : Education and National Development (Chairman, Prof. D.S. Kothari), Ministry of Education, Government of India, Delhi, 1966, Chapter XI, Higher Education: Objectives and Improvement,

W.R. AYKROYD, HEALTH BULLETIN NO. 23, THE NUTRITIVE VALUE OF INDIAN FOODS AND THE PLANNING OF SATISFACTORY DIETS

DIETARY REQUIREMENTS

Foodstuffs supply fuel for the body and they contain proteins, fats, carbohydrates, vitamins and various mineral salts. Proteins, fats and carbohydrates are sometimes known as the energy-yielding food factors, since they are 'burnt' or oxidized in the body to provide the energy necessary for life. Vitamins and mineral salts do not supply energy in appreciable quantities, but they play an important part in the physiological functions of the body. Water is also a necessary dietary element. Human beings, like other animals, require a sufficiency of these if they are to live and thrive, and in a well balanced diet they are present in correct proportions. Our present knowledge of what constitutes an adequate or optimum diet is based on an enormous amount of research work on human beings and laboratory animals carried out in many countries. We have a very fair idea of how much of each food factor is required and we can state requirements in terms of common foodstuffs.

CALORIES

In drawing up a new diet schedule, or in assessing the value of an existing schedule, it is essential to know whether enough food is being provided. It might be thought that it is easy to discover whether, let us say, a group of labourers or the boys in a boarding school are getting enough to eat; if their food is insufficient, they will be hungry and complain about it. But experience has shown that human beings can adapt themselves, at a low level of vitality and with their powers impaired, to an insufficient ration, and scarcely realise that they are under-fed. The nutrition worker, in setting up standards of food requirements, ignores the remarkable faculty of the body to adapt itself to semi-starvation. His standard of food intake implies full satisfaction, enough to enable human beings to lead an energetic life at a reasonably high level of working capacity.

Quantitative food requirements are usually estimated in terms of heat units- calories. Let us first illustrate the problem to be discussed by a simple example. A group of coolies is provided with a ration of 17 ozs. of rice and 2 ozs. of pulse (dhal) per head per day, and very little food from other sources can be obtained by them. There are complaints that the coolies are lazy, that they work languidly and reluctantly. By reference to the Tables (given at the end) and a simple calculation, we discover that this amount of food would provide about 2,100 calories per day. The question arises: are they getting enough food? Or, in other words, are 2,100 calories a day sufficient for an adult man performing manual work?

An expert commission of the League of Nations* has drawn up the following statement about energy requirements:

*(a) An adult, male or female, living an ordinary everyday life in a temperate climate and not engaged in manual work is taken as the basis on which the needs of other age-groups are reckoned. An allowance of 2,400 calories net** per day is considered adequate to meet the requirements of such an individual.*
(b) The following supplements for muscular activity should be added to the basic requirements in (a):
Light work: up to 75 calories per hour of work.
Moderate work: up to 75 - 150 calories per hour of work.
Hard work: up to 150-300 calories per hour of work.
Very hard work: up to 300 calories and upwards per hour of work.

India is mainly an agricultural country and the 'average Indian man' is engaged in a manual occupation. There are justifiable reasons for reducing 'basic' calorie requirements in a warm country, in which the diet consumed is largely vegetarian, below the League of Nations standards. Let us suppose that an Indian male, of sedentary occupation, requires some 2,150 calories, a figure 10 per cent below that of the League Commission. Six hours 'moderate' work at the lowest reckoning, will involve an increase

*The Problem of Nutrition, Volume II. *Report on the Physiological Bases of Nutrition, 1936.*
**The term 'net calories' refers to the amount of energy available from the food actually assimilated.

of requirements to roughly 2,600. We shall not be very far out if we reckon the minimum calorie needs of an average Indian, engaged in ordinary easy-going agricultural or coolie work as 2,500-2,600 calories per diem. Those who perform heavy manual work will probably require about 2,800-3,000 calories per day, as is indicated by the League Commission's figures; if the agriculturist is to work very strenuously on his holding, he must have a correspondingly high calorie intake. A similar high intake is required by athletic young men such as university students. It scarcely needs to be said that a large man working in a cold climate will require more food than a smaller man working equally hard in a warm climate.

It is usual to assess the food requirements of women and children as fractions of those of the 'average man', various coefficients being applied to the different age and sex groups. The following scale of coefficients and calorie requirements is put forward as sufficiently accurate for practical nutrition work in India:

SCALE OF AVERAGE CALORIE REQUIREMENTS.

	Co-efficient	Calories Required
Adult male (over 14)	1.0	2,600
Adult female (over 14)	0.8	2,080
Child 12 and 13 years	0.8	2,080
Child 10 and 11 years	0.7	1,820
Child 8 and 9 years	0.6	1,560
Child 6 and 7 years	0.5	1,300
Child 4 and 5 years	0.4	1,040
Child 2 and 3 years	0.3	780
Child 0 to 2 years	0.2	520

It must be emphasised that this scale is a somewhat arbitrary one. Physique, habits of life and other factors are so variable in different areas that no one scale of energy requirements and coefficients could be entirely suitable for application throughout the country. A somewhat higher scale of requirements would perhaps be more appropriate for North India. It is possible that the proposed scale puts the requirements of an adult woman at too high a figure. During pregnancy and lactation, however, the needs of a woman may equal or exceed those of a man. The League of Nations Commission assesses requirements during these periods as follows:

	Calories
Pregnant woman	2,400
Nursing woman	3,000

These figures are definitely too high for Indian women, but they bring out the point that women need more food when they have to nourish a child in the womb or at the breast.

With the help of the Tables in the Bulletin, the calorie content of diets can be worked out and compared with requirements as suggested; or, conversely, diet schedules yielding approximately the right number of calories can be constructed. In dealing with a group of mixed age and sex composition, the number of 'consumption units' in the group - its '*adult man-value*' - is first calculated. Let us take a simple example. A family consisting of father, mother and 3 children aged 10, 8 and 6 respectively has a '*man-value*', on the above scale, of 3.6, and its daily calorie requirements would work out at 2,600 × 3.6. If it is necessary to draw up a diet schedule for the family, food supplying roughly this number of calories should be included in the schedule. Suppose analysis of the existing diet of the family indicates that total intake per day is only 7,000 calories, *i.e.*, about 1,950 calories per 'consumption unit'. Comparison of this value with the scale shows that the family is not getting enough to eat. The same method of approach is applicable in the case of larger groups in boarding schools, asylums, etc.

Commonsense must always be used in drawing up new diet schedules, or in assessing the adequacy of existing ones. It is usually better to err on the side of excess by 100-150 calories to allow for waste of all kinds, including the inevitable 'leakage' of food which occurs in large institutions. Standards of calorie requirements are applicable only to reasonably large numbers, and not to individuals. The relation between calorie requirements and such factors as work, activity and climate must be borne in mind.

It might be thought that there is little danger that children or adults housed in charitable institutions under careful and well-meaning management should be under-fed. But experience has shown that this is not infrequently the case in India. Superintendents of children's institutions should

take particular care that enough food is provided. The children themselves, often coming from homes in which they were half-starved, are not likely to complain of hunger in circumstances of relatives abundance.

PROTEIN

The next step, in constructing a balanced diet, is to ensure that it is satisfactory in quality. Protein is perhaps the most important of the food factors; it supplies building material for the body and makes good the loss of tissue which occurs as the inevitable result of living at all. It can also be used by the organism as a source of energy.

As is apparent from the Tables, nearly all common foodstuffs contain protein, but the amount they contain varies widely. Animal foods such as milk, eggs, fish, and meat are rich in protein. The common cereals, such as rice, wheat, millet, barley, etc., contain a fair proportion of protein, rice being the poorest of all cereals in this respect. The outer layers of the grain are richer in protein than the inner starchy kernel, and when wheat and rice are highly milled there is some loss of protein as well as of other valuable food factors, such as vitamins and mineral salts. Among the vegetable foods, the pulses are richest in protein. Leafy and root vegetables, and fruits do not contain much protein, but if they are abundantly present in a diet their contribution to total protein intake is by no means negligible.

It is important to remember that growing children require, per unit of body weight, more protein than adults. The new tissue which is being laid down is largely built of elements drawn from protein. For the same reasons the protein needs of women during pregnancy and lactation are greater than at other times. The following scale of protein requirements is suggested as a rough guide for practical nutrition work:

PROTEIN REQUIREMENTS

Age and sex	Co-efficient	Grammes per day
Man 18 to 60	1.00	65
Woman 18 to 60	0.85	55
Boy 10 to 17	1.20	80
Girl 10 to 17	1.10	70
Child 6 to 9	0.90	60
Child 2 to 6	0.60 to 0.80	40-50

This scale falls short of the ideal as defined by modern physiologists, and may often with advantage be exceeded. It is nevertheless excessive, as far as India is concerned, in the sense that economic circumstances and dietary habits often prevent its attainment.

The total protein content of a diet can be estimated by means of the Tables. But more important than the total protein content of a diet is the proportion of protein of high biological value it includes. Proteins contained in various foods differ in their *amino-acid* constitution; amino-acids are the bricks with which tissue is built and replaced, and the more closely the amino-acid make-up of a protein resembles that of the tissues the greater its value. Another factor to be considered in assessing the value of the proteins of a foodstuff is their digestibility.

In general, protein derived from vegetable foods is of less value to the body than protein derived from animal foods. It is, indeed, probable that no combination of vegetable proteins can support growth and lay the foundations of healthy vigorous manhood and womanhood as effectively as a mixture of vegetable and animal proteins. The Commission of the League of Nations referred to reported as follows: 'During growth, pregnancy and lactation, some animal protein is essential, and in the growing period it should form a large proportion of the total protein.'

We may recommend that this proportion should be *at least* one fifth. The best source of animal protein for growing children is milk, derived from the cow or other species. It must be emphasised that skim milk is as rich in good protein as whole milk, and butter-milk of good quality is also a useful source. Eggs, fish, liver and muscle meat also contain proteins of high biological value.

Diets for growing children which do not contain a fair proportion of animal protein cannot be regarded as satisfactory. In devising 'cheap balanced diets' in India the inclusion of animal protein in adequate amounts is the point which presents the greatest difficulty.

Data about the biological value of a number of proteins are given in Appendix I.

FAT

Fat must be included in ordinary diets, but we have no exact knowledge of the quantity required. It is probably advisable that not less than 45-60 grammes ($1\frac{1}{2}-2$ zs.) should be consumed daily.

Most diets in India are low in fat. Fat is of value to the body in a number of ways, and a diet low in animal fat is often deficient in certain important vitamins. Animal fats, such as butter or ghee, contain vitamin A, while most vegetable fats and oils lack this factor. Ghee adulterated with vegetable oil may contain little or no vitamin A. There is one vegetable oil which is very rich in vitamin A activity, namely, red palm oil, which is obtained from the fruit of the palm *Elaeis guineensis*, grown in West Africa, Malaya and Burma. A part from oils and fats which are consumed as such, the following foodstuffs are among those rich in fat: coconuts, nuts, soya bean, avocado pear.

CARBOHYDRATES

Carbohydrates are the body's chief source of energy. Grain foods and root vegetables are largely composed of carbohydrates, and sugar is wholly carbohydrate. The carbohydrates are necessary constituents of the diet, but when, as commonly in India, they are present in excessive proportion, the diet becomes ill-balanced. In working out diet schedules, requirements of protein, fat, vitamins and minerals should first be attended to; subsequently carbohydrate-rich foods can be included in sufficient quantities to fulfil energy requirements.

MINERAL SALTS

The calcium, phosphorous and iron content of most common Indian foods is given in the Tables. It is probable that these are the elements which are most likely to be insufficiently supplied by average human diets. There are a number of other elements needed by the body; it may be assumed that if the diet is well-balanced generally enough of these elements will be obtained. The special problem of iodine deficiency in goitrous areas will not be considered here.

CALCIUM

Calcium is found abundantly in milk (including skim milk and butter-milk) cheese and green leafy vegetables. Murraya, amaranth, fenugreek and drumstick leaves are rich in calcium. Children need relatively more calcium and other minerals than adults, just as they need relatively more protein.

Expectant and nursing mothers require a large intake of calcium. A healthy breast-fed baby of 3 months contains a great deal of calcium in its bones, all of which has been drawn from its mother's blood and its mother's milk. If the mother's diet is deficient in calcium, then the calcium present in her own bones is drawn upon, and her health and probably that of the child, will suffer. Since there is this enormous drain of calcium during pregnancy and lactation, a large intake of milk during this period is recommended.

The usual text-book figures representing calcium requirements are 0.68 gramme daily for children. These figures allow a high 'margin of safety'. Indian diets, particularly diets based on milled rice, may supply less than 0.20 gramme of calcium daily. This intake is too small. The diet of growing children should contain upwards of 0.60 gramme of calcium daily and that of pregnant and nursing women rather more.

The best source of calcium is milk. Green vegetables and certain of the millets - *e.g.*, ragi - are particularly rich in calcium, but the calcium contained in such foods may not be as well absorbed and assimilated as milk calcium.

The habit of chewing betel leaves coated with lime (calcium oxide), which is common throughout India, increases intake of calcium. At present we have no precise knowledge of the value to the body of calcium consumed in this manner.

PHOSPHORS

It is usually stated that rather more than 1.0 gramme of phosphorus daily should be supplied by the diet. Cereals in the raw state are fairly rich in phosphorus, but considerable loss of this element occurs on cooking. If a diet contains sufficient calcium, it may be taken for granted that its phosphorus content is satisfactory.

Hæmoglobin, the red pigment of blood- a most important physiological substance which transports oxygen from the lungs to the tissues- contains iron as an essential constituent of its molecule. Iron is needed by the body for blood formation. When destruction and loss of blood corpuscles is taking place as in such conditions as chronic malaria and ankylostomiasis (hook-worm) iron requirements are increased.

It is suggested that a well-balanced diet for a growing child or an adult should contain 20 mgs. of iron according to the Tables. This figure gives a 'margin of safety' and allows for the possibility that the iron content of foods in certain parts of India may be lower than that of the foods analysed in the Coonoor laboratories. The iron in certain foods is less 'available' - i.e., less well assimilated - than iron in others. A high percentage of the iron in pulses and meat, for example, is 'available' but only a low percentage of the iron in vegetables. If, however, total iron intake from all foods present in the diet exceeds 20 mgs. per day, it is possible that sufficient iron will be assimilated. The percentage of available iron in a number of foodstuffs is given in Appendix II.

In the *treatment* of certain forms of anæmia, iron medication is more effective than the consumption of a diet containing abundant iron rich foods. For the *prevention* of anæmia, however, an iron rich diet is valuable. Pregnant women are particularly prone to suffer from anæmia.

VITAMINS

Vitamin A

Vitamin A is found in animal fats; in whole milk, curds, butter, unadulterated ghee, egg yolk, liver, fish, etc. Its richest natural source is fish liver oil, *e.g.*, halibut liver oil and cod liver oil. But it is not only animal foods which possess vitamin A activity. While vegetable foods do not contain vitamin A, the pigment carotene, which is present in many such foods, appears able to fulfil the physiological functions of vitamin A in the body. Vitamin A requirements can thus be covered by the consumption of a suitable vegetable diet. Leafy vegetables, such as spinach, lettuce, cabbage, amaranth leaves, coriander leaves, drumstick leaves, celery leaves, and ripe fruits such as mangoes, pappaya, tomatoes oranges, etc., are rich in carotene. Carrots are also a good source.

In the Tables the vitamin A and carotene content of foodstuffs is expressed in terms of international units. Our knowledge of vitamin A requirements is at present limited. It may be suggested, however, that a well-balanced diet should contain a daily minimum of 3,000 international units. In Western countries a large proportion of the total vitamin A activity of the diet is usually derived from vitamin A contained in animal foods. Animal foods rich in vitamin A are, however, expensive foods, and in the East it will usually be found that the easiest and cheapest way of ensuring a sufficiency of vitamin A units is to increase intake of green leafy vegetables. For example 3 ozs. (about 85 grammes) of amaranth leaves will supply more than 3,000 international units and cover adult requirements. The needs of children of school age, which may possibly exceed those of adults, can be covered in the same way by a high intake of green leafy vegetables. In the case of infants and young children, and sickly and malnourished children of all ages, vitamin A may be supplied in the form of a daily dose of fish liver oil. The addition of cod liver oil increases the nutritive value of the diet of the average Indian child.

The vitamin A activity of any given foodstuff is variable, depending on a number of factors. That of milk and butter for example, fluctuates according to the diet of the animal from which it is derived; it has been observed in Europe that 'summer' milk, obtained from cows fed on succulent green grass rich in carotene, contains more vitamin A than 'winter' milk from stall-fed cows. Prolonged heating of ghee in an open pan may cause destruction of vitamin A. In the case of leafy vegetables, a good rough indication of carotene content is their greenness. The greener the better, and the fresher the better. Ordinary cooking does not destroy the carotene present in vegetables.

For a number of foods the Tables give a range of vitamin A and carotene content. In devising diets, a figure lying midway between the two extremes may be used. In the absence of

information about the vitamin A activity of a vegetable food, it may be assumed that all green leafy vegetables are richly endowed in this respect, while other vegetables, cereals, legumes, etc., are less important sources of carotene.

Vitamin A deficiency is common in India, and care must be taken to ensure that diets supply a sufficiency of this vitamin. Reference to the effects of vitamin A deficiency will be made in a later section.

The B Vitamins

A whole group of vitamins is included under this head.

Vitamin B_1, commonly known as the 'anti-beriberi' vitamin, is found in unmilled cereals, pulses, eggs, fruits, nuts, most vegetables, glandular organs such as liver and to some extent in muscle meat and milk. A diet largely composed of milled rice contains insufficient vitamin B_1, and may give rise to beriberi, which is common in certain parts of India. Parboiled rice, even when milled, contains vitamin B_1.

The Vitamin B_1 requirements of school children and adults may be estimated at 300 international units per day. It is not difficult to ensure that a diet contains this quantity of the vitamin. If 4 ozs. of unmilled cereal, 6 ozs. of leafy and other vegetables and 2-3 ozs. of pulses are consumed daily, it is probable that enough vitamin B_1 will be obtained, even if the rest of the diet is composed of milled rice. The smaller the supply of vegetables, pulses, and fruits, the more important it becomes to avoid a preponderance of milled cereal in the diet. Even when nine-tenths of the diet is based on rice, beriberi will not usually follow if the rice is consumed in the 'home-pounded' form. But if rice is subjected to several washings before consumption a great proportion of whatever vitamin B_1 it contains may be removed, and there will be a loss of mineral matter. Rice which is mouldy and full of weevils is likely to be subjected to most washing. Such rice is consumed by the very poor whose diet contains only small quantities of foods other than rice, and who are in the greatest need of the elements lost in washing.

It is noteworthy that milk, which is a good source of most of the important food factors, is not rich in vitamin B_1.

Vitamin B_2 (a term covering several vitamins) is an important food factor. The Tables give a rough idea of how it occurs in foodstuffs. All cereal foods are poor sources of it, milled rice being the poorest. Certain of the common pulses contain it fairly abundantly; among these are Bengal gram, black gram, and red gram. Green leafy vegetables and certain roots and tubers, are fairly rich, but fruits in general probably do not contain much of this vitamin. Its richest sources are yeast, milk products (including skim milk, butter-milk, curds and cheese), lean meat, liver, eggs, pulses and green vegetables.

'Soreness' of the angles of the mouth and the tongue is probably caused by deficiency of vitamin B_2. It occurs most commonly in those whose diet consists largely of milled rice. Rapid cure follows the daily consumption of $\frac{1}{2}$ - 1 oz. of dried yeast, $\frac{1}{2}$ to 1 pint of good milk, or 2-3 eggs.

Vitamin C

Vitamin C or ascorbic acid, the vitamin which prevents scurvy, is found in fresh fruits and vegetables. Among vegetables, the green leafy varieties are the best sources of this vitamin. When vegetables become dry and stale, most of the vitamin C originally present is destroyed.

Pulses and cereal grains in the ordinary state contain no vitamin C. When, however, they are allowed to sprout, the vitamin is formed in the grain and in the growing green sprouts. A method of causing grains to sprout is described in Sir Robert McCarrison's 'Food' as follows: 'Dhal, gram, wheat, unsplit peas or any other grain is first soaked in water for 24 hours and is then spread out on damp earth or on a damp blanket and covered over with a moist cloth or sack (gunny bag) which is kept moist by sprinkling water upon it from time to time. After two or three days the grains will have sprouted and be ready for use'.

'The sprouted grains should be eaten raw or after cooking for not more than 10 minutes'.

When fresh vegetables and fruits are not easily obtained, sprouted grains may be used as a cheap and easily available source of vitamin C. Sprouted pulses may contain 10-15 milligrammes of vitamin C per 100 grammes.

A well-balanced diet for school children and adults should contain some 30-50 mgs. of vitamin C per day. Vitamin C is sensitive to heat, and loss occurs in cooking, particularly if cooking is prolonged. Nevertheless, the inclusion of a few ounces of fresh fruit and leafy and other vegetables in a diet will ensure that its vitamin C content is satisfactory. In the case of infants fed on boiled fresh milk or re-constituted dried milk, special attention to vitamin C requirements is necessary. These can be met by giving fruit juice in small quantities.

Vitamin D

Vitamin, D, the vitamin which prevents rickets and osteomalacia, is found in liver oils, egg yolk, and in milk and milk fat (*e.g.*, ghee) obtained from animals feeding on green pastures and exposed to sunlight. Fish liver oil is its richest natural source. Vitamin D is formed in the skin by the action of sunlight, and hence rickets is particularly apt to occur in infants kept in dark houses, while osteomalacia in India is often found in the North among women who keep purdah. Probably minor degrees of rickets are more common in infants and young children throughout India than is generally supposed. Often the cheapest and easiest way of supplying vitamin D is by exposure of the body to sunlight. Cod liver oil and medicinal preparations of vitamin D cost money. The sun is free. There is a close connection between vitamin D and calcium and phosphorus requirements. When little vitamin D is obtained, and at the same time insufficient calcium is present in the diet, the danger of rickets and osteomalacia is increased. This is an additional reason why attention must be given to calcium intake.

An abundant intake of vitamin D helps to ensure the development of strong regular teeth. A good supply of this vitamin during pregnancy benefits the mother and helps to ensure the satisfactory future development of the child.

THE EFFECT OF COOKING ON NUTRITIVE VALUE

The effect of heating and cooking on the nutritive value of food-stuffs is, on the whole, less pronounced than is generally imagined. Vitamin C is destroyed by moderate degrees of heat, and for this reason the inclusion of some raw fruit in the diet is desirable. When foods are cooked for prolonged periods in excessive quantities of water, some of the vitamins and salts they contain may pass into the water, and will be lost if the water is discarded. A considerable loss of phosphorus occurs during the washing and cooking of rice. The addition of washing soda (a strong alkali) to cooking water, for the preservation of colour or to facilitate cooking, tends to promote vitamin destruction. Conversely, a highly acid substance like tamarind has, when added to cooking water, a preservative effect. It must be added that we need more information about the effect of ordinary Indian methods of preparing and cooking foods on nutritive value.

MALNUTRITION

It is advisable that those who are responsible for the institutional care of children, etc., and all who are concerned with practical nutrition work, should have some idea of the effects on the body of a diet which is ill-balanced and defective- *e.g.*, of a diet which is largely composed of milled cereals and contains an insufficiency of proteins, mineral salts and vitamins - and which calls for improvement. There is a long list of diseases, common in India, due in some way or other to dietetic causes. Such are: beriberi, certain anaemias of pregnancy, keratomalacia, osteomalacia. States of malnutrition which fall short of serious disease are wide-spread. A well-balanced diet is essential if growth and development are to take place normally. A badly fed child is often small for its age and thin; its 'weight for height' will be below average. It will fall sick easily. The frequency of minor ailments in school children can be reduced by improving the diet. A certain apathy, a lack of 'pep', of enthusiasm for work and play, is characteristic of the malnourished'. The state of the skin is a sensitive index of faulty feeding; a rough dry skin,

or a skin covered with a papular eruption, suggests faulty feeding and in particular vitamin A deficiency. Everybody knows that a well-fed animal exhibits a certain glossiness and sleekness of fur - a 'good coat' - which is not seen in poorly fed animals. Similarly, a well-fed human being has a glossy skin and a glow of health. Bright clear eyes are also a sign of satisfactory feeding. Xerophthalmia (areas of dryness on the conjunctivae of the eyes sometimes covered with white exudative patches known as Bitot's spots) is associated with vitamin A deficiency. Sore-mouth and tongue and erosions at the angles of the mouth are found in ill-fed children; in the properly fed child the tongue should be smooth and evenly coloured and not show enlarged papillae, fissures and areas denuded of the superficial epithelium. Such lesions, occurring most commonly in milled rice eaters, may be due to vitamin B_2 deficiency; they can often be rapidly cured by increasing milk intake. Spongy bleeding gums suggest vitamin C deficiency - mild scurvy - and call for a greater consumption of fresh fruit and vegetables.

SUMMARY OF DIETETIC PRINCIPLES

Human beings, and particularly children, cannot thrive at their best on a diet composed largely of cereals such as rice, millet, etc., and insufficiently supplemented by other foods. To make good the deficiencies of such a diet, they must consume fair quantities of foods like milk, green vegetables, eggs, fruits, etc. These are sometimes known as the 'protective' foods, since they are rich in proteins, vitamins, and mineral salts and protect the body against the ills which result when the diet is largely based on less nutritious foods, such as milled rice. Cod liver oil, which is very rich in vitamins A and D, may for present purposes be classed as a most valuable 'protective' food.

In general, diets in India are defective because they do not contain 'protective' foods in sufficient abundance. *Our aim in public health nutrition work, in general, and planning 'well-balanced' diets must be to increase intake of 'protective' foods.* The classes in the community which are particularly likely to suffer if their diet is defective are infants and growing children, and expectant and nursing mothers.

THE INVESTIGATION AND PLANNING OF DIETS

A concrete example will illustrate the methods to be followed in improving diets and drawing up satisfactory diet schedules. Let us suppose that the daily diet schedule of an institution, or of any group of people, works out as follows in amounts per consumption unit per day:

	Ozs.
Milled rice	15.0
Milk	1.0
Pulses (dhal arhar)	1.0
Brinjal	1.0
Ladies finger	0.5
Amaranth	0.25
Gingelly oil	0.50

This diet is shown diagrammatically in the Figure (the 'ill balanced' diet).

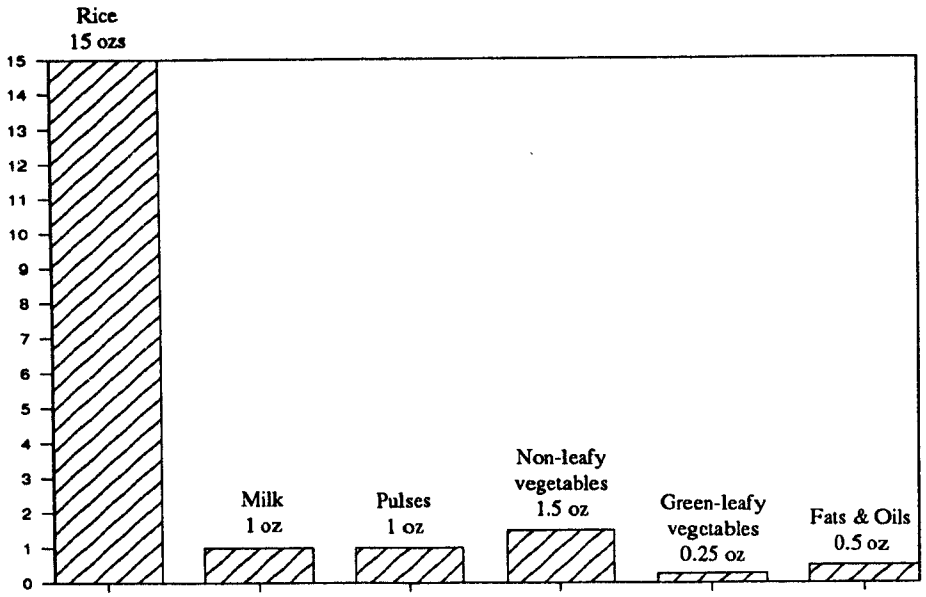
By reference to the Tables, the nutritive value of the ill-balanced diet can be worked out. Its content of calories, etc., is roughly as follows:

Protein	38 gms.
Fat	19 gms.
Carbohydrate	357 gms.
Calories	1750
Calcium	0.16 gms.
Phosphorus	0.60 gms.
Iron	9.00 mgs.
Vitamin A (international units)	500
Vitamin B_1 (international units)	160
Vitamin C	15.0 mgs.

It is at once apparent that this diet is insufficient in quantity and that it fails to supply the necessary requirements of any of the food factors enumerated. Such a diet, it may be remarked, is typical of diets consumed by millions in India.

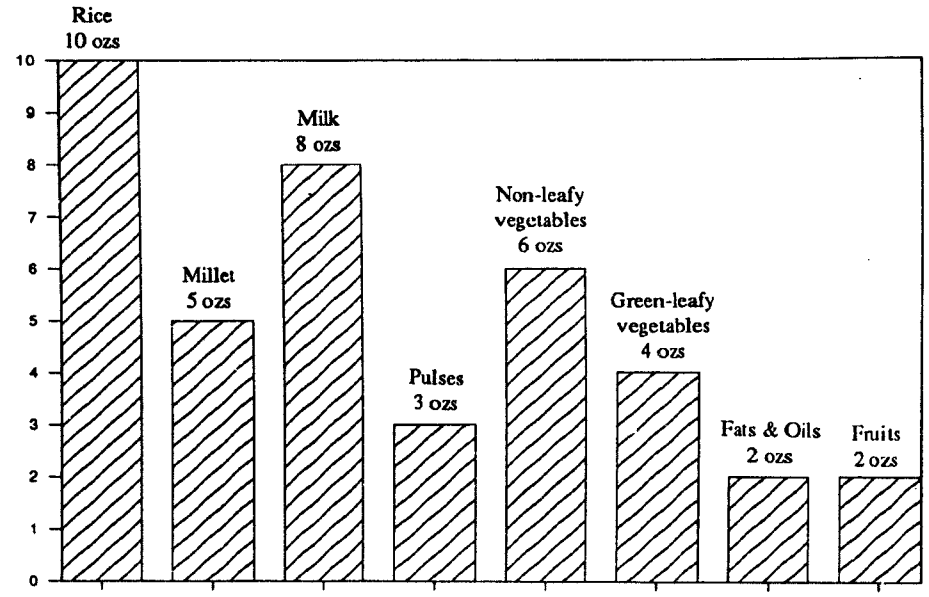
The following adjustments might be made in a defective diet of this nature in order to make it adequate and 'well-balanced'. The 'well-balanced' diet is illustrated in the Figure.

Insufficient and 'Ill-Balanced' Diet



1750 Calories less than average adult daily requirements.

'Well-Balanced' Diet



2600 Calories, corresponding to average adult daily requirements.

An insufficient and ill-balanced diet compared with an adequate and well-balanced diet.

Raw milled rice	.. ..	..	10
Cambu	.. ..	..	5
Milk	.. ..	..	8
Pulses (dhal arhar 1 oz) (black gram 2 ozs)	.. .. ..	..	3
Non-leafy vegetables	brinjal	2 ozs.	6
	ladies fingers	1 oz.	
	snake gourd	1 oz.	
	cluster beans	1 oz.	
	drumstick	1 oz.	
Leafy vegetables	amaranth leaves ..	2 ozs.	4
	drumstick leaves ..	1 oz.	
	spinach	1 oz.	
Gingelly oil	.. .. ..	..	2
Fruit	mangoes	1 oz.	2
	ripe plantains	1 oz.	

Five ozs. of millet (cambu) replace a similar quantity of milled rice; this increases intake of all the essential food factors, but notably that of protein and vitamin B_1. The additional milk supplies proteins of high biological value, calcium, and some vitamin A. The extra pulses increase total protein consumption and add calories. Intake of vegetables is greatly increased, with consequent all round improvement; the green leafy vegetables will be rich in vitamin A (carotene), a factor somewhat lacking in the remainder of the diet, and also in vitamin C. Two ozs. of fats and oils will provide a considerable addition of calories. The inclusion of fruit ensures that vitamin C requirements are more than fulfilled. The changes will also raise intake of vitamin B_2.

The composition of the 'well-balanced' diet is roughly as follows:

Protein		73 gms.
Fat		74 gms.
Carbohydrate		408 gms.
Calories		2590
Calcium		1.02 gms.
Phosphorus..		1.47 gms.
Iron		44.00 mgs.
Vitamin A (international units) ..	over	7000
Vitamin B_1 (international units) ..	over	400
Vitamin C (international units) ..	about	170.0 mgs.

This diet contains enough calories to supply the requirements of an average man. All the important food factors are present in sufficient quantities, with a fair 'margin of safety'. The chief cereal in both the 'ill-balanced' and 'well-balanced' diets is milled rice. If, however, the staple cereal is wheat or millet, the principle of balance between the cereal and the other elements in the diet applies equally.

IMPROVEMENT IN RELATION TO COST

Well-balanced diets are in general more expensive than deficient ones. For example, the 'ill-balanced' diet shown in the diagram, which is largely composed of rice and contains very little milk, vegetables, or fruit, would cost about Rs 2-8-0 per adult per month; the 'well-balanced' diet, richer in milk and other foods, about Rs 5 to 6. It is at this point that the nutrition worker encounters the main difficulty. Those who suffer from under-and-mal-nutrition usually cannot afford to purchase a satisfactory diet. Many residential institutions for children in India, for example, are very short of money, and have often to feed their boarders on Rs 3 per head per month or a good deal less. Now it is difficult, in fact impossible, to supply a really satisfactory diet for such sums.

But even when poverty prevents the purchase of a diet which satisfies modern standards of nutrition, it is often possible to make effective improvements with little increase in cost. It is desirable that children should consume upwards of 8 ozs. of milk a day- 8 ozs. being an amount below that recommended as 'optimum' by nutrition workers elsewhere. If available funds do not admit the addition of this quantity of whole

milk, butter-milk or skim milk reconstituted from skim milk powder, which are considerably cheaper, may be supplied. Even a little milk is better than none. Careful experiments have shown that the giving of 8 ozs. of skim milk daily to children fed on an average 'ill-balanced' Indian diet results in an acceleration of growth and a great improvement in health and well-being. Such an addition is not very costly.

Diets in children's homes, and among the general population, are often low in fat. Addition of extra vegetable oil (at the expense of a quantity of cereal supplying an equivalent number of calories), does not greatly increase expenditure. Pure ghee or butter is, of course, preferable to vegetable fat, but very much dearer.

Other points to which attention should be given include the following: If the cereal consumed is milled rice, an improvement in the nutritive value of the diet (and in the health of those consuming it) can be brought about by wholly or partially substituting whole rice, whole wheat, or one of the millets, particularly ragi. If milled rice remains the basis of the diet, it should be realised that the milled rice eater needs more 'protective' foods - milk, green vegetables, fruits, etc. - than the consumer of whole rice or ragi. When the diet is almost wholly composed of rice- when people are so poor that they cannot afford to buy other foods except in minute quantities - then the state in which the rice is eaten becomes of paramount importance. Parboiled rice, even when milled, is superior in nutritive value (particularly as regards the anti-beriberi vitamin) to raw rice milled to the same degree.

Pulses are rich in protein and in the B vitamins. 2-3 ozs. per day increase the nutritive value of a diet largely composed of cereals. The soya bean is rich in protein, fat, and in vitamins A and B. If soya bean is to be 'widely used in India, considerable attention will have to be given to methods of preparing it in a palatable form. It does not seem, however to have any advantage as a food for human beings over other pulses in common use in India, and the pulses in general are less valuable dietary supplements than animal foods such as milk, fish meat.

Intake of green leafy vegetables should be not less than 4 ozs. per head per day. The cheaper varieties- amaranth leaves, coriander leaves, drumstick leaves, etc. - are as nutritious as the more expensive ones, such as lettuce. In children's homes the available supply of green vegetables could often be increased by creating a vegetable garden to be tended by the children themselves.

Fruits should always be included in children's diets. Plantains, a cheap fruit often supplied in hostels, are not of high nutritive value. Tomatoes and oranges and other 'juicy' fruits are rich in vitamins and make a useful addition to diets of the poorer type.

PRACTICAL NUTRITION WORK IN GENERAL

There are, of course, many kinds of public health nutrition work besides the planning of adequate diets. The task of the nutrition worker is often to make special additions (*e.g.*, milk, cod liver oil, various vitamin-rich preparations) to an unsatisfactory diet rather than to plan the whole diet afresh. Infant feeding is a special subject demanding special knowledge and training. But in all branches of practical dietetics the fundamental principles involved are the same, and an understanding of them is essential for successful work in this field.

Finally, it may be pointed out that it is not only the poor, whose choice in the matter of food is extremely limited, but also of those who are ignorant and prejudiced about diet. Plenty of people in India and elsewhere, who could afford to consume an excellent diet, and feed their children on an excellent diet, do not in fact do so. One can readily find, among children of the more prosperous classes, cases of serious malnutrition and food deficiency disease.

NOTE ON FOOD VALUE TABLES

The foodstuffs analysed were mostly obtained in the local market, Coonoor. Foods which may be described as common Indian foods, consumed throughout the country, originated in the majority of cases in the neighbouring plains of the Coimbatore district; others of a kind less widely used in India (*e.g.*, European vegetables such as lettuce) were largely grown in the neighbourhood of Coonoor, 6,000 feet above sea level. Among

the foods analysed were some from other parts of India, including North India. The edible portion of the foodstuff, in as fresh a state as possible, was used for the analysis. The method of analysis is described in a paper in the *Indian Journal of Medical Research.**

The figures given represent percentages- *i.e.*, grammes per 100 grammes. Iron is expressed as milligrammes per 100 grammes. The great variety of Indian measures makes it difficult to supply metric and avoirdupois equivalents for the weights used in various provinces. In using the Bulletin in practice, the following conversion table may be useful:

1,000 grammes (1 kilo) ..	.. = 2.2 pounds (avoirdupois)
1,000 grammes (1 kilo) ..	.. = 87.5 tolas.
100 grammes ..	.. = 3.5 ounces (avoirdupois)
100 grammes ..	.. = 8.75 tolas.
1 pound (avoirdupois) ..	.. = 453.6 grammes
1 ounce (avoirdupois) ..	.. = 28.4 grammes.
1 tola ..	.. = 11.4 grammes.

The vitamin A and carotene figures are almost entirely based on spectrographic assays, while vitamin C was estimated chemically. In the case of vitamin B_1, use has been made of results appearing in various journals. The vitamin B_2 estimates are based on biological assay in the Coonoor Laboratories. No international unit has yet been established for vitamin B_2 or any of its components, and it has been found necessary to adopt the older method of reckoning values by means of signs. + + + indicates a very rich source; + + a good source; + means that the vitamin is present but not in large amounts; 'poor' means that the vitamin is shown to be present by biological tests, but that the foodstuff so labelled should be regarded as an almost negligible source of the vitamin.

The absence of figures or estimates of vitamin content means that tests have not yet been carried out.

* Ranganathan, *et al.*, *Indian Journal of Medical Research*, 24. 3. January 1937.

Cereals

Name of foodstuff	Botanical name	Moisture %	Protein %	Fat (Ether Extractives) %	Mineral matter %	Fibre %	Carbohydrate %	Calcium (Ca) %	Phosphorous (P) %	Iron (Fe) mgs. %	Calorific value per 100 gms.	Carotene (International Vitamin A units per 100 gms.)	Vitamin B_1* (International units per 100 gms.)	Vitamin B_2	Vitamin C mgs. per 100 gms.	Remarks
Arrow-root flour (West Indian)	Maranta arundinacea.	16.51	0.17	0.06	0.12	..	83.14	0.009	0.017	1.00	333.8	..	..	..	..	
Bajra or cambu	Pennisetum typhoideum	12.41	11.59	4.99	2.65	1.22	67.14	0.049	0.352	8.84	359.9	220	110	Poor	..	
Barley	Hordeum vulgare	12.48	11.47	1.28	1.51	3.92	69.34	0.025	0.225	3.70	334.8	Trace	150	Poor	..	
Cholam	Sorghum vulgare	11.88	10.42	1.93	1.76	..	73.99	0.027	0.282	6.18	352.8	136	..	Poor	..	
Italian millet	Setaria Italica	11.23	12.31	4.65	3.24	7.95	60.62	0.026	0.287	6.25	333.6	..	195	..	..	
'Kootu'	Fagopyrum esculentum	11.33	10.26	2.36	2.42	8.60	65.03	0.068	0.299	13.20	322.4	..	300	..	..	
Maize, tender	Zea mays	79.36	4.33	0.46	0.65	..	15.20	0.005	0.102	0.68	82.3	42	..	..	3.5	
'Makhana'	..	12.75	9.70	0.14	0.52	..	76.89	0.016	0.091	1.38	347.6	Trace	..	..	..	
Oatmeal	Avena sativa	10.68	13.55	7.59	1.78	3.46	62.94	0.045	0.384	3.81	374.3	Trace	325	..	..	
Pani-varagu	Panicum miliaceum	11.85	12.49	1.06	3.39	2.16	69.05	0.014	0.333	5.72	335.7	..	..	..	..	
Ragi	Eleusine coracana	13.05	7.10	1.29	2.24	..	76.32	0.334	0.272	5.38	345.3	70	..	Poor	..	
Rice, raw, homepounded		12.19	8.49	0.35	0.70	..	78.27	0.007	0.165	2.22	350.2	..	100	Poor	..	
Rice, parboiled homepounded		12.63	8.50	0.39	0.86	..	77.62	0.010	0.277	2.75	348.0	..	100			
Rice, raw, milled	Oryza sativa	12.96	6.85	0.55	0.50	..	79.14	0.007	0.108	1.02	348.9	0	26			
Rice, parboiled. milled		13.29	6.44	0.64	0.77	..	78.86	0.007	0.149	2.22	347.0	0				
Rice, white, puttu		12.97	7.51	0.37	0.40	..	78.75	0.008	0.084	3.33	348.4	..			..	
Rice, black, puttu		12.26	7.69	1.27	1.25	0.65	76.88	0.012	0.241	4.93	349.7	..	100	Poor or none	..	
Rice beaten		12.23	6.63	1.15	1.73	..	78.26	0.016	0.217	8.00	349.9	..			..	
Rice puffed		14.68	7.46	0.12	3.41	..	74.33	0.024	0.162	6.15	329.1	..			..	
Sago	Metroxylon sago	12.20	0.24	0.17	0.30	..	87.09	0.019	0.006	1.27	350.9	0	..	..	..	
Samai	Panicum miliare	11.46	7.70	4.71	4.83	7.60	63.70	0.015	0.364	7.08	328.0	Trace	..	Poor	..	
Sanwa millet	Panicum crusgallivar. frumantaceum	11.87	6.22	2.23	4.44	9.83	65.41	0.019	0.282	2.86	306.6	..	..	..	..	
'Singhara', dry	Trapa bispinosa	13.76	13.43	0.83	3.07	..	68.91	0.069	0.443	2.35	336.8	..	..	..	..	
Vermicelli	..	11.67	8.66	0.44	0.47	..	78.76	0.020	0.079	0.33	353.6	Trace	..	..	..	
Varagu or Kodu millet	Paspalum scrobiculatum	12.77	8.31	1.37	2.92	8.97	65.66	0.039	0.242	5.17	308.2	..	..	..	..	
Wheat, whole	Triticum vulgar	12.77	11.77	1.45	1.49	1.20	71.30	0.054	0.315	5.34	345.4	108	230	+	..	
Refined wheat flour	Triticum vulgar	13.30	11.00	0.90	0.40	0.30	74.10	0.020	0.092	1.00	348.5	..	..	..	..	

* All whole grain foods rich in vitamin B_1, while milled grains are largely deprived of this vitamin. An exception is parboiled milled rice, which retains vitamin B_1 after milling.

Pulses

Name of foodstuff	Botanical name	Moisture %	Protein %	Fat (Ether Extractives) %	Mineral matter %	Fibre %	Carbohydrate %	Calcium (Ca) %	Phosphorous (P) %	Iron (Fe) mgs. %	Calorific value per 100 gms.	Carotene (International Vitamin A units per 100 gms.)	Vitamin B_1 (International units per 100 gms.)	Vitamin B_2	Vitamin C mgs.* per 100 gms.	Remarks
Bengal gram	Cicer arictinum	9.83	17.08	5.26	2.68	3.92	61.23	0.185	0.236	9.83	360.6	316	93	++	..	With outer husk.
Bengal gram, roasted	Cicer arictinum	11.17	22.54	5.17	2.19	..	58.93	0.067	0.311	8.89	372.4	..	..	..	..	Without outer husk.
'Bhetmas'	Glycine hispida	8.80	41.29	16.95	4.49	4.25	24.22	0.213	0.603	9.88	414.6	..	..	..	..	
Black gram	Phaseolus mungo	10.87	23.95	1.38	3.39	..	60.41	0.200	0.367	9.80	358.7	64	140	++	..	Without outer husk.
Cow gram	Vigna catiang	12.00	24.56	0.69	3.23	3.75	55.77	0.073	0.485	3.81	327.5	60	..	++	..	
Field bean, dry	Dolichos lablab	9.60	24.94	0.78	3.21	1.38	60.09	0.063	0.446	1.98	347.1	Trace	..	None	..	
Green gram	Phaseolus radiatus	10.42	23.96	1.26	3.57	4.10	56.69	0.143	0.281	8.40	342.8	158	155	++	..	With outer husk.
Horse gram	Dolichos biflorus	11.81	22.01	0.54	3.13	5.30	57.21	0.275	0.385	7.59	321.7	158	..	Poor	..	
'Khesari'	Cicer arietinum	9.98	28.22	0.57	2.99	..	58.24	0.107	0.496	5.63	351.0	..	..	..	..	
Lentil	Lens esculenta	12.44	25.10	0.74	2.13	..	59.56	0.130	0.250	1.98	345.4	450	150	+	..	
Peas, dried	Pisum sativum	16.03	19.68	1.14	2.12	4.50	56.53	0.068	0.298	4.44	315.1	..	150	..	..	
Peas, roasted	Pisum sativum	9.90	22.94	1.39	2.34	..	63.43	0.033	0.357	5.00	358.0	..	..	..	..	
'Rajmah'	..	12.03	22.89	1.31	3.22	..	60.55	0.256	0.408	5.84	345.6	..	..	..	..	
'Rawan'	Vigna catiang	12.67	23.40	1.28	2.92	..	59.73	0.075	0.430	4.31	344.0	..	..	..	..	
Red gram (Dhal arhar)	Cajanus indicus	15.23	22.27	1.71	3.56	..	57.23	0.136	0.264	8.80	341.9	220	190	++	..	Without outer husk.
Soya bean	Glycine hispida	8.08	43.22	19.50	4.63	3.72	20.85	0.237	0.689	11.50	431.8	710	300	++	..	

* Sprouted pulses contain 10-15 milligrammes of vitamin C per 100 grammes.

Leafy Vegetables

Name of foodstuff	Botanical name	Moisture %	Protein %	Fat (Ether Extractives) %	Mineral matter %	Fibre %	Carbohydrate %	Calcium (Ca) %	Phosphorous (P) %	Iron (Fe) mgs. %	Calorific value per 100 gms.	Carotene (International Vitamin A units per 100 gms.)	Vitamin B_1 (International units per 100 gms.)	Vitamin B_2	Vitamin C mgs. per 100 gms.	Remarks
Amaranth, tender	Amaranthus gangeticus	85.78	4.90	0.50	3.05	..	5.77	0.500	0.100	21.40	47.2	2,500-11,000	29	+	172.9	
Amaranth, spined	Amaranthus spinoses	85.00	3.00	0.25	3.61	..	8.14	0.800	0.052	22.91	46.8	..	..	..	..	
Bamboo, tender shoots	Bambusa arundinacea	87.06	3.92	0.09	1.40	..	7.53	0.016	0.088	0.11	46.6	Trace	..	..	..	
Brussels sprouts	Brassica oleracea bullata gemmifera	84.57	4.68	0.46	1.02	..	9.27	0.045	0.082	2.33	59.9	..	..	..	71.8	
Cabbage	Brassica oleracea capitata	90.20	1.75	0.11	0.61	0.95	6.38	0.034	0.046	0.76	33.5	2,000	50	..	124.2	
Celery	Apium graveolens rapaceum	81.27	5.97	0.61	2.11	1.42	8.62	0.226	0.137	6.25	63.9	5,760 to 7,470	Trace	..	62.4	
Coriander	Coriandrum sativum	87.90	3.29	0.64	1.65	..	6.52	0.137	0.058	9.97	45.0	12,630	..	++	135.2	
Curry leaves	Murraya koenigii	66.31	6.11	1.04	4.17	6.37	16.00	0.811	0.057	3.09	97.8	12,600	..	++	4.2	
Drumstick	Moringa oleifera	74.98	6.65	1.73	2.27	0.87	13.50	0.437	0.071	7.00	96.2	11,330	..	..	..	
Fenugreek	Trigonella foenumgraecum	81.78	4.86	0.86	1.57	1.04	9.89	0.472	0.047	16.90	66.7	3,860	..	..	..	
Garden Cress	Lepidium sativum	82.30	5.79	0.96	2.16	..	8.79	0.359	0.113	28.57	67.0	..	50	..	..	
'Gogu'	Hibiscus sabdariffa	86.22	1.70	1.07	1.02	..	9.99	0.181	0.038	5.38	56.4	..	..	..	..	
Ipomoea	Ipomoea reptans	90.33	2.90	0.40	2.11	..	4.26	0.113	0.048	3.90	32.2	3,270	29	..	137.1	
Lettuce	Lactuca stiva	92.94	2.05	0.26	1.18	0.53	3.04	0.051	0.030	2.39	22.7	2,200	90	..	14.9	
Mint	Mentha viridis	82.99	4.81	0.59	1.56	1.95	8.10	0.204	0.077	15.56	57.0	2,700	..	..	..	
Neem, mature	Azedirachta indica	59.44	7.09	1.04	3.36	6.19	22.88	0.514	0.080	17.14	129.2	..	..	..	..	
Neem, tender	Azedirachta indica	59.36	11.56	2.97	2.61	2.22	21.28	0.124	0.189	25.30	158.1	4,560	..	..	..	
Parsley	Petroselinum sativum	68.42	5.93	0.97	3.17	1.80	19.71	0.392	0.195	17.86	111.3	3,200	..	..	280.8	
'Agathi'	Sesbania grandiflora	76.73	8.40	1.39	3.11	2.17	11.80	1.131	0.077	3.91	93.3	..	..	..	..	
'Manathakkali'	Solanum nigrum	82.12	5.86	1.00	2.13	..	8.80	0.410	0.074	20.51	68.0	..	..	..	11.3	
Spinach	Spinacia oleracea	91.66	1.92	0.85	1.50	..	4.07	0.061	0.010	4.95	31.6	2,630 to 3,000	70	..	47.7	

Roots and Tubers

Name of foodstuff	Botanical name	Moisture %	Protein %	Fat (Ether Extractives) %	Mineral matter %	Fibre %	Carbohydrate %	Calcium (Ca) %	Phosphorous (P) %	Iron (Fe) mgs. %	Calorific value per 100 gms.	Carotene (International Vitamin A units per 100 gms.)	Vitamin B_1 (International units per 100 gms.)	Vitamin B_2	Vitamin C mgs. per 100 gms.	Remarks
Beet root	Beta vulgaris	83.81	1.65	0.05	0.75	..	13.74	0.195	0.057	0.98	62.0	0	70	..	<88	
Carrot	Daucus carota	86.00	0.92	0.07	1.08	1.18	10.75	0.082	0.030	1.52	47.3	2020	60	..	2.5	
Colocasia	Colocasia antiquorum	73.05	2.95	0.10	1.72	..	22.18	0.038	0.143	2.13	101.4	40	..	+	Trace	
'Onthalaigasu'		84.40	1.24	0.05	0.34	..	13.97	0.013	0.024	0.53	61.3	..	..	..	..	
Parsnip	Pastinaca sativa	72.41	1.33	0.27	1.12	1.68	23.19	0.048	0.041	0.40	100.5	30	105	..	16	
Potato	Solanum tuberosum	74.73	1.73	0.13	0.61	..	22.80	0.004	0.034	0.68	99.3	40	40	++	17.3	
Radish (pink)	Raphanus sativus	90.76	0.61	0.32	0.85	..	7.46	0.046	0.017	0.47	35.2	3	60	..	16.9	
Radish (White)	Raphanus sativus	94.41	0.70	0.06	0.58	..	4.25	0.054	0.025	0.40	20.3				15.0	
Sweet potato	Ipomoea batatas	66.51	1.24	0.32	1.04	..	30.89	0.017	0.050	0.79	131.4	10	..	++	24.0	
Tapioca	Manihot utilissima	59.37	0.68	0.20	0.98	..	38.77	0.045	0.039	0.92	159.6	..	..	..	..	
Yam (elephant)	Amorphophallus Campanulatus	78.79	1.24	0.02	0.82	0.80	18.33	0.046	0.022	0.62	78.4	434	..	++	Trace	
Yam (ordinary)	Typhonium trilobatum	69.90	1.41	0.09	1.55	..	28.46	0.061	0.016	1.30	120.3	..	24	..	Trace	

Other Vegetables

Name of foodstuff	Botanical name	Moisture %	Protein %	Fat (Ether Extractives) %	Mineral matter %	Fibre %	Carbohydrate %	Calcium (Ca) %	Phosphorous (P) %	Iron (Fe) mgs. %	Calorific value per 100 gms.	Carotene (International Vitamin A units per 100 gms.)	Vitamin B_1 (International units per 100 gms.)	Vitamin B_2	Vitamin C mgs. per 100 gms.	Remarks
Amaranth, stem	Amaranthus gangeticus	92.49	0.85	0.11	1.84	1.20	3.51	0.263	0.034	1.80	18.4	..	..	..	..	
Artichoke	Cynara scolymus	77.27	3.64	0.14	1.75	1.20	15.99	0.120	0.101	2.29	79.9	..	75	..	Trace	
Ash gourd	Benincasa cerifera	96.01	0.41	0.06	0.34	..	3.18	0.025	0.017	0.45	14.9	Trace	21	..	0.9	
Bitter gourd	Momordica charantia	92.39	1.64	0.15	0.76	0.80	4.26	0.023	0.065	2.22	25.0	210	24	Poor	88.4	
Bitter gourd(small variety)	Momordica charantia	83.16	2.87	0.98	1.43	1.70	9.86	0.045	0.144	9.35	59.7			..		
Brinjal	Solanum melongena	91.49	1.31	0.26	0.50	..	6.44	0.024	0.064	1.31	33.3	5	..	+	22.5	
Broad beans	Dolichos lablab var. lignosus	82.41	4.49	0.12	0.93	2.02	9.98	0.045	0.055	1.61	59.0	..	..	..	12.2	
Calabash cucumber	Lagenaria vulgaris	96.34	0.16	0.14	0.49	..	2.87	0.015	0.003	0.69	13.4	Trace	..	..	..	
Cauliflower	Brassica oleracea botrytes	89.43	3.51	0.41	1.36	..	5.29	0.034	0.061	1.25	38.9	38	110	..	65.8	
'Cho-cho' marrow	Sechium edule	92.53	0.70	0.11	0.41	..	6.25	0.138	0.026	0.62	28.8	Trace		..	..	
Celery stalks	Apium graveolens rapaceum	93.53	0.79	0.09	0.89	1.17	3.53	0.033	0.038	4.76	18.1	..	..	..	5.7	
Cluster beans	Cyamopsis psoralioides	82.45	3.67	0.17	1.35	2.26	10.10	0.120	0.051	5.76	56.6	330	..	..	49.4	
Colocasia stems	Colocasia antiquorum	93.44	0.34	0.34	1.20	0.59	4.09	0.062	0.024	0.50	20.8	..	..	..	..	
Cucumber	Cucumis sativus	96.42	0.45	0.06	0.31	..	2.76	0.012	0.025	1.48	13.4	Trace	30	..	6.9	
Dbouble beans	Faba vulgaris	73.75	8.28	0.27	0.94	..	16.76	0.036	0.142	2.27	102.6	..	..	..	22.4	Seeds only
Drumstick	Moringa oleifera	86.88	2.53	0.11	1.96	4.80	3.72	0.032	0.111	5.28	26.0	184	..	..	119.6	
French beans	Phaseolus vulgaris	91.43	1.74	0.11	0.53	1.80	4.39	0.048	0.025	1.67	25.5	221	26	..	13.8	
Indian gooseberry	Emblica officinalis	81.21	0.52	0.09	0.68	3.42	14.08	0.045	0.019	1.23	59.2	..	..	..	..	
Ipomoea, stems	Ipomoea reptans	93.67	0.83	0.20	1.76	..	3.54	0.081	0.027	0.78	19.3	..	..	..	..	
Jack, tender	Artocarpus integrifolia	84.01	2.61	0.31	0.91	2.78	9.38	0.026	0.043	1.66	50.8	..	..	..	..	
Jack fruit seeds	Artocarpus integrifolia	51.60	6.60	0.36	1.54	1.40	38.45	0.049	0.133	0.16	183.4	..	..	..	..	
'Kandan Kathiri'	Solanum *xanthocarpum*	75.50	3.09	0.77	1.57	14.15	4.92	0.100	0.091	1.22	39.0	..	..	..	..	
'Kovai' fruit, tender	Coccinia indica	93.07	1.17	0.10	0.46	1.56	3.64	0.037	0.030	1.35	20.1	260	..	..	28.0	
Knol-khol	Brassica oleracea caulorapa	92.10	1.07	0.20	0.65	..	5.98	0.023	0.035	0.40	30.0	..	..	..	84.5	
Ladies fingures	Hibiscus esculentus	87.95	2.20	0.20	0.74	1.15	7.76	0.094	0.078	1.54	41.6	58	21	+	15.6	
Leeks	Allium porum	78.91	1.84	0.10	0.68	1.32	17.15	0.052	0.073	2.30	76.9	..	75	..	10.7	

Other Vegetables *(Contd.)*

Name of foodstuff	Botanical name	Moisture %	Protein %	Fat (Ether Extractives) %	Mineral matter %	Fibre %	Carbohydrate %	Calcium (Ca) %	Phosphorous (P) %	Iron (Fe) mgs. %	Calorific value per 100 gms.	Carotene (International Vitamin A units per 100 gms.)	Vitamin B_1 (International units per 100 gms.)	Vitamin B_2	Vitamin C mgs. per 100 gms.	Remarks
Mango, green	Mangifera indica	90.03	0.65	0.11	0.37	..	8.84	0.012	0.017	4.48	39.0	150	..	..	3.2	
Nut of Avocado pear	Persea drymifolia	63.67	2.52	0.71	1.10	..	32.00	0.018	0.083	1.19	144.5	..	..	..	..	
Onion, stalk	Alium cepa	87.64	0.94	0.24	0.77	1.60	8.81	0.048	0.054	7.50	41.2	..	..	..	..	
Peas, English	Pisum sativum	72.09	7.18	0.12	0.75	..	19.86	0.019	0.078	1.47	109.2	139	120	..	9.2	
Pink beans	Phaseolus vulgaris	88.49	2.44	0.18	0.58	2.10	6.21	0.035	0.039	1.24	36.2	..	..	..	<27.7	
Plantain flower	Musa paradisiaca	90.22	1.45	0.19	1.21	1.93	5.00	0.034	0.048	0.12	27.5	..	..	..	..	
Plantain green	Musa paradisiaca	83.24	1.41	0.23	0.51	..	14.61	0.005	0.027	0.60	66.2	50	15	++	23.9	
Plantain stem	Musa paradisiaca	88.26	0.48	0.05	0.61	0.76	9.84	0.009	0.005	1.06	41.7	..	..	..	..	
Pumpkin	Cucurbita maxima	92.60	1.36	0.07	0.58	..	5.39	0.009	0.030	0.67	27.6	84	20	..	2.0	
Rhubarb stalks	Rheum Rhaponticum	92.74	1.10	0.51	1.05	0.85	3.75	0.119	0.012	2.20	24.0	..	0	..	36.7	
Ridge gourd	Luffa acutangula	95.43	0.52	0.12	0.34	..	3.59	0.035	0.040	1.58	17.5	56	22	..	..	
'Singhara' or water chestnut	Trapa bispinosa	70.01	4.67	0.29	1.07	..	23.96	0.024	0.154	0.82	117.1	20	..	..	..	
Snake-gourd	Trichosanthes anguina	94.06	0.46	0.31	0.70	..	4.47	0.045	0.024	1.28	22.5	160	..	..	Trace	
Spinach stalks	Spinacia oleracea	93.37	0.87	0.14	1.82	..	3.80	0.090	0.015	1.34	19.9	..	..	..	2.9	
'Sundakai', dry	Solanum torvum	12.25	8.31	1.66	5.09	17.58	55.11	0.370	0.179	22.22	268.6	750	..	..	..	
Tomato, green	Lycopersicum esculentum	92.81	1.88	0.06	0.68	..	4.57	0.016	0.039	2.37	26.3	320	23	..	31.3	
Turnip	Brassica rapa	91.10	0.52	0.23	0.60	..	7.52	0.028	0.035	0.42	34.2	Trace	40	..	43.4	
Vegetable marrow	Cucubita pepo	94.84	0.48	0.09	0.27	..	4.32	0.002	0.026	0.63	20.0	Trace	..	..	17.8	

Nuts and Oil Seeds

Name of foodstuff	Botanical name	Moisture %	Protein %	Fat (Ether Extractives) %	Mineral matter %	Fibre %	Carbohydrate %	Calcium (Ca) %	Phosphorous (P) %	Iron (Fe) mgs. %	Calorific value per 100 gms.	Carotene (International Vitamin A units per 100 gms.)	Vitamin B_1 (International units per 100 gms.)	Vitamin B_2	Vitamin C mgs. per 100 gms.	Remarks
Almond	Prunas amygdalis	5.23	20.75	58.92	2.90	1.70	10.50	0.225	0.492	3.47	655.3	..	80	..	..	
Cashew nut	Anacardium occidentale	5.89	21.19	46.93	2.43	1.27	22.29	0.053	.0449	4.95	596.3	100	..	+	..	
Coconut	Cocos nucifera	36.28	4.47	41.60	0.96	3.59	13.19	0.013	0.243	1.70	444.7	Trace	Trace	Poor	0.8	
Gingelly seeds	Sesamum indicum	5.08	18.33	43.26	5.20	2.88	25.25	1.453	0.574	10.54	563.7	107	..	..	..	
Ground-nut	Arachis hypogea	7.92	26.72	40.13	1.87	3.07	20.29	0.048	0.392	1.56	549.2	63	300	+	..	
Ground-nut, roasted	Arachis hypogea	4.04	31.54	39.76	2.28	3.07	19.31	0.045	0.435	0.29	561.2	..	..	..	..	
Linseed (seeds)	Linum usitatissimum	6.57	20.27	37.11	2.44	4.80	28.31	0.173	0.371	2.65	530.3	..	..	..	..	
Mustard seeds	Brassica juncea	8.46	22.04	39.64	4.19	1.80	23.87	0.488	0.704	17.88	540.4	270	..	..	Trace	
Pistachio nut	Pistacia vera	5.58	19.81	53.51	2.75	2.10	16.25	0.136	0.431	13.70	625.8	..	..	..	..	
Walnut	Juglans regia	4.53	15.64	64.49	1.84	2.60	10.90	0.095	0.384	4.76	686.6	..	150	..	..	

Fats and oils of vegetable origin derived from oilseeds, etc., are in general devoid of carotene and vitamin A. Red palm oil is an exception (see p. 313).

Condiments, Spices, etc.

Name of foodstuff	Botanical name	Moisture %	Protein %	Fat (Ether Extractives) %	Mineral matter %	Fibre %	Carbohydrate %	Calcium (Ca) %	Phosphorous (P) %	Iron (Fe) mgs. %	Calorific value per 100 gms.	Carotene (International Vitamin A units per 100 gms.)	Vitamin B_1 (International units per 100 gms.)	Vitamin B_2	Vitamin C mgs. per 100 gms.	Remarks
'Arisithippili'*	Piper clusii	12.53	13.24	4.66	6.03	5.17	58.37	0.462	0.278	13.54	328.4	..	..	..	..	
Asafoetida	Ferula narthex	16.03	3.95	1.13	6.99	4.12	67.78	0.692	0.045	22.20	297.1	..	..	..	..	
Cardamom	Elettaria cardamomum	19.95	10.21	2.18	5.37	20.10	42.19	0.128	0.163	5.00	229.2	..	..	..	..	
Chillies, green	Capsicum annuum	82.60	2.87	0.59	1.04	6.73	6.17	0.029	0.079	1.31	41.5	454	..	..	111.0	
Chillies, dry	Capsicum annuum	10.02	15.88	6.24	6.10	30.15	31.51	0.163	0.371	2.25	245.7	576	..	..	51.2	
Cloves	Eugenia caryophyllata	23.29	5.24	8.90	5.20	9.54	47.83	0.739	0.097	4.90	292.4	..	..	..	..	
Coriander	Coriandrum sativum	11.15	14.08	1.04	4.39	32.58	36.76	0.630	0.366	17.94	212.7	1570	..	..	Trace	
Cumin	Cuminum eyminum	11.94	18.71	0.58	5.84	11.98	50.95	1.083	0.487	31.00	283.9	870	..	..	3.0	
Fenugreek seeds	Trigonella foenumgraecum	13.70	26.19	5.77	3.00	7.16	44.18	0.157	0.365	14.10	333.4	160	..	..	..	
Garlic	Allium sativum	62.79	6.31	0.13	1.02	0.80	28.95	0.025	0.305	1.31	142.2	0	..	..	13.2	
Ginger	Zingiber officinale	80.86	2.33	0.94	1.19	2.42	12.26	0.016	0.063	2.57	66.8	67	..	..	6.0	
'Kandanthippili'	Piper roxburghii	12.24	6.44	2.32	4.77	8.51	65.72	1.225	0.188	62.10	309.5	..	..	..	..	Roots only
Mace	Myristica fragrans	15.92	6.51	24.36	1.58	3.76	47.87	0.181	0.103	12.64	436.8	..	..	..	..	
Mustard	Brassica juncea	8.46	22.04	39.64	4.19	1.80	23.87	0.488	0.704	17.88	540.4	270	..	..	Trace	
Nutmeg	Myristica fragrans	14.32	7.49	36.44	1.72	11.59	28.44	0.122	0.235	4.57	471.7	..	..	..	..	
Omum	Carum copticum	8.92	15.41	18.08	7.09	11.87	38.63	1.422	0.297	14.62	378.9	..	..	..	..	
Onion, big	Allium cepa	86.76	1.22	0.04	0.36	..	11.62	0.176	0.046	0.66	51.7	..	40	..	10.5	
Onion, small	Allium cepa	84.33	1.80	0.08	0.55	..	13.24	0.040	0.058	1.18	60.9	25		..		
Pepper, dry	Piper nigrum	12.86	11.53	6.79	4.40	14.02	49.50	0.460	0.199	16.80	305.2	..	..	..	..	
Tamarind	Tamarindus indicus	20.86	3.06	0.14	2.86	5.57	67.51	0.172	0.110	10.90	283.5	100	..	..	2.6	Pulp only
Turmeric	Curcuma longa	13.08	6.33	5.10	3.51	2.60	69.38	0.146	0.284	18.60	348.7	50	..	..	..	

Fruits

Name of foodstuff	Botanical name	Moisture %	Protein %	Fat (Ether Extractives) %	Mineral matter %	Fibre %	Carbohydrate %	Calcium (Ca) %	Phosphorous (P) %	Iron (Fe) mgs. %	Calorific value per 100 gms.	Carotene (International Vitamin A units per 100 gms.)	Vitamin B_1 (International units per 100 gms.)	Vitamin B_2	Vitamin C mgs. per 100 gms.	Remarks
Apple	Pyrus malas	85.94	0.31	0.08	0.27	..	13.40	0.013	0.021	1.68	55.0	Trace	40	..	2.1.	
Banana	Musa sapientum	61.39	1.33	0.15	0.72	..	36.41	0.002	0.045	0.42	147.6	Trace	50	..	1.0	
Bullock's heart	Anona reticulata	76.79	1.39	0.16	0.74	..	20.92	0.014	0.009	0.63	90.7	..	..	..	..	
Cape goose-berry	Physalis peruviana	82.69	1.78	0.17	0.59	3.19	11.58	0.006	0.058	1.80	55.0	..	..	..	49.0	
Dates (Persian)	Pheonix dactylifera	26.11	3.04	0.16	1.31	2.07	67.31	0.067	0.076	10.58	282.8	600	30	+	Trace	Preserved fruits
Figs	Ficus carica	80.80	1.31	0.23	0.64	..	17.02	0.055	0.026	1.16	75.4	..	..	..	2.4	
Grapes (Blue variety)	Vitis vinifera	85.51	0.83	0.10	0.43	3.00	10.13	0.025	0.019	0.40	44.7	15	Trace	..	2.5	
Grape fruit (Triumph)	Citrus grandis var. maxima	92.04	0.71	0.03	0.20	..	7.02	0.017	0.021	0.18	31.2	..	40	..	31.2	
Grape fruit Marsh's seedless)	Citrus grandis var. maxima	88.51	0.95	0.06	0.35	..	10.13	0.025	0.027	0.20	44.9	..		..	(Juice)	
Guava, country	Psidium guyava	76.07	1.46	0.19	0.81	6.90	14.57	0.013	0.040	1.04	65.8	100	..	..	299.0	
Guava, Hill	Psidium catelianum	85.31	0.95	0.16	0.61	4.82	8.15	0.046	0.022	1.20	37.8	..	..	..	15.0	
Jack fruit	Artocarpus integrifolia	77.20	1.86	0.10	0.78	1.09	17.88	0.022	0.028	0.46	79.9	540	..	..	10	
Jambu fruit	Eugenia jambos	78.21	0.67	0.10	0.41	0.87	19.74	0.016	0.011	1.00	82.5	..	..	..	..	
'Korukkapalli'	Pithecolobium dulce	80.78	2.57	0.31	0.41	..	15.93	0.011	0.036	0.37	76.8	..	..	..	..	
Lemon	Citrus medica var. var. limonum	84.97	0.98	0.85	0.26	1.65	11.29	0.070	0.014	2.33	56.7	..	..	..	38.5 (Juice)	
Lime	Citrus medica var. acida	84.57	1.49	0.97	0.64	1.25	11.08	0.091	0.021	0.29	59.0	120	..	..	62.5 (Juice)	
Mango, green	Mangifera indica	90.03	0.65	0.11	0.37	..	8.84	0.012	0.017	4.48	39.0	150	..	..	3.2	
Mongo ripe	Mangifera indica	86.14	0.64	0.07	0.32	1.14	11.69	0.007	0.020	0.25	50.0	4,800	..	Poor	..	
Mango 'Ankola'	Mangifera indica	85.94	1.02	0.11	0.46	..	12.46	0.004	0.016	0.45	55.0	1,860	..	..	23.6	
Melon, water	Citrullus vulgaris	95.70	0.12	0.15	0.22	..	3.81	0.001	0.008	0.15	17.1	Trace	..	..	1.0	
Orange	Citrus aurantium	87.84	0.85	0.32	0.43	..	10.56	0.046	0.022	0.08	48.5	350	40	..	67.7	
Palmyra fruit, tender	Borassus flabellifer	92.72	0.58	0.02	0.17	..	6.51	0.005	0.021	0.46	28.5	..	..	..	..	

Fruits-*contd.*

Name of foodstuff	Botanical name	Moisture %	Protein %	Fat (Ether Extractives) %	Mineral matter %	Fibre %	Carbohydrate %	Calcium (Ca) %	Phosphorous (P) %	Iron (Fe) mgs. %	Calorific value per 100 gms.	Carotene (International Vitamin A units per 100 gms.)	Vitamin B_1 (International units per 100 gms.)	Vitamin B_2	Vitamin C mgs. per 100 gms.	Remarks
Papayya, ripe	Carica papaya	89.62	0.47	0.03	0.38	..	9.50	0.013	0.009	0.42	40.2	2,020	..	..	45.5	
Peaches	Amygdalis persica	90.07	1.52	0.19	0.58	..	7.64	0.006	0.029	1.70	38.4	Trace	..	..	1.0	
Pears, country	Pyrus communis	86.92	0.18	0.05	0.27	1.00	11.58	0.006	0.011	0.68	47.5	14	..	..	Trace	
Pears, English	Pyrus Achras	85.84	0.94	0.23	0.23	..	12.76	0.005	0.016	0.84	56.9	80	30	..	1.0	
Pears Avocado or Butter fruit	Persca drymifolia	73.55	1.68	22.81	1.05	..	0.91	0.011	0.076	0.71	215.7	..	..	..	13.0	
Pine apple	Ananas sativus	86.50	0.57	0.04	0.49	0.40	12.00	0.021	0.007	0.92	50.6	98	..	..	62 9	
Plantain (Ordinary)	Musa paradisiaca	73.35	1.06	0.08	0.72	..	24.79	0.011	0.031	0.50	104.1	124	..	Poor	5.5	
Plantain, Hill 'Anaikombu'	Musa paradisiaca	79.93	1.22	0.06	0.80	..	17.99	0.007	0.025	0.27	77.4	124	..	..	8 5	
Plums (Red variety)	Prunus domestica	89.82	0.68	0.22	0.36	..	8.92	0.017	0.018	0.55	40.4	230 (Yellow variety)	40	..	0.6	
Pomegranate	Punica granatum	78.00	1.63	0.04	0.67	5.10	14.56	0.009	0.066	0.27	65.1	0	..	..	15 6	
Pomeloe	Citrus decumana	88.10	0.63	0.04	0.51	0.60	10.12	0.028	0.027	0.04	43.4	200	..	..		
Quince	Cydonia vulgaris	85.76	0.28	0.04	0.33	1.72	11.87	0.005	0.015	0.44	49.0	..	..	..	10 0	
Raisins (preserved)	Vitis vinifera	18.47	1.96	0.18	1.98	..	77.41	0.101	0.075	3.98	319.1	..	75	.	Trace	
Strawberry	Fragaria grandiflora	87.82	0.71	0.18	0.38	1.14	9.77	0.026	0.026	1.75	43.5	..	..	..	52.0	
Tomato, ripe	Lycopersicum esculentum	94.52	1.02	0.08	0.48	..	3.90	0.008	0.018	0.08	20.4	320	40	..	32.2	
Tree Tomato	Cyphomandra betacea	82.72	1.46	0.21	1.12	4.15	10.34	0.013	0.029	0.71	43.3	..	..	..	Trace	
Wood apple	Feronia elephantum	69.54	7.31	0.56	1.88	5.16	15.55	0.127	0.107	0.62	96.5	..	..	..	.	
Tamarind	Tamarindus indicus	20.86	3.06	0.14	2.86	5.57	67.51	0.172	0.110	10.90	283.5	100	..	..	2.6	

Flesh Foods

Name of foodstuff	Moisture %	Protein %	Fat (Ether Extractives) %	Mineral matter %	Fibre %	Carbohydrate %	Calcium (Ca) %	Phosphorous (P) %	Iron (Fe) mgs. %	Calorific value per 100 gms.	Vitamin A (International units per 100 gms.)	Carotene (International Vitamin A units per 100 gms.)	Vitamin B_1 (International units per 100 gms.)	Vitamin B_2	Vitamin C mgs. per 100 gms.	Remarks
Beef (muscle)	74.33	22.61	2.58	0.99	..	..	0.004	0.190	0.77	113.7	59.0	0	50	++	..	
Crab (muscle)	83.49	8.87	1.07	3.20	..	3.37	1.370	0.147	21.20	58.6	Trace	1,300	..	..	..	
Egg, duck	71.00	13.54	13.72	1.03	..	0.70	0.073	0.261	2.97	180.4	1,233	..	..	..	..	
Egg, fowl	73.65	13.33	13.32	0.95	..	..	0.056	0.271	2.07	173.2	1,197	1,000	..	..	..	
Fish (Mangalore, big fish)	78.38	22.60	0.06	0.83	..	..	0.020	0.185	0.83	90.9					..	Types of fish commonly consumed in Malabar
Fish (Mangalore, small fish)	77.89	21.49	1.63	2.03	..	..	0.055	0.413	2.28	100.6	25.6	9.0	..	Poor	...	
Fish 'Vajra'	79.41	19.92	1.51	1.38	..	..	0.044	0.379	0.72	93.3					..	
Liver, sheep	70.37	19.29	7.49	1.45	..	1.40	0.006	0.378	6.30	150.2	22,308	0	120	..	..	
Mutton (muscle)	71.46	18.54	13.30	1.26	..	..	0.147	0.151	2.52	193.9	30.8	0	60	..	..	
Pork (muscle)	77.41	18.66	4.40	1.01	..	..	0.034	0.198	2.27	114.2	Trace	..	320	..	..	
Prawn (muscle)	77.94	20.84	0.28	1.42	..	..	0.088	0.244	0.79	85.9	Trace	Trace	<30	..	..	

Milk and Milk Products

Name of foodstuff	Moisture %	Protein %	Fat (Ether Extractives) %	Mineral matter %	Fibre %	Carbohydrate %	Calcium (Ca) %	Phosphorous (P) %	Iron (Fe) mgs. %	Calorific value per 100 gms.	Vitamin A (International units per 100 gms.)	Carotene (International Vitamin A units per 100 gms.)	Vitamin B_1 (International units per 100 gms.)	Vitamin B_2	Vitamin C mgs. per 100 gms.	Remarks
Milk cow's	87.60	3.30	3.60	0.70	..	4.80	0.120	0.093	0.24	66.8	180	0	..	++	..	
Milk buffalo's	82.30	4.75	7.70	0.80	..	4.45	0.203	0.125	..	106.1	162	0	..	..	..	
Milk goat's	86.30	3.60	4.00	0.80	..	5.30	0.128	0.103	..	71.6	182	0	..	..	..	
Milk human	87.58	1.18	3.74	0.30	..	7.20	0.034	0.015	..	67.2	208	0	..	..	..	
Butter-milk	97.54	0.84	1.08	0.14	..	1.40	0.030	0.030	0.78	18.7	0	0	..	++	..	
Curds	90.31	2.86	2.94	0.59	..	5.30	0.120	0.088	0.31	59.1	Trace	Trace	..	++	..	
Skim milk powder	4.10	38.04	0.09	6.83	..	50.94	1.370	0.995	1.43	356.7	0	0	165	+++	..	
Cheese	40.30	24.10	25.10	4.20	..	6.30	0.786	0.524	2.10	347.5	273	..	..	..	..	

Miscellaneous Foodstuffs

Name of foodstuff	Moisture %	Protein %	Fat (Ether Extractives) %	Mineral matter %	Fibre %	Carbohydrate %	Calcium (Ca) %	Phosphorous (P) %	Iron (Fe) mgs. %	Calorific value per 100 gms.	Vitamin A (International units per 100 gms.)	Carotene (International Vitamin A units per 100 gms.)	Vitamin B_1 (International units per 100 gms.)	Vitamin B_2	Vitamin C mgs. per 100 gms.	Remarks
Betel leaves (*Piper betel*)	85.41	3.07	0.80	2.25	2.33	6.14	0.227	0.044	5.74	44.0	0	9,635	..	..	4.8	
Jaggery	3.93	0.36	0.06	0.62	..	95.03	0.075	0.038	11.40	382.1	..	280	..	..	..	
'Pappads'	20.32	18.76	0.33	8.17	..	52.42	0.080	0.298	17.24	287.7	..	Trace	..	..	..	
'Perandai' (*Vitis quadrangularis*)	87.42	1.21	0.34	2.01	1.83	7.19	0.651	0.050	2.12	36.7	..	..	..	..	..	
Sweet toddy	84.72	0.10	0.17	0.66	..	14.35	0.149	0.011	0.26	59.3	..	..	..	Poor	..	
Cod liver oil	..	..	100.0	..	..	..	..	..	..	900.0	45,000 to 168,000	0	..	..	..	
Halibut liver oil	..	..	100.0	..	..	..	..	..	..	900.0	3,900,000	0	..	..	..	
Red Palm oil (*Elaeis guineensis*).	..	..	100.0		..	..	..	..	..	900.0	0	44,000	..	..	..	

APPENDIX I.

TABLE SHOWING THE BIOLOGICAL VALUE OF THE PROTEINS IN CERTAIN FOODSTUFFS.

Foodstuff	Biological Value
Barley	71
Cambu	83
Cholam	83
Maize, tender	60
Oatmeal	65
Ragi	89
Rice, raw polished	80
Wheat, whole	67
Bengal gram	76
Black gram	64
Cow pea	61
Dew gram	57
Field pea	72
Green gram	51
Horse gram	59
Lentil	41
Navy beans	38
Red gram	74
Soya bean	54
Amaranth leaves	72
Cabbage leaves	76
Drumstick leaves	41
Ipomoea leaves	67
Potato	67
Sweet potato	72
Brinjal	71
Ladies fingers	82
Coconut	58
Linseed	78
Peanut, raw	58
Peanut, roasted	56
Beef liver	77
Beef, muscle	98
Whole egg	94
Milk	85
Cocoa	37

APPENDIX II.

TABLE SHOWING THE PERCENTAGE OF 'AVAILABLE' IRON IN CERTAIN FOODSTUFFS.

Foodstuff	Per cent of 'available' iron
Wheat	47
Oats	57
Yeast	47
Lima beans	72
Navy beans	61
Peas (canned)	90
Peas (fresh)	72
Soya bean (roasted)	60
Soya bean (non-roasted)	80
Parsley (dry)	23
Lettuce	25
Spinach (fresh)	19
Spinach (dry)	20
Raisins (bleached, seedless)	30
Raisins (Muscat)	62
Apricots	50
Almonds	88
Bananas	61
Alfalfa	27
Oysters (dry)	25
Beef, skeletal muscle (dry)	50
Beef heart muscle (dry)	70
Pork heart muscle (dry)	86
Beef liver (dry)	70
Pork liver (dry)	66
Beef kidney	40

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CHAPTER II
THE AIMS OF UNIVERSITY EDUCATION

I. - New India

1. *The Impact of Political Change.*- Great as were the changes that had taken place in the political and economic conditions of Indian society in the years that preceded the transfer of power on August 15, 1947, considerable as was the progress in education during that period, they are less great than the changes that have been crowded into these few months of freedom. The academic problem has assumed new shapes. We have now a wider conception of the duties and responsibilities of universities. They have to provide leadership in politics and administration, the professions, industry and commerce. They have to meet the increasing demand for every type of higher education, literary and scientific, technical and professional. They must enable the country to attain, in as short a time as possible, freedom from want, disease and ignorance, by the application and development of scientific and technical knowledge. India is rich in natural resources and her people have intelligence and energy and are throbbing with renewed life and vigour. It is for the universities to create knowledge and train minds who would bring together the two, material resources and human energies. If our living standards are to be raised, a radical change of spirit is essential.

2. *Universities as the Organs of Civilisation.*- He indeed must be blind who does not see that, mighty as are the political changes, far deeper are the fundamental questions which will be decided by what happens in the universities. Everything is being brought to the test of reason, venerable theologies, ancient political institutions, time-honoured social arrangements, a thousand things which a generation ago looked as fixed as the hills. If India is to confront the confusion of our time, she must turn for guidance, not to those who are lost in the mere exigencies of the passing hour, but to her men of letters, and men of science, to her poets and artists, to her discoverers and inventors. These intellectual pioneers of civilisation are to be found and trained in the universities, which are the sanctuaries of the inner life of the nation.

In simpler conditions of life, in primitive societies, the leader can follow the urge of his instinct and take us to the scene of his vision. In the complex organisation of modern life, any reform requires careful thought and planning. Our leaders must be capable of intellectual analysis and imaginative insight.

3. *Intellectual Adventure.* - We must give up the fatal obsession of the perfection of the past, that greatness is not to be attained in the present that everything is already worked out and all that remains for the future ages of the world is pedantic imitation of the past. When we are hypnotised by our own past achievements, when all our effort is to repeat a past success, we become fetish worshippers. If our cultural life is to retain its dynamism, it must give up idolatry of the past and strive to realise new dreams. We should think with the young men in the Latin poe(m) that nothing is done while anything remains to do. All that man has yet done is very little compared to what he is destined to achieve. The present which moves backwards and forwards, which is a summary of the past and a prophecy of the future, is hallowed ground and we who tread on it should face it with the quality of reverence and the spirit of adventure. Universities are the homes of intellectual adventure.

4. *An Integrated Way of Life.*- A life of strenuous endeavour for human betterment is not possible, if we are not persuaded that life has a meaning. Many of our popular writers to-day seem to be possessed by the one desire to escape from the world of meaning and teach us the essential purposelessness of life. They make us believe, with a good deal of cleverness and sophistry, that life is infinitely complicated and totally inexplicable. Many of our students are taught to assume that free-will and personal responsibility are illusions, that human beings are conditioned almost wholly by their physical make-up and the society in which they live, and that the only sense that the religious statements make is emotional and subjective. This is a generation which knows how to doubt but not how to admire, much less to believe. This aimlessness, this indi(ff)erence to basic issues, is to no small extent, responsible for the decline of standards, for the fading of ideals, for the defeat of human

endeavour.

The purpose of all education, it is admitted by thinkers of East and West, is to provide a coherent picture of the universe and an integrated way of life. We must obtain through it a sense of perspective, a synoptic vision, a *samanvaya* of the different items of knowledge. Man cannot live by a mass of disconnected information. He has a passion for an ordered intellectual vision of the connections of things. Life is one in all its varied manifestations. We may study the factual relations of the different manifestations but we must have knowledge of life as a whole. It cannot be a collection of distracting scraps but should be a harmony of patterns. The subjects we study must be taught as parts of a connected curriculum.

5. *Wisdom and Knowledge.*- Our ancient teachers tried to teach subjects and impart wisdom. Their ideal was wisdom (*irfan*) along with knowledge (*ilm*), *jnanam vijnana-sahitam*[1]. We cannot be wise without some basis of knowledge though we may easily acquire knowledge and remain devoid of wisdom. To use the words of the Upanisad, we may be the knowers of texts (*mantravit*) and not knowers of self (*atmavit*)[2]. Plato distinguishes between factual information and understanding. No amount of factual information would make ordinary men into educated or 'virtuous' men unless something awakened in them an innate ability to live the life of the soul.

'Where is the wisdom we have lost in knowledge?
Where is the knowledge we have lost in information?
The cycles of Heaven in twenty centuries
Bring us farther from God and nearer to the dust'.[3]

The strength of the new 'faiths' among intellectuals is partly due to their claim to explain the universe. By professing to interpret all human activity in terms of a single thesis, they give to the modern educated men a sense of assurance and certainty formerly provided by religion. Since education is both a training of minds and a training of souls, it should give both knowledge and wisdom.

6. *Aims of the Social Order.*- We must have a conception of the social order for which we are educating our youth. The Russians are clear in their minds about the kind of society for which they are educating and the qualities required in their citizens. They tried to remake man in a new image. Our educational system must find its guiding principle in the aims of the social order for which it prepares, in the nature of the civilisation it hopes to build. Unless we know whither we are tending, we cannot decide what we should do and how we should do it. Societies like men need a clear purpose to keep them stable in a world of bewildering change.

The outlines of the social philosophy which should govern all our institutions, educational as well as economic and political, are indicated in the preamble to our Draft Constitution. It reads:-

'WE THE PEOPLE OF INDIA, having solemnly resolved to constitute India into a SOVEREIGN DEMOCRATIC REPUBLIC and to secure to all its citizens;
JUSTICE, social, economic and political;
LIBERTY of thought, expression, belief, faith and worship;
EQUALITY of status and of opportunity; and to promote among them all FRATERNITY assuring the dignity of the individual and the unity of the Nation;
IN OUR CONSTITUENT ASSEMBLY this .....
... . (..... day of August,

1. See *Bhagavadgita*-IX 1.
2. *Chandogya Upanisad*-VII. 7.3.
3. T.S. Eliot

1949 A.D.)
do HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION'.

We are engaged in a quest for democracy through the realisation of justice, liberty, equality and fraternity.

II. Democracy

7. *Plan of Treatment.*- We shall take up the different problems of educational theory and practice and arrange them under the five heads of democracy, justice, liberty, equality and fraternity.

We shall consider under 'Democracy' education as the development of body, mind and spirit of each individual with his specific nature, the relation of the different studies to the growth of the individual, the nature of human freedom and the need for social changes. There can be no democratic freedom without social justice which demands the freeing of the individual from poverty, unemployment, malnutrition and ignorance. This is not enough. We must cultivate the art of human relationships, the ability to live and work together overcoming the dividing forces of the time. Social harmony can be achieved by wise leadership and proper administration. Under *Justice* we will consider how universities should train technical men of all types, social leaders and wise administrators. Under *Liberty* we shall refer to the liberating character of all education, the need for the autonomy of the universities and for freedom of thought and expression for the teachers. The meaning of equality of opportunity in education, the barriers to it, especially the economic, communal ratios and the need for the assistance of scheduled castes and backward communities will be considered in the section on *Equality*. The idea of *Fraternity* will be treated at two levels, the national and the international. Closer co-operation in colleges and universities between the teachers and the pupils, the development of the residential system, of corporate life and a knowledge of India's culture and history will help to promote the former. The latter will be attempted by fostering among the members of the university the spirit of 'one world' and acquainting them with the cultures and achievements of other peoples.

8. *Value of the Individual.*- The basis of democracy is the belief in the inherent worth of the individual, in the dignity and value of human life. It repudiates the totalitarian principle in all its forms, *viz.*, that the individual as such is useless and that he must be either destroyed or converted into an efficient unit in the power-machine of the State. Democracy affirms that each individual is a unique adventure of life.

9. *Education as Growth.*- The function of education is the guidance of this adventure to the realisation of the potentialities of each individual in the face of the actual world of men and things. It aims at the development of the individual, the discovery, training and utilisation of his special talents. Like all living organisms the individual grows by the impulse of his own self-development. The natural tendency of the child is to grow into maturity. From complete dependence on others the child has to grow into relative independence. The function of the teacher is to assist the growth by stimulation and guidance. The growth is advanced by the acquisition of knowledge and skills. These latter are intended to set free and develop the possibilities of human individuals.

Education is not a discipline imposed from above on an apathetic if acquiescent nature. It is a process of leading up the inward nature to its fulfilment. All true development is self-development.

The process of education as growth is continuous and life long. It is said that a pupil gets a fourth of his education from his teacher, another fourth by his own intellectual effort, a third fourth from his fellow students and the rest in course of

time through life and experience.[1] We learn from the teacher, by ourselves, from one another and from life or experience. Education is not always formal. Where we have a number of keen young men as members of an intellectual community, they educate one another through the daily give and take. Experience is a great teacher. We learn daily and hourly from our home, from our community, from the press, the radio and the movies. All life is experience and therefore education.

10. *Physical Education.*- Human beings are psycho-physical in nature. They have bodies which obey certain definite laws of growth. These must be kept in a state of health and physical fitness. Education of the body through physical exercises, sports and athletic activities helps to develop qualities of initiative, courage, discipline, fair play and team spirit. We cannot realise fully our intellectual possibilities without health and physical vigour. No great nation can be built without strong physical foundations.

11. *The Triune Character of the Human Mind.*- Human beings are not all built in the same way. They are of different types, reflective, emotional or active, though they are not exclusively so. They are distinguished on account of the dominance of emphasis of the one or the other. Cognition, feeling and will, though logically distinguishable are not really separable in the concrete life of mind. These three sides which answer to the familiar distinction of *jnāna*, *bhakti* and *karma*, express themselves through theoretical contemplation, aesthetic enjoyment and practical activity. These are found in different proportions in different individuals.

The true educator should understand the psychological make-up, the *svabhāva* of the pupil and adapt his teaching to the mind of the pupil. The difficulty is to discover the true inward being of each individual. In the same family we have individuals of different temperaments. A seer of the *Rg Veda* says: 'I am a poet (*Kāruh*), my father is a physician (*bhisag*) and my mother a grinder of corn (*upalapraksini*)'.[2] Even as medical men treat their patients with a view to their individual defects and prescribe remedies against the particular diseases to which they are inclined, the teachers should discover the tendencies and weaknesses of the individual pupils, encourage their desirable aptitudes and cure the weaknesses to which they are inclined.

In a well-planned educational system, opportunities will be provided at every level to the pupils for the exercise of their reflective powers, artistic abilities and practical work. The sensitive teacher will be able to find out the mental make-up of the pupil, whether he has in him more of the reflective or the artistic or the practical bent. If he is reflective, he must find out whether he has philosophic or scientific, mathematical or linguistic talents; if he is artistic, he must discover whether he has taste for literature or music, painting or sculpture; if he is practical minded, he must notice whether he is a great experimenter or is mechanically minded. These varying tendencies can be discovered at the Secondary School stage and if proper guidance is provided, much wastage at the later stages will be avoided. Secondary Schools are expected to offer many different kinds of vocational training.

It is wrong to think that the more intelligent go to the universities and the less intelligent to technical schools. Success in a technical school requires as high an intelligence as success in a purely literary or scientific course. It may be of a different kind even as pupils are of different kinds, meditative or mechanical, scientific or artistic. Bookishness or the manipulation of concepts is not the only kind of intelligence. The new Secondary Schools should insist on the equal dignity and importance of the different courses they offer.

12. *Nature, Society and Spirit.*- There are three types of existence, which are inter-related, the

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1. ācāryāt pādam ādhatte sisyah pādam svamedhayā pādam sa brahmacāribhyo pādam kālakramena tu.

2. X.112

natural, the social and the spiritual. The content of teaching may be classified under three heads, our relation to things or nature; our relation to men or society; our relation to values or the world of spirit.[1]

Nature.- Natural Sciences and technology come under this head. The desire to understand nature leads to science; the desire to use knowledge of nature for definite ends gives us technology.

Every pupil should have a knowledge of the physical world in which he lives. It is, of course, not possible for every one to be a specialist in each of the sciences, but by the time he leaves college, every student, even if he is a student of humanities, should be familiar with the general principles governing his physical environment.

Instruction in the technological forces shaping the world is also essential. Technology is continually transforming our environment. All progress in industry from the Stone Age is but a record of the transformation of our environment by the triumphs of technology.

Society.- Every one should know something of the society in which he lives, the great forces that mould contemporary civilisation. History, economics, politics, social psychology, anthropology, belong to the group of social sciences. Whatever may be our specialised field, a general understanding of our social environment and of human institutions is essential.

Spirit.- The purpose of humanities is to enable man to understand his inner aspirations and ideals. The study of the language and the literature of our mother tongue should occupy the first place in general education. Language incarnates the genius of the people which has fashioned it. Every word, every phrase conveys some idea of men and women as they ploughed their fields, tended their homes, built their towns or sailed their ships. We get into the spirit of our people by acquiring control over the language.

Literature quicknes and enlarges the human spirit. It appeals to the imagination of the child and imparts a sense of the inexhaustible richness of human personality and the immense complexity of human relationships.

Arts like music and painting help to educate our emotions and impart a certain grace in living. Men of taste will abhor ugliness, squalor and vulgarity.

Any course of education intended to prepare men and women for the business of living should include philosophical studies, which deal with conduct and the ends of life. However well-informed we may be in general knowledge, however technically efficient we may be in our special vocations, if we are not acquainted with the roots of our past, if we do not have an understanding of what is called the 'wisdom of the ages' our education falls short of its true ideals. It would indeed be very strange if we neglect philosophy, art and literature at a time when civilisation is in danger, not from any poverty of material resources or the power to use them but from want of the knowledge and the spirit to use them rightly. Our present condition is in part due to the failure of our education to cope with moral and spiritual uncertainties. Human values are not a part of nature in the sense in which stones and plants are and yet they can be studied scientifically. If intellectual fragmentation and anarchy are to be avoided, the student must acquire a frame of reference which will give meaning and direction to his college work as he moves from class to class to study different subjects. The different studies should be treated as parts of a whole. There must be an intellectual integration of his varied knowledge.

13. *Natural Sciences, Social Studies and Humanities*.- The divisions of subjects into sciences, social studies and humanities are not exclusive. It will be wrong to assume that science is amoral or indifferent to values. Science is not to be taught as something external to man. It is one of the greatest of the creations of the human spirit. It provides the material basis of the good life. Its aim is not only utility or success but the pursuit of truth. Its essence is careful observation of facts, rigid conscientiousness in inference and

1. adhibhutam, adhyatmam adhidaivam. *Bhagavadgita*, Ch. VIII.

elimination of personal prejudice and passion. Its method is to follow the argument where it leads and its goal is to see things as they are. Its ideal is the same as that of philosophy, the vision of reality. Till recently scientific studies were treated as philosophical disciplines. Even now 'Philosophical Transactions' of the Royal Society deal with scientific investigations. Similarly when we study language, the relations of words to meanings, the construction of sentences, the method we adopt is that of science. Panini's work on Grammar (6th century B.C.) is unsurpassed as a scientific study of the facts of language.

Broadly speaking, the three divisions deal with facts, events and values. Their methods are different, though they are used in all studies in different degrees. While scrupulous attention to fact is the method of science, imaginative insight is also needed for scientific work. Mere heaping of data is not knowledge. In the realm of values, objective analysis of complex situations is necessary for proper appreciation. In history we need a judicious blend of factual observation and judgment. Whatever be our subject of study, we must be able to observe carefully, think effectively and use our judgment properly.

Any one who wishes to live intelligently in the modern world should have some knowledge of selected materials from the three fields of (1) Science and Technology (2) Social studies including History (3) Humanities including language and literature, fine arts, ethics, philosophy and religion. Our education is incomplete if it is limited to the knowledge of the masterpieces of thought and imagination, ignoring altogether other expressions of the human spirit, the exact sciences.[1]

14. *Unity of Mind and Interdependence of Knowledge.*- If education is to guide the individual towards the comprehension of the art of life, it must energise his whole being and give him ideas of nature, society and values. Human mind is a unity and all knowledge is interdependent. In a sense every study should excite and satisfy the different mental powers. It must give the pupils intellectual vision, aesthetic enjoyment and practical power.

Education must look to the whole man. Karl Marx says: 'The education of the future will in the case of every child over a certain age, combine productive labour with education (unterricht) and athletics (gymnastik) not merely as one of the methods of raising social production but as the only method of producing fully developed human beings'.[2] On this question of learning through doing Marx and Gandhi agree. Whether we are being introduced to the delights of literature, or the wonders of science, or the pride of craftsmanship, our whole being must be at work. Only then is education turned into joy triumphing over its weariness and pain.

While a general understanding of the scientific method, of the history of our society and the world and literature which feeds our imagination and stabilises our emotional life is to be regarded as a part of general education for all, professional education trains the students for competence in an occupation. Education has among others this double aim of preparing for a particular vocation

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1. The list of subjects mentioned in the *Chāndogya Upanisad,* 8th Century B.C., includes literature, history, philosophy, religion, mathematics and astronomy, practical arts, military science.

rgvedam, yajurvedam, sāmavedam, ātharvedam, itihāsapurānām vedānām vedampitryam, rāsim, daivam, nidhim, vākovakyam, ekāyanam, devavidyām, brahmavidyām, bhutavidyām, ksatravidyām, naksatravidyām, sarpadevajanavidyām VII.1.

In the University of Taksasilā (Taxila) which was famous even in the 7th century B.C. and attracted scholars from many parts of India and was known in Greece, the subjects taught included philosophy and literature, medicine and surgery, archery and military arts, agriculture and commerce. Special schools for grammar, law and astronomy, medicine and surgery were established by the fifth century B.C.

2. *Das Kapital,* 8th ed. (1928), I. 425 sadāsucih kāruhastah; which exalts the dignity of a manual worker who is held to be always pure.

and also for citizenship in a democratic community. These two ends are not exclusive of each other. If knowledge is power all education is both pure and professional.

The vocation may well require specialisation in humanities or social sciences. Professional education is different from general education, not so much in its subject matter as in its method, outlook and objective. To give a basic understanding of the principles of science, history and literature is the aim of the general course; to train experts in them is the aim of the specialised course.

15. *Mechanical Learning.*- The process of education becomes dull and boring if we are unable to interest the live minds of the students. What they learn unwillingly becomes dead knowledge which is worse than ignorance. Learning is an activity of thought. It is not stuffing the mind with facts. We must be able to use what we learn, test it, throw it into fresh combinations. It must become vibrant with power, radiant with light.[1]

16. *Inwardness of Freedom.*- There are not many today who hold that the concern of the college is primarily with the intellect and little, if at all, with the fashioning of character, the building of personality. While the conservation and advancement of learning is a dominant purpose of the universities, they should also aim at raising the personal quality of its members and make them seek the good life. A free society is composed of free citizens and men are not free simply because they are freed from external restraints. True freedom is inward, a function of mind and spirit. This inner fearlessness is the affirmation of human individuality. The recognition that a human being is a free moral agent with the right and capacity to choose between truth and error, good and evil, is the essence of freedom. We may make a wrong choice but true democracy concedes to us the right to choose wrongly.[2]

A human being lives in the world of nature but apprehends a world of values. We can break him on the wheel, burn him at the stake, bury him alive in a concentration camp or crucify him, but we cannot make him lie or steal or betray the cause he believes in. Our education should encourage the development in its members of fearlessness of mind, strength of conscience and integrity of purpose. If human life is to remain human, it must deepen and live by a sense of moral obligation. Without moral freedom there can be no true democracy. Freedom and justice in the world depend on there being enough men and women who say, 'We will obey God rather than men'. For the sake of the soul we may sometimes have to abandon the world.[3]

Plato says in his *Apology:* 'A man who is good for anything ought not to calculate the chance of living and dying; he ought only to consider whether in doing anything he is doing right or wrong- acting the part of a good man or a bad'.[4] The period of studentship, *brahmacharya,* was looked upon in India, as a time of learning and discipline. It is a way of life, of spirit. In the Christian Gospel we are warned not to be afraid of them that kill the body but are not able to kill the soul.

17. *Education as Initiation into a New Life.*- Education, according to the Indian tradition, is not merely a means to earning a living; nor is it only a nursery of thought or a school for citizenship. It is initiation into the life of spirit, a training of human souls in the pursuit of truth and the practice of virtue. It is a second birth, *dvitiyam janma.*

18. *Inadequacy of Education as Adjustment to Society.*- It is of course true that we should mould students to a pattern that is sanctioned by the past

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1. tejasvināv *adhitam astu.* Cp. Yāska's *Nirukta* (1.18) 'The person who is able only to recite the Veda (adhitya) but does not understand its meaning is like a post or a mere bearer of a load. For the words that are simply memorised and not understood will merely sound when uttered, and not enlighten, just as wood, be it never so dry will not blaze if it is put into what is not fire'.

2. 'If all mankind minus one were of one opinion, and only one person were of the contrary opinion, mankind would be no more justified in silencing that one person, than he, if he had the power, would be justified in silencing mankind', said J.S. Mill in his work on *LIBERTY.*

3. *atmarthe prthivim tyajet.*

4. 1.28.

if society is not to become discontinuous. Education is a means by which society perpetuates itself. In 1852 Newman defined the function of the university thus: 'If a practical end must be assigned to a university course, then I say it is training good members of society'.[1] No system of education could be directed to the weakening of the State that maintains it. But education is also an instrument for social change. It should not be its aim merely to enable us to adjust ourselves to the social environment. We must train people not merely to be citizens but also to be individuals. Many systems of education tend to transform the individual, who might otherwise seek to rise above the type, into the representative of the community. On such a scheme we cannot get leaders, who with new values transform the community. There is no stimulus to individuality, to being in any respect distinct or different from one's surroundings. The aim of education should be to break ground for new values and make them possible.

19. *Flexibility of the Educational System.*- The institutions of democracy must be flexible, capable of adaptation to the changing needs and conditions of men. We must make modifications whenever we feel that changes are necessary to realise more effectively the ends of individual development and social welfare.

Educational systems are built for a time and not for all time. There are no changeless ways of educating human nature. A curriculum which had vitality in the Vedic period or the Renaissance cannot continue unaltered in the 20th Century. Realising that the vision of free men in a free society is the living faith and inspiring guide of democratic institutions, we must move towards that goal adapting wisely and well to changing conditions.

III. Justice

20. *Social Justice.*- Even as we cannot break up the human person into separate mental faculties, we cannot separate the individual from society. Social justice is the foundation of States and it demands that we create a society which is freed from the evils which it is within human power to banish. If all men are entitled to an equal chance to be free from want, fear and ignorance, we cannot sit quiet and contented when millions of our fellowmen continue to live in poverty, disease, hunger and ignorance. If we are to demonstrate, not by words, but by deeds, that the democratic way of life is superior to the totalitarian, we must raise the material standards of life and increase national productivity by the larger use of scientific discoveries and technical applications. After the October Revolution of 1917, Soviet Russia wiped out illiteracy, raised the educational level of the masses, built and equipped scientific institutes and laboratories and transformed the country with new industries and a new type of agriculture.

21. *The Present Needs.*- There is great disparity between what our country requires and what our education offers. We produce a large number of arts and law graduates but not enough teachers, administrators, doctors, engineers, technicians, scientific researchers and the like. On account of their expensive character we have neglected the scientific and technical courses.

22. *Agricultural Education.*- The vast majority of our people are engaged in agriculture and our position in regard to food production is pathetic. While Great Britain which is highly industrialised has attempted progressively to reduce her imports of food from overseas and increase her own food production, India where 70 per cent of the people are engaged in agriculture imported $1\frac{1}{2}$ million tons of food grains in 1946, 2 million tons in 1947, 3 million tons in 1948 and threatens to import $4\frac{1}{2}$ million tons in 1949 at a cost of 200 crores of rupees. While we with 70 per cent of our population working on farms are unable to produce enough food even at the subsistence level for our population, the United States of America, of whose working population only 13 per cent work on farms, provides food at a high level not only for her entire population but for a large part of the rest of the world. The output of rice per acre

1. *The Scope and Nature of University Education.* Discourse 6.

in India is about 1,000 lbs only as against 2,500 lbs in China and 3,000 lbs in Japan. What is possible in China and Japan must be possible in India. We have neglected the country-side, disrupted the village communities and destroyed rural initiative. If we wish to increase our food production, we must train the farmers and utilise the results of scientific research in agriculture in the fields.

23. *Technological Education.*- Our leaders have drawn up ambitious plans for the industrialisation of our country involving expenditure of crores of rupees. They wish to improve communications, develop systems of irrigation, distribute electricity to the villages. They have large schemes for the improvement of health and sanitation. If these schemes are to be realised, we have to increase the number of professional colleges, agricultural, medical and engineering, to produce the requisite number of graduates and set up throughout the country technical schools which will supply the much larger number of technicians needed for the purpose. For a fuller realisation of the democratic principles of justice and freedom for all, we need growth in science and technology. The presence of the suffering millions, tired, discontented, mentally inefficient is a challenge to us. Where human action can remove the evils, inaction has the guilt of vice.

24. *Rural Development.*- The industrialisation of the country should take into account the fact that the large majority of our people live in villages. As far back as 1830 Sir Charles Metcalfe wrote about the village communities in these words: 'They seem to last where nothing else lasts. The union of the village communities, each one forming a separate little state in itself, has, I conceive, contributed more than any other cause to the preservation of the people of India through all revolutions and changes which they have suffered, and it is in a high degree conducive to their happiness and to the enjoyment of a great portion of freedom and independence. I wish, therefore, that village constitutions may never be disturbed and I dread everything that has a tendency to break them up'. They have been broken up. We have to revive them today and make them, as far as possible, self-sustaining. Cottage industries and small co-operatives require to be developed and machines to lighten the labours of men living in cottages. 'If we could have electricity in every village home, I shall not mind villagers plying their implements and tools with electricity', said Gandhi.

We need heavy large scale industries for power, mining, metallurgy, oil, machinery and machine tools, automobiles, locomotives, ship-building, aircraft, heavy chemicals, pharmaceuticals. These are to be located by the State in centres selected for the availability of raw materials and local labour conditions. Our economy must be a decentralised one supported by agriculture and village industries, supplemented by the necessary large-scale industries which are worked, not for the profit of a few industrialists but for the general welfare.

25. *The Place of the Machine.*- The machine should be treated as a natural accessory to man's social development. It is the tool of the free individual and not his master. It must not become the servant of powerful self-seeking individuals and groups. Under proper control and an equitable system of distribution, it can supply the basic needs of food, shelter and clothing to every individual and release him from the burden of life for his own proper function of relating himself to his source, to his fellowmen, and the forces of his natural environment.

26. *Defects of Exclusively Scientific and Technical Education.*- Now that scientific discoveries and technological applications have altered our physical environment profoundly in the space of a few generations, our social habit and institutions require to be readjusted. We have grown strong in the mastery of the physical world but are very weak in our ability to manage and direct the social forces that shape our lives. It is a false belief that scientific pre-eminence is the only basis of national security and welfare.

27. *Need for Social Studies and Research.*- To impart correct social vision is an essential part of true education. While graduates in law, medicine and engineering acquire specialised information and technical skill, they should also be inspired

by high social aims as no groups can pursue their private ends without regard to the social consequences of their activities. We do not work in a social vacuum. No man should expect to benefit from social order and progress without contributing to it. Individual freedom entails social responsibility.

Our students must be educated in the ethical values and the concept of human relations on which our political system rests, in the structure and processes of government. They must learn to know the imperfections of actual procedures and institutions through which government works. We must widen and deepen their social conscience and indicate how, though reason is set up as the final arbiter in human relations, the appeal to emotion and prejudice is more common among us than the appeal to reason.

We should not be tempted by the prestige of natural sciences and their immediately tangible results to give them a disproportionate place in our teaching programmes and research budgets. There is at least as much research to be undertaken in the social sciences as in the natural sciences. The pattern of inquiry and the canons of validity on social studies are somewhat different from those employed in natural sciences. The warning against the insistence on the same standards of precision in all fields is as old as Aristotle. 'Discussion will be adequate if it has as much clearness as the subject matter admits of, for precision is not to be sought for alike in all discussions. It is the mark of an educated man to look for precision in each class of things just so far as the nature of the subject admits; it is evidently equally foolish to accept probable reasoning from a mathematician and to demand from a rhetorician scientific proofs'.[1] We cannot expect more exactness than the subject permits.

28. *Training for Leadership.*- Training for leadership in the professions and in public life is one of the central aims of university education, which it is difficult to realise. President Truman remarked: 'Our national policies must be administered by men of broad experience, mature outlook and sound judgment. But there is a critical shortage of such men - men who possess the capacity to deal with affairs of State'. He went on - 'We have been much less successful in obtaining persons with broad understanding and an aptitude for management. We need men who can turn a group of specialists into a working team and who can combine imagination and practicability into a sound public programme. Men trained for this kind of administrative and political leadership are rare indeed'.[2]

If it is the function of universities to train men and women for wise leadership they must enable young men and women to read with insight the records of human experience as they are expressed in world's literature, to know the nature and consequences of ethical values, to sense the meaning of the social forces operating in the world today and comprehend the complexities and intricacies of life in all its immensity, physical, social and spiritual. Sciences supply us with the tools of civilisation but the guidance for their use does not come from them. Our obsession with the temporal, our passion for even increasing velocity of movement require to be tempered by attention to the world of values, the 'unchanging forms' of Plato.

We are building a civilisation, not a factory or a workshop, The quality of a civilisation depends not on the material equipment or the political machinery but on the character of men. The major task of education is the improvement of character.

Education must carry out at appropriate levels a combination of general, scientific, artistic and technical education for students of varying abilities and occupational objectives.

IV. Liberty

29. *University Autonomy* - Freedom of individual development is the basis of democracy. Exclusive control of education by the State has been an important factor in facilitating the

1. *Nichomachean Ethics*, Ross E.T.
2. Quoted in *Higher Education for American Democracy*, 1948, Pp. 88-89.

maintenance of totalitarian tyrannies. In such States institutions of higher learning controlled and managed by governmental agencies act like mercenaries, promote the political purposes of the State, make them acceptable to an increasing number of their populations and supply them with the weapons they need. We must resist, in the interests of our own democracy, the trend towards the governmental domination of the educational process.

Higher education is, undoubtedly, an obligation of the State but State aid is not to be confused with State control over academic policies and practices. Intellectual progress demands the maintenance of the spirit of free inquiry. The pursuit and practice of truth regardless of consequences has been the ambition of universities. Their prayer is that of the dying Goethe: 'More light' or that of Ajax in the mist 'Light, though I perish in the light'.

Professional integrity requires that teachers should be as free to speak on controversial issues as any other citizens of a free country. An atmosphere of freedom is essential for developing this 'morality of the mind'.

The respect in which the universities of Great Britain are held is due to the freedom from governmental interference which they enjoy constitutionally and actually. Our universities should be released from the control of politics.

30. *The Spirit of Science and Social Conservatism.*- The active principle of science is discovery and every new discovery involves modification of hitherto accepted knowledge and so has to overcome the inertia of what is already established. When we adopt the scientific method of thought, we demand that we reach conclusions from tested data only and our conclusions are tentative, since our data may be enlarged. Readiness for change marks the scientific attitude while resistance to change is normally the attitude of defenders of tradition. The general aversion to change common to all static societies is hostile to scientific progress.

31. *Liberal Education.*- All education is expected to be liberal. It should free us from the shackles of ignorance, prejudice and unfounded belief. If we are incapable of achieving the good life, it is due to faults in our inward being, to the darkness in us. The process of education is the slow conquering of this darkness. To lead us from darkness to light[1], to free us from every kind of domination except that of reason, is the aim of education.

V. Equality

32. *The Democratic Way of Life.*- Democracy as a way of life and not a mere political arrangement requires of its adherents a jealous regard not only for their own rights but equally for the similar rights of others. It is based on the principle of equal freedom and equal rights for all its members, regardless of race, religion, sex, occupation or economic status. Education is the great instrument of social emancipation by which a democracy establishes, maintains and protects the spirit of equality among its members.

33. *Freedom of Conscience.*- If we develop the social temper of democracy we will have confidence in one another. We will allow freedom of conscience to others as it is our faith that others like ourselves are competent to work out their own salvation.

34. *Equality of Opportunity.*- Equal opportunity does not mean identical opportunity for all. It means the equal availability of education for every qualified person. Our system must provide for every young person education to the extent that he can profit from it and of a character best designed to assure the maximum development of his nature. It must of course recognise differences of gifts and interests.

Article I of the Universal Declaration of Human Rights says: 'All human being are born free and equal in dignity and rights. They are endowed with reason and conscience and should act towards one another in a spirit of brotherhood'.

Education confined to those who come from

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1. tamaso m ā jyotir gamaya

nobility, landed gentry or professional classes is suited to a society built on an economic and social hierarchy of classes. In a democratic society, the opportunity of learning must be open not only to an *elite* but to all those who have to carry the privilege and responsibility of citizenship. Education is a universal right, not a class privilege.

The educational attainments of our people are far below what is necessary either for effective individual living or for the satisfactory maintenance of society. For the great majority of our boys and girls the kind and amount of education they may hope to get depends not on their own abilities but on the economic status of their family or the accident of their birth. The earnings of a very large part of our population are so low that they find it difficult to have even barest necessities of physical existence. Low family income together with the rising costs of education is an almost impossible barrier to college education for many young people. There is no relation, however, between the ability to profit from a college education and the ability to pay for it. Speaking of the mathematical genius, Ramanujan, Pandit Jawaharlal Nehru said in his *Discovery of India*: 'Ramanujan's brief life and death are symbolic of conditions in India. Of our millions how few get education at all, how many live on the verge of starvation, of even those who get some education, how many have nothing to look forward to but a clerkship in some office on a pay that is usually far less than the unemployment dole in England? If life opened its gates to them and offered them food and healthy conditions of living and education and opportunities of growth, how many among these millions would be eminent scientist, educationists, technicians, industrialists, writers and artists, helping to build a new India and a new world?' We cannot let our potential human resources go undiscovered and undeveloped.

In distribution of educational opportunity there should be no caprice, prejudice, favouritism, special privilege, or other arbitrary action. In general, each person should have educational opportunity of the kind and to the extent that is suited to his capacity and interest and which represents his fair share of the total educational resources. Application of this principle may be adjusted to the need of society and to humane considerations. Should society need more technicians and fewer clerical workers, educational opportunity may be shifted accordingly. Exceptional ability is socially so valuable that it may be given exceptional opportunity. Special training for retarded persons may be justified by the need to make them self-sustaining and not a burden to society. Humane considerations may lead to special educational provisions for the blind and other handicapped persons. Wise administration of educational resources must rest on the integrity and judgment of the State.

35. *Economic Barriers.*- Owning to economic difficulties many young people are not getting the chance to which they are entitled and the nation is deprived of a large amount of potential leadership in science and scholarship, industry and commerce. If we are to give substance and actuality to the claim of equality we profess, we must devise a system in which qualified individuals are not prevented by economic barriers from attaining the kind of education for which they are suited by their aptitudes and interests.

The President's Commission on *Higher Education in America* 'recommends that in publicly controlled institutions there be no tuition or other required fees for the thirteenth and fourteenth school years, irrespective of whether they are offered by a 2-year or a 4-year college; and that fees above the fourteenth school year be reduced at the earliest possible moment to the level prevailing in 1939'[1]. Conditions in India are much worse. If we are to enable even the poorest to obtain not merely some but the best education they are capable of we must organise a large and

1. *Equalising and Expanding Individual Opportunity.*

generous system of scholarship which will provide a ladder from the bottom to the university along which any child can climb to the limit of his capacity. These scholarships should cover not only tuition costs but costs of board, lodge and other living needs.

36. *Communal Ratios.*- The principle of equality in regard to educational rights is set forth in Section 23 of the Constitution: 'No minority whether based on religion, community or language shall be discriminated against in regard to the admission of any person belonging to such minority into any educational institution maintained by the State'. Unfortunately in some Government, not University, Colleges in South India there is what is called a 'rationing of seats' among members of different communities.[1] The fundamental right is the right of the individual, not of the community. Every young man must have an equal chance with others to make the most of his abilities. To curtail the chance to learn for members of particular groups is inconsistent with the Fundamental Right. It would tend to increase the stratification of our society. To insist on quotas for communities would be to assume that the nation is composed of separate and self-sufficient groups, which is a negation of our national ideal and democratic principle. Discriminat(ory) practices generate tensions and the spiritual damage caused by them is not measurable. Education should not be used for creating or deepening the very inequalities which it is designed to prevent. Progress for the nation requires that access to higher education should be determined by the interest and ability of the student. There is much to be said for the suggestion that the information about caste and religion should not be asked for from candidates for admission to colleges and universities.

37. *Assistance to Backward Communities.*- We cannot banish social situations by democratic phrases. Our Constitution has abolished communal electorates, privileges and weightages for all, except the scheduled castes. We are in great sympathy with the anxiety of these scheduled castes and backward communities to raise their cultural level. Their backwardness is the result of a long period of unequal opportunity and it should be remedied as speedily as possible. We must provide them with additional assistances which will enable them to give their children equal educational opportunities with others in the nation.

By expanding the facilities in the colleges and increasing their number, we will be able to move towards equalisation of educational opportunities. But to deny to the most talented members of the nation, Brahmin or non-Brahmin, Christian or Muslim, opportunities for self-development is not only unjust to them but is unfair to the nation which is deprived of high class professional ability and social competence. Besides, we live in a competitive world in which mind yields itself only to an ascendancy of mind.

In the present conditions of our society the needs of justice to the members of the scheduled castes and the communities declared to be backward by the government of the Province or the State can be met by reserving a certain proportion of the seats in any college maintained by the State for qualified students of these communities and throwing open the rest of the seats to members of all communities by open competition. The percentage of reservation shall not, however,

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1. Government of Madras issued an order No. 1254-Education, dated 17th May, 1948 directing 'that the following communal proportion be kept in view and be observed as far as possible in regard to admission in the Engineering College from the Academic year 1948-1949:-

Non-Brahmin (Hindus).....6 out of 14.
Backward Hindu Communities.....2 out of 14.
Brahmins.....2 out of 14.
Harijans.....2 out of 14.
Anglo-Indian and Indian Christians ....1 out of 14.
Muslims.....1 out of 14'.

exceed a third of the total number of seats. The principle of reservation may be adopted for a period of ten years.

VI.- Fraternity: National.

38. *Extra-Curricular Activities.*- Fraternity refers to the need for fraternal concord and good-will among the people of India and the world. It can be fostered in educational institutions among the members of different communities, if we do not emphasise differences of caste, community and religion. In the hostels and playgrounds and unions, students should be trained in the democratic way of life. The extra-curricular activities of the college provide avenues through which students could participate in making decisions and carrying on joint undertakings. Habits of mutual trust and co-operation and qualities of fair play, patience, disinterestedness, consideration for others, are acquired through practice. Students cannot learn these if the institutions are run on authoritarian lines. We cannot teach the lessons of freedom by the methods of servitude. Students should be encouraged to participate in the social and cultural activities of the areas in which the colleges are situated, so that they may become alive to the needs of the society in which they live.

39. *Indiscipline.*- We hear a great deal today of indiscipline among students. The university has split into two groups. The world of teachers is separate from that of the students. The students adopt a trade union attitude to the authorities. They have little respect for their teachers and little concern for academic standards. They are convinced that the teachers are less informed than they about the illness of the society in which we live. A restless youth, discontented with its older generation, conscious of talents and cramped by lack of opportunity, which draws simultaneously towards and away from the Indian pattern of life, eager, thoughtful, suspicious, requires to be treated with understanding by the colleges and the universities. The teacher who shows in the class room or outside any interest in the problems which are alive for the student has a following. The young people are in desperate need of assistance. Out of the mass of individuals who have enrolled in a college, we have to build a community. The university surroundings do not provide adequate opportunities for corporate life.

40. *The Residential System.*- In ancient times the teacher and the pupil shared a common life. They shared the same simple food and life and in the process was established a close relation between the teacher and the pupils. Education was regarded as a co-operative enterprise. The imperceptible action of the teachers' character, devotion to learning and the spirit of dedication on the growing minds of the pupils was the most valuable part of any education. The teacher not only imparts instruction but transmits the power of spirit. Compulsory residence within college walls which is required in many universities of the world assumes this invaluable interaction between the matured character of the teacher and the still unformed mind of the pupils. The absence of this personal relationship is to no small extent responsible for the increasing indiscipline. Numbers swamp 'humanity' and make education mechanical.

41. *College a Community Centre.*- The College should be a community centre and not merely a class room or a hotel. In the dormitories, in student government, in clubs and organisations, in the varied social, recreational, intellectual life of the college, there are unique opportunities for the practice of the democratic way of life. They should be regarded as an integral part of the educational programme. Members of the teaching staff may participate in them actively, not to dictate or supervise but to advise and help, to make available to youth their wide knowledge and mature experience.

42. *National Discipline.*- There has been in recent years, a deterioration of the moral fibre. Many of the students as well as teachers are lacking in moral purpose and integrity. Many of those in power are in the grip of greed, selfishness and hatred. In our visits to the colleges and the universities, we were impressed by the need for improvement in national character and discipline. Universities ought to be examples to the nation in fair dealing and decent behaviour. Some of the universities, we regret to say, are not models of decency and dignity. We can suggest only improved machinery giving less scope for

intrigue and rackets. But no improvement of machinery can do much without a change of spirit. University personnel must develop a greater sense of social responsibility for educational and national progress, a preference for quality over quantity. The teachers can do much to raise the tone of the universities. It is in educational institutions that we can train character, build personality, by the discipline of body, intelligence and will.

43. *The Need for Culture.*- What holds a society together and gives the individual balance and perspective, is the possession of culture. Culture is intellectual alertness, receptiveness to beauty, human feeling, social enthusiasm.

As the result of the vast expansion of the area of knowledge and the diversification of its content, the aim of teaching has become almost exclusively specialisation. It is the normal feature in professional colleges. Even in colleges for liberal arts and sciences, the tendency is to specialise and prepare for advanced study in one or the other special field. If society is not to disintegrate into an aggregate of individual specialists, we should endow the youth with a central core of values, transmit to them a cultural heritage. It alone can serve as a cohesive force in a society which is getting splintered by over-specialisation. It will confer a unity and consistency of aim on specialised vocational courses and make for a more abundant personal life and a freer social order.

44. *The Un-Indian Character of Education.*- One of the serious complaints against the system of education which has prevailed in this country for over a century is that it neglected India's past, that it did not provide the Indian students with a knowledge of their own culture. It has produced in some cases the feeling that we are without roots; in others, what is worse, that our roots bind us to a world very different from that which surrounds us.

A British historian of Indian education observes: 'Our education has done far less for Indian Culture than for the material and political progress of India. She looks to our Schools and Colleges for equipment in the struggle for existence; for the secret of happy living, *vivendi causae*, she looks elsewhere'.[1]

45. *Cultural Unity of India.*- Nations are not made chiefly by traders and politicians. They are made by artists and thinkers, saints and philosophers. National unity and progress require a deeper foundation than political and economic arrangements. It is the life of spirit that has shaped and unified our collective existence and has been the real bond of oneness among the Indian people. After centuries of stress and conflict India has gradually evolved a common civilisation, a collective consciousness which embraces wide varieties of temperament, tradition, ways of thought and belief. Our people belong to different provinces, speak their own languages, preserve their own habits and customs. There are sharp differences of temper, tradition and dialect. Despite all these there is a fundamental unity which binds the people together as members of one society with the same cultural loyalties.

Indian culture is like a palimpsest in which new characters do not entirely efface the old. In a single social pattern fragments of different ages are brought together. It would be impossible to think of an India where no Moghuls ruled, where no Taj was built, where no Macaulay wrote his Minute on education. Indian culture is like a living organism growing in richness and content. Primitive cultures are marked by extreme conservatism where social groups follow the same path of custom and convention with irrational persistence. Living cultures are dynamic and maintain their cultural pattern by a continuous effort of individual and social discipline.

46. *Conflict in India's Soul.*- Two contradictory impulses have attracted Indian intellectuals. One is a jealous pride in Indian genius and tradition wholly distinct from those of the West. The other is the no less jealous desire to profit by the example of the West.

A revolutionary period is not generally inclined to respect the wisdom of the past, but to cultivate this disrespect would be to forego our spiritual heritage. There are treasures of spirit which may

1. A. Mayhew: *The Education of India*, (1926), p. 4.

not be of any conceivable use in the struggle for material comfort but, if we are to be qualified to assist or resist the dominant tendencies of our age, we cannot afford to ignore the standards and ideals built by the austerity and abnegation of our ancestors across the centuries. The chief source of spiritual nourishment for any people must be its own past perpetually rediscovered and renewed. A society without a knowledge of the past which has made it would be lacking in depth and dignity.

47. *Critical Study of the Past.*- This is not to romanticise the past filling the gaps of memory from the resources of imagination. India has suffered on account of her great weaknesses, her spirit of reaction and narrow-mindedness. We must be critical and selective and use the past to illumine the present. We should not blindly give up the great values of our past nor should we cling to beliefs simply because they are ancient.[1] We should accept so much of ancient thought as is sympathetic to us.

Even in the darkest days of degradation, the light of India's culture never failed. It may have flickered but it was never extinguished. There were loving hands which cherished and tended it. Today it is burning with a renewed glow. If it is to become a consuming flame, we must become aware of its past greatness and its contemporary value.

VII.- Uninterrupted Continuity of Indian Culture

48. *The Indus Valley Civilisation.*- From the prehistoric civilisation of the Indus Valley brought to light by the excavations at Harappa and Mohenjo-daro to our own time it is a span in all probability of nearly five to six thousand years.[2] Sir John Marshall tells us that these excavations provide us with evidence of the presence in India of a highly developed culture that 'must have had a long antecedent history on the soil of India, taking us back to an age that can only be dimly surmised'. Professor Childe writes: 'India confronts Egypt and Babylonia by the third millennium; with a thoroughly individual and independent civilisation of her own technically the peer of the rest. And plainly it is deeply rooted in the Indian soil'. He continues: 'it has endured; it is already specifically Indian, and forms the basis of modern Indian culture'.[3]

49. *The Vedic Period.*- The Vedic period on a most cautious estimate covers the stretch between 1500 to 600 B.C. The Rg Veda is older than Homer or the Old Testament. The concluding parts of the Veda, the Upanisads which are the sources of the Vedānta, antedate the Orphic and the Eleusinian mysteries, Pythagoras and Plato. The first connections of things are understood by the seers of the Rg Veda. They believe in a truth, a law which governs our existence, which sustains the different levels of our being, an infinite reality, *ekam sat*, of which all the different deities are but forms.

In Mittāni (Asia Minor we have cuneiform inscriptions (fourteenth century B.C.) mentioning the Vedic deities Indra, Mitra, Varuna and Asvins. Xerxes is reported to have destroyed a temple at Media where people adored gods with Vedic names like Indra and Sarva. The kinship of the Vedic and the Avestan beliefs is now accepted, and the Iranians and Indians had lived together or in close proximity from remote antiquity. The truths suggested in the Vedas are developed in the Upanisads. They are the source of the various philosophies and religions which have developed in India. Their influence can be traced in the thought of Pythagoras and Plato. In the Upanisads we find formulated the distinction between Absolute spirit and personal God, between the ultimate truth of the eternal and the relative truth of mortal existence. They trace the lines of the inward growth of man from the physical to the

1. Cf. Kālidasa: *purānam ity eva na sādhu sarvam na cāpi kāvyam navam ity avadyam.*
2. *Mohenjo-daro and the Indus Civilisation*, (1931), Volume 1, p. 106.
3. *New Light on the Most Ancient East*, (1934), p. 220. 'About the Indus Valley of Mohenjo-daro civilisation of around 3000 B.C.', A.L. Kroeber says, 'we cannot yet say whether its recently discovered remains represent a peak or a level, nor whether they characterise only the North West Frontier or a larger part of India'. *Configurations of Culture Growth*, (1934), p. 688.

spiritual mode of existence. They give us techniques for spiritual realisation which are flexible and continuous and discourage claims for the monopoly of truth. On the principle of live and let live, they give full freedom to seekers to get to their goal in their own ways.

50. *Buddhism.*- The sixth century B.C. is a period of great awakening the world over; Confucius in China, Pythagoras in Greece, and the Buddha in India belong to it. The Buddha's doctrine is a restatement of the truths of the Upanisads with a new emphasis. Asoka's missions spread Buddhism in East and West including Syria and Palestine.

51. *Indian Influence Abroad.*- The spread of Buddhism in the centuries before the Christian era and in the early centuries of it in the East, in Tibet, Burma, Nepal, Cambodia, Annam, China, Japan, without spilling a drop of blood is well-known. Its appeal to the modern mind is remarkable.

From the third century B.C. there were conquests of culture in the regions of Indo-China and Indonesia and familiar Indian names like Campā, Kāmbhojā, Amarāvati, names which we find in the Buddhist texts, were given to the places in Indian colonies even as European names like Boston, Cambridge, Berlin are taken over by settlers in America from their European homelands. Brahmanical and Buddhist faiths prevailed in this Farther India and came to terms with each other as in India. Harsa, the last great ruler of Northern India (A.D. 606-647) dedicated temples to Siva and the Buddha.

52. *South Indian Teachers.*- About and after the eighth century the teachers of South India, Samkara, Rāmānuja Madhva, effected a cultural union between the North and the South, between the Aryan and the Dravidian, and laid the foundations of Indian national unity.

53. *The Spread of Islam.*- When Islam spread in the land, theistic developments became more prominent in the doctrines of Rāmānanda, and Kabir, Rāmdās, Dādu, Tukārām and Tulsidās, Nānak and Caitanya. Attempts at the reconciliation of the two faiths were made not only by the spiritual leaders but by the emperor Akbar. In the sufism of Islam, of which Chishti, Baba Farid and Jami are illustrious representatives, we have a close approximation to the Vedānta philosophy.

From very ancient times India had intimate relations with the Arabs, especially in commerce and trade, and there were land and sea routes established between the two countries. The Muslims were welcomed in India by the Hindu rulers, who permitted them to build mosques and spread their teachings. Indian culture did not believe in compelling people to choose its way of life. It encouraged each group that found its home in India to live by its own conception of the good life. A number of communities of mixed descent came into existence. When later Muslim invaders from outside attacked India, Indian Muslims fought side by side with the Hindus and resisted them. When these invaders settled down in India, there were frequent feuds and instances are not wanting of Hindus fighting under Muslim leadership and Muslims fighting under Hindu leadership. The Muslims of India spoke the Indian languages, belonged to the same racial stock, adopted the occupational groupings and, within each class, the Hindus and the Muslims were often indistinguishable as they are today, in dress and manners, in ways of thought and behaviour. With the advent of the Moghuls, the imperial court became the meeting ground of Hindu and Muslim scholars who made themselves familiar with each other's cultures. In the eleventh century, the great Muslim scholar, Alberuni, mastered the Sanskrit language and left us an impressive and critical account of the achievements of the Hindus in sciences and philosophy. India's spirit of comprehension and forbearance influenced the Moghuls and the cultural activities of India between the fourteenth and the nineteenth centuries illustrate Hindu-Muslim collaboration. In science and literature, music and architecture, in painting and dancing, there was a notable synthesis of Hindu and Muslim ideas.

54. *The Influence of Christianity.*- Christianity flourished in South India from the beginning of the Christian era. The early Christians looked upon themselves as an integral part of the general

Hindu community and today the younger sections of the converted Christians regard themselves as the inheritors of the great Indian culture. Attempts to reconcile the inherited spiritual tradition of India with the acquired Christian doctrine on the lines of the reconciliation effected by the great scholastic thinkers between the Aristotelian tradition and Christian dogma are being made by the more enterprising of the Indian Christian leaders.

55. *Chief Tenets of Indian Culture.*- During all these centuries the people of India have evolved a culture and preserved it in an uninterrupted continuity. Its ideals are recognised not so much as superstitions but as living truths, capable of satisfying the spiritual needs of humanity. The figure of Siva, the great Yogi, has come down to us from nearly 3250 B.C. calling upon us to be kings not over others but over ourselves. Religion is not so much a revelation to be attained by faith as an effort to unveil the deepest layers of man's being and get into enduring contact with them. Belief and conduct, rites and ceremonies, authorities and dogma are subordinate to the art of conscious self-discovery and contact with the divine. Their function is to aid the growth of spirit by supplying supports for a task that is strictly personal. He who has seen the real is lifted above all narrowness and is released from a multitude of opinions. The name by which we call God and the rites by which we approach him do not matter much. Toleration in the positive sense of an active appreciation of other faiths has been the characteristic of India's religious life. Toleration is the homage which the finite mind pays to the inexhaustibility of the Infinite.

The process of self-discovery is not the result of intellectual analysis but of the attainment of a human integrity reached by a complete mastery of self. This view is humanistic in a deep sense, for it tells us that there is something more in man than is apparent in his ordinary consciousness, something which frames ideals and thoughts, a finer spiritual presence which makes him dissatisfied with mere earthy pursuits. This is our true being, which it is our business to discover and consciously become.

The soul that has found itself is no longer conscious of itself in its isolation. It is conscious rather of the universal self of which all individuals, races and nations are specific articulations. This secret solidarity of the human race cannot be abolished by the passing insanities of the world. Man belongs to the two orders of time and eternity. Life eternal consists in another kind of life in the midst of time. Human life is a rhythm with moments of contemplation and of action, of refreshment and restoration in the life of spirit, and of action with a sense of mission in the world. The test of authentic spiritual insight is an increased integration of the personal life, quickened sensibility, heightened power and universal love.

The greatness of a culture consists not in its permanence which is a relative term but in the qualities which it is able to contribute to human growth in the way in which it is able to mould the hidden drama of history which is a perpetual struggle between the external environment and the inner values of man. Its vital character is tested by its capacity to evolve without surrendering its master plan, to adapt new material which enters into it, which, though not strictly conformable to its central pattern, is yet not in conflict with it.

VIII.- History of India

56. *Study of the Past.*- No nation is healthy that parts company with its traditions. Social development is an organic process. The continuing influence of the past on the present cannot be ignored. Our art and literature, our law and history, belong to the main stream of our culture. Every Indian student should get to know the main outlines of the history of India, which is not a mere chronicle of dates and defeats, of follies and failures. He should know the lives of the heroes who express the spirit of our civilisation, the seers of the Vedas, the Buddha and Samkara, Asoka and Akbar. A habitual vision of greatness is the way to cultural growth. Those who have not greatness in themselves - they are the vast majority - should live in the company of the great. Culture is an attitude of mind, an inclination of the spirit and those who yearn for it wish to have

a vision of greatness, sit in the presence of nobility, see the highest reach and scope of the spirit of man.

57. *The Epics.*- If Indian people, in spite of widespread illiteracy, still retain certain traits of their culture, it is because their poetry and folklore, their Ramayana and Mahabharata, their art and architecture lifted the veil from the hidden beauty of the world.

The epics are rooted in India's culture but are not in any way fettered by it. They deal with problems of ethics and politics and are at the same time great literature. Their incidents and characters are known throughout India as also in Ceylon, South East Asia, Burma and Siam and the Indies. They are carved on the walls of Angkor and in the temples of Java and enacted in the shadow plays of Bali. They are not works of the past but through the translations in the several Indian languages are alive and active in the life of India. They are told in the homes, chanted in the temples and recited under the village tree. The grandmother tells them to the children, travelling minstrels present them in town and village, scholars interpret them, amateurs love to enact them. In these epics we see greatness in spiritual vision and moral teaching as well as in artistry of language and imaginative eloquence.

58. *Appeal of the Epics to the Youth.*- As these stories come out of the youth of the world, they appeal to all youth. When they are read imaginatively, with an appreciation of the living movement that lies behind them, we feel the intangible quality of our culture which eludes definition and a comradeship is established between the past and the present. The epic literature is a part of the tradition of our race.[1]

If our children are taught their language by means of these stories, they will have pleasure as well as illumination. They will catch something of their perfect sense of form as well as moral inspiration. There is a tendency to over-emphasise the significance of the rational argument. We cannot present ideals in abstract shape to the mass of mankind; only through concrete illustrations can the ordinary man apprehend them in any real sense. These epics speak to us of the rights of the weak, the lust for power and its nemesis, the problem of reconciliation and atonement for wrong-doing, the triumph of a great victory, the sufferings of the vanquished, the debasement of the victors. If we are to work for a society of human beings as high as human nature allows, we must start with a vision of great and good men. That should be the centre of all education.

Even in college classes a study of these epics, which are a part of our intellectual inheritance, will form what is now called education by great books. We cannot measure the effect on the young minds of these classics, their profound thought their sublime poetry, something absorbed rather than understood. Their study will broaden the horizons of our students, stabilise their emotions and make them less susceptible to the appeals of those who would like to take advantage of the bewilderment of the average man in the presence of violent changes he does not understand. When there is a great empty space in the souls of men, superstitions fill the void. Belief in absolute values seems to be a condition of life. One cannot too often recall the profound words of Pascal: 'It is the nature of man to believe and to love; if he has not the right objects for his belief and love, he will attach himself to wrong ones'. Great literature enriches the life of contemplation, provides enduring satisfaction and inclines us to the good life.

59. *Living Cultures.*- Cultures are alive and healthy only when they are creative, only when they are responding to some new challenge, physical, social or spiritual. When we rest on our oars we stagnate. The decadent periods of Indian

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Cf The words of Tagore: 'To know my country, one has to travel to that age, when she realised her soul and thus transcended her physical boundaries, when she revealed her being in a radiant magnanimity which illumined the eastern horizon, making her recognised as their own by those in alien shores who were awakened into a surprise of life; and not now when she has withdrawn herself into a narrow barrier of obscurity, into a miserly pride of exclusiveness, into a poverty of mind that dumbly revolves around itself, in an unmeaning repetition of a past that has lost its light, and has no message for the pilgrims of the future'.

culture were those when we idolised our past achievements and lost the spirit of adventure. When the sources of creativity dried up, culture became barren. Today we have to build a world of friendly, prosperous human beings. It can be done only by an extension of the spirit which has sustained India through all its vicissitudes. Sylvan Levi refers in vivid terms to the greatness of the Indian spirit in these words: 'From Persia to the Chinese Sea, from the icy regions of Siberia to the islands of Java and Borneo, from Oceania to Socotra, India has propagated her beliefs, her tales and her civilisation. She has left indelible imprints on one-fourth of the human race in the course of a long succession of centuries. She has the right to reclaim in universal history the rank that ignorance has refused her for a long time and to hold her place amongst the great nations summarising and symbolising the spirit of humanity'.

IX.- Fraternity: International

60. *World-mindedness and National Sentiments.*- Fraternity is to be reached at the national and the international levels.

A nation state is not the beginning and the end of political organisation, though it is an essential feature of modern life. The nationalist tradition has been strong because the colour of life, the fertility of mind, the originality in arts and adventures in ideas spring from the cultural individuality of peoples. It arises out of the natural feeling to believe that our country has a beauty all its own and of which it is intensely proud. We love the intimate familiar things of our own land, its hills and rivers, its plains and cities, its art and architecture, its native speech and faith. These things evoke echoes of earliest childhood and give us a warm feeling which we cannot acquire anywhere else. These existed long before there was such a thing as loyalty to a political state and will survive after they have ceased to have any political meaning.

61. *Cultural Co-operation.*- Great philosophical developments like great civilisations, seem often to come about through the clash of different cultures. The setting for the development of a world culture through the cross-fertilisation of cultures is ready. The world has become, through the speed of transportation and communication and economic interdependence, a single body. We must secure recognition and acceptance of the oneness of the world in the thinking of the people. Growth in mutual understanding arises from the recognition that the different cultures are dialects of the one language of the spirit.

If the democratic spirit is deep and strong, it will express itself in every phase of living, personal and social, economic and political, international and inter-religious. If the essence of democracy is an active regard for the rights and freedom of others, it cannot stop short at national, racial or religious boundaries. It must develop intercultural understanding and co-operation. A blind loyalty to one way of life is not a democratic attitude. It is unreasoning and self-righteous. If we accept the interdependence as well as the individuality of all men, we must develop a sensitivity to the hopes and fears, needs and emotions of human beings everywhere.

62. *Provincialism.*- Our thinking still bears marks of provincialism. We still tend to see other peoples with suspicion and distrust or dismiss them as inferior and backward because they are different from ourselves. To regard one's own country as the centre of the universe, to view all things solely in relationship to this fixed point is primitive and outmoded. The advice of Comenius, given three centuries before the Second World War, in 1643, has not lost its force: 'There is needed in this century', he said, 'an immediate remedy for the frenzy which has seized many men and is driving them in their madness to their mutual destruction. For we witness throughout the world disastrous and destructive flames of discords and wars devastating kingdoms and peoples with such persistence that all men seem to have conspired for their mutual ruin which will end only with the destruction of themselves and the universe. Nothing is, therefore, more necessary for the stability of the world, if it is not to perish completely, than some universal rededication of minds. Universal

harmony and peace must be secured for the whole human race. By peace and harmony, however, I mean not that external peace between rulers and peoples among themselves, but an internal peace of minds inspired by a system of ideas and feelings. If this could be attained the human race has a possession of great promise'.[1] We must learn to admit the possible worth of human values and ways of living which we ourselves do not accept. To a narrowly provincial mind cultural differences are irritating but to a liberal sensitive mind they are greatly rewarding.

63. *Larger Patriotism.*- World Union is not a threat to the deep loyalty we feel for our own country. The wider patriotism does not supersede but embraces the narrower patriotisms. To draw the various nations into a closer union, we need not sacrifice our national loyalties but acquire a new loyalty to the world community of which we are all members. Within united world there will be room for a wide diversity. World union will mean not the impoverishment but the enrichment of the world.

64. *UNESCO.*- The United Nations Educational Scientific and Cultural Organisation states in its preamble the declaration that wars begin in the minds of men and it is in the minds of men that the defences of peace must be constructed. However much the political and economic arrangements of governments may contribute to world-union, peace must be founded on the intellectual and moral solidarity of mankind. If nations are to survive in the world, where the spread of science and technology is acting as the solvent of cultures, nations cannot remain separated from one another by the barriers of prejudice and ignorance. The desire to know one another is not a matter of scientific curiosity but a political necessity. The institutional arrangements devised by the United Nations will have to be built upon an understanding among peoples, an understanding that embraces cultural differences, ethical values, religious faiths and patterns of sentiment and feeling. A world society of free men becomes possible when we become international-minded.

65. *Positive Peace.*- Peace is not the absence of armed conflict. It is the positive establishment of just and humane relationships among the peoples of the world, the development of mutual confidence among nations. Universities can make a significant contribution to world peace. As their very name implies, universities are suited for fostering an active appreciation and understanding of other cultures. In the world of letters, science, art, music, there have been no effective national boundaries. The citizens of that world are peoples of all nations for whom words and equations, images and sounds have meaning. Through the work of the universities we can widen the citizenship in this world republic of arts and science. This is the task of the UNESCO which attempts to give a soul and a conscience to the United Nations which are the body-politic of the new world. Modern man cannot regard himself as an Indian or a Chinese, or a European or an American. He is the heir to the world's culture.[2]

In different parts of the world man attempted to rise above mere humanity towards some higher kind of spiritual life. Here and there a few transfigured men and women achieved this goal of civilisation but we have not had a civilised society. It cannot be based on nationalism which is but a local interest in our present age. The truly civilised men are citizens of the world. Life and not merely the life of our race, our religion, or our nation, demands their devotion. The happiness of the human race is of more import to them than the

1. See I.L. Kandel: '*John Amos Comenius, Citizen of the World School and Society,*' April 1942.
2. Professor Arnold Toynbee observes: 'Our own descendants are not going to be just Western, like ourselves. They are going to be heirs of Confucius and Lao-Tse as well as Socrates, Plato and Plotinus; heirs of Gautama Buddha as well as Deutero-Isaiah and Jesus Christ, heirs of Zarathustra and Mohammad as well as Elizan and Elisha and Peter and Paul, heirs of Samkara and Ramanuja as well as Clement and Origen; heirs of the Cappadocian Fathers of the Orthodox Church as well as our African Augustine and our Umbrian Benedict, heirs of Khaldun as well as Bossuet and heirs (if still wall owing, in the Serbonian Bog of politics) of Lenin and Gandhi and Sun Yat Sen as well as Cromwell and George Washington and Mazzini'.

triumph of their nation.

66. *World Citizenship.*- A programme of education for world citizenship should be made a part of every person's general education. Universities must make provision for the study of the different aspects of international affairs, such as the nature and development of other civilisations and cultures, nationalism in its relation to internationalism, tensions leading to wars, structure and operation of the various world organisations designed to further international security and the peaceful solution of international problems.

67. *Summary.*- Democracy depends for its very life on a high standard of general, vocational and professional education. Dissemination of learning, incessant search for new knowledge, unceasing effort to plumb the meaning of life, provision for professional education to satisfy the occupational needs of our society are the vital tasks of higher education.

There must be a sufficient unity of purpose in all this diversity to produce a (comity) of values and ideas among educated men. Our policies and programmes must be brought into line with the social purposes which we profess to serve. We may use various institutional forms as time and circumstances may require but we must be steadfastly loyal to the abiding elements of respect for human personality, freedom of belief and expression for all citizens, a deep obligation to promote human well-being, faith in reason and humanity.

The greatness of a country does not depend on the extent of its territory, the length of its communications or the amount of its wealth, not even on widespread education or equitable distribution of wealth, important as all these things are. If we wish to bring about a savage upheaval in our society, a *raksasa raj*, all that we need to do is to give vocational and technical education and starve the spirit. We will have a number of scientists without conscience, technicians without taste who find a void within themselves, a moral vacuum and a desperate need to substitute something, anything, for their lost endeavour and purpose. Society will then get what it deserves. If we claim to be civilised, we must develop thought for the poor and the suffering, chivalrous regard and respect for women, faith in human brotherhood regardless of race or colour, nation or religion, love of peace and freedom, abhorrence of cruelty and ceaseless devotion to the claims of justice.

We cannot preserve real freedom unless we preserve the values of democracy, justice and liberty, equality and fraternity. It is the ideal towards which we should work though we may be modest in planning our hopes as to the results which in the near future are likely to be achieved. 'Utopias are sweet dreams', wrote Kant, 'but to strive relentlessly toward them is the duty of the citizen and of the statesman as well'. Universities must stand for these ideal causes which can never be lost so long as men seek wisdom and follow righteousness.

Our Constitution lays down the general purposes of our State. If we are to make the understanding and vision of our farsighted and sensitive leaders who framed the Constitution the common possession of all our people, our universities must educate on the right lines and provide proper facilities for educating a larger number of people. If we do not have the necessary intelligence and ability to work out these purposes, we must get them through the universities. What we need is the awareness of the urgency of the task, the will and the courage to tackle it and a whole-hearted commitment of this ancient and yet new people to its successful performance.

REPORT OF THE EDUCATION COMMISSION 1964-66

CHAPTER XI
HIGHER EDUCATION: OBJECTIVES AND IMPROVEMENT

OBJECTIVES OF UNIVERSITIES

11.01. Pandit Jawaharlal Nehru, in his convocation address to the University of Allahabad in 1947, thus summed up the basic objectives of the university and its role in national life: 'A university stands for humanism, for tolerance, for reason, for the adventure of ideas and for the search of truth. It stands for the onward march of the human race towards even higher objectives. If the universities discharge their duties adequately, then it is well with the nation and the people'. These great words highlight the basic truth that universities have a crucial part to play in the life, welfare and strength of a nation. They can, however, fill this role only if they owe uncompromising loyalty to certain fundamental values of life. They are essentially a community of teachers and students where, in some way, all learn from one another or, at any rate, strive to do so. Their principal object is to deepen man's understanding of the universe and of himself - in body, mind and spirit, to disseminate this understanding throughout society and to apply it in the service of mankind. They are the dwelling places of ideas and idealism, and expect high standards of conduct and integrity from all their members. Theirs is the pursuit of truth and excellence in all its diversity - a pursuit which needs, above all, courage and fearlessness. Great universities and timid people go ill together.

11.02. While the fundamental values to which the universities owe their allegiance are largely unrelated to time or circumstance, their functions change from time to time. In the rapidly changing contemporary world, universities are undergoing profound changes in their scope, functions and organisation and are in a process of rapid evolution. Their tasks are no longer confined to the two traditional functions of teaching and advancement of knowledge. They are assuming new functions and the older ones are increasing in range, depth and complexity. In broad terms, the functions of the universities in the modern world may be said to be:

- to seek and cultivate new knowledge, to engage vigorously and fearlessly in the pursuit of truth and to interpret old knowledge and beliefs in the light of new needs and discoveries;
- to provide the right kind of leadership in all walks of life, to identify gifted youth and help them develop their potential to the full by cultivating physical fitness, developing the powers of the mind and cultivating right interests, attitudes and moral and intellectual values;
- to provide society with competent men and women trained in agriculture, arts, medicine, science and technology and various other

professions, who will also be cultivated individuals, imbued with a sense of social purpose;
- to strive to promote equality and social justice and to reduce social and cultural differences through diffusion of education; and
- to foster in the teachers and students, and through them in society generally, the attitudes and values needed for developing the 'good life' in individuals and society.

UNIVERSITIES IN INDIA

11.03. **Historical Development.** The ancient universities in India were leading centres of learning in the contemporary world and attracted scholars and students from other countries. So did some famous centres of Islamic learning in the mediaeval period. But unfortunately these traditions did not survive and the modern universities were established, more than a hundred years ago, as exotic institutions created in imitation of the London University as it then was. The earliest of these were the Universities of Bombay, Calcutta and Madras - all founded in 1857 - and the University of Allahabad, founded in 1887. They all began as purely examining bodies and continued to be so till the opening of the present century when the Indian Universities Commission was appointed (1902) and the Indian Universities Act was passed (1904). As Lord Curzon observed: 'How different is India! Here the university has no corporate existence in the same (i.e., as in Oxford and Cambridge) sense of the term; it is not a collection of buildings, it is scarcely even a site. It is a body that controls courses of study and sets examination papers to the pupils of affiliated colleges. They are not part of it. They are frequently not in the same city, sometimes not in the same province'.[1] The Government Resolution on Educational Policy (1913) accepted the need for establishing more universities. It said, 'The day is probably far distant when India will be able to dispense altogether with the affiliating universities. But it is necessary to restrict the area over which the affiliating universities have control by securing, in the first instance, a separate university for each of the leading provinces in India and secondly to create new local teaching and residential universities within each of the provinces in harmony with the best modern opinion as to the right road to educational efficiency'. As a result of this policy, six new universities came into existence between 1913 and 1921. A teaching, unitary and largely residential university was established at Lucknow (1920). Recognition was also given to the efforts made by eminent Indians to break new ground in creating teaching universities. For instance, the Banares Hindu University, founded by Pandit Madan Mohan Malaviya, was incorporated in 1916 and the Aligarh Muslim University, founded by Sir Syed Ahmed Khan, was incorporated in 1920. In the meanwhile, two princely States also established universities for their areas, Mysore in 1916 and Osmania in 1918, the latter making history by the adoption of Urdu as the medium of eduction.[2] After 1921, when education was transferred to Indian control, the development of universities was much faster and during the next 26 years, nine more universities were established. After the attainment of independence, there has been a much more rapid expansion in the field of higher education. The number of universities has increased from 19 to 64. In addition, nine institutions have been 'deemed to be universities' under Section 3 of the UGC Act. The details about these will be found in the note at the end of this chapter (not printed here). But even this expansion has not fulfilled the needs of the situation.

11.04. **Special Responsibilities.** The general objectives of university education given earlier apply equally to Indian universities. They have, in addition, some special responsibilities in the present state of our social and educational development. First and foremost, they must learn to strive to serve as the 'conscience of the nation', as assessors of the national way of life, and this responsibility becomes all the greater in the absence of an enlightened public opinion. There are so many new pulls and forces (as well as old ones) operating in our national life - as, indeed, in the life of man as a whole - that its balance has

1. *Lord Curzon in India*, Vol. II, p. 35.
2. The S.N.D.T. Indian Women's University was founded by Maharshi Annasahib Karve in 1916 and it used Marathi and Gujarati as the media of education. It was, however, incorporated much later in 1949.

become very precarious; and there is a danger of losing our bearings unless universities are able to play this role adequately by involving themselves deeply in the study and evaluation of the social process. Such involvement is vital since the universities are pre-eminently the forum for a critical assessment of society - sympathetic, objective, unafraid - whose partiality and motives cannot be suspected. So far, the Indian universities have not performed this function adequately. This may be due either to apathy or failure to recognize the importance of this role or to the traditional belief that scholarship and academic excellence thrive only in isolation from the clamour of the multitude. In some cases, an apprehension of the displeasure of the authorities or influential vested interests, which may not take kindly to their opinions and criticisms, may also have worked as a deterrent. To discharge this function properly, the university teachers should cultivate not only intellectual integrity, courage and scientific knowledge but also win public confidence. Unless they have the high ambition to make an impact on the quality of social thinking and endeavour, they will not be able to help in moulding a new society which will not merely cherish high values but actually provide opportunities for living by them. For this purpose, it is necessary, as a first step, to develop the universities themselves into communities where such values are prized and practised.

11.05. From this point of view, the universities must learn to encourage individuality, variety and dissent, within a climate of tolerance. Dissent there is, even now, but usually of a superficial or sensational kind of which many manifestations can be seen in India and abroad. The general tendency, however, is to produce the 'organisation man' who is afraid to challenge the accepted pattern of social behaviour and social institutions at the intellectual level and who is too often anxious to worm himself into the good graces of the people who count so that he may be able to 'get on' in life. A university should have no truck with this type of mind. Its business is not primarily to give society what it *wants* but what it *needs* and obviously they are not always identical. It is not a 'community service station', passively responding to popular demands and thereby endangering its intellectual integrity. Nor is it an ivory tower into which students and teachers can withdraw for a time for teaching or research, accepting no responsibility for the improvement of society. It has to maintain an ambivalent position, balancing itself carefully between commitment and detachment - commitment in action, detachment in thought. It must always be in a constant state of creative *tension* knowing where to interpret, where to criticise, where to pioneer and where to support traditional values. It can neither identify itself with the existing environment and institutions, nor yield uncritically to every kind of change, every passing pressure. This would be to surrender its basic integrity of outlook and judgement. It must ever stand ready to assimilate the new that is healthy and to eschew the old that is diseased. Such an attitude is challenging and can be unpleasant, for it needs courage to reject unduly complacent images of one's individual or national life and overcome the many emotional blocks in the mind. The university can play this role adequately if it has faith in the power of the mind and encourage, not only in its students but also in the general public, so far as possible, free and disinterested thinking which can challenge vested interests and established ways. This is the only way which holds out some hope that man will be able to live wisely and intelligently.

11.06. Another special responsibility of the Indian universities is to develop programmes of adult education in a big way and, to that end, evolve a wide-spread network of part-time and correspondence courses. The universities have to provide these courses in all their faculties, not only as extra-mural preparation for their examinations, but also as programmes of in-service education of professional workers in all walks of life. General adult education programmes are also needed to create a unity of outlook and faith between the masses and the intelligentsia. An extension programme would include provision for training the intermediate leadership groups which, in the circumstances of today, may not be in a position to enter the university but on whose understanding of, and identification with, national problems, the future of the country largely depends. Above all, it will

require that universities function as agencies for a deep and careful study of local, regional and national problems, to which Government, public and private organisations and industry, may turn for advice and guidance.

11.07. Yet another responsibility of the Indian universities in the present context is to strive to assist the schools in their attempts at qualitative self-improvement. For this purpose, universities should conduct experimental schools, run advanced courses for teachers in various school subjects, assume greater responsibility for the training of teachers at all levels, organise summer institutes for their in-service education, assist in the search for and development of talent, and develop new curricula, textbooks and teaching materials. These programmes of extension and school improvement have been discussed in detail elsewhere.[1]

11.08. Perhaps the most onerous responsibility which the Indian universities now have is to shake off the heavy load of their early tradition, which gives a dominant place to examinations, to improve standards all-round and by a symbiotic development of teaching and research, to create at least a few centres which would be comparable to those of their type in any other part of the world. This alone would help to bring back the 'centre of gravity' of Indian academic life within the country itself. We can do no better than to quote Sir Eric Ashby on this subject:

Looking at Indian Universities a century after their foundation, one cannot but help feel that they have failed to adapt themselves sufficiently to the vast and unique opportunities which surround them; they seem to have lost enthusiasm and initiative under the crushing problems which have beset them. Despite three major commissions, they have not been able to extricate themselves from their own brief history. With a few notable exceptions, they remain examining bodies and their students naturally regard success in examinations as the sole end of an under-graduate career. As universities multiply in number, their academic standards - relative to those elsewhere- do not improve. And something even more serious than this happens: the universities remain alien implantations, not integrated into the New India as the writers of the Radhakrishnan Report (in its brilliant second chapter) hoped they might be. This is one reason why, to the observer from outside, the Indian intellectual remains a culturally displaced person, nostalgically treasuring his threads of communication with England. Notwithstanding the fact that the leadership of modern India is in the hands of statesmen more intellectual than perhaps are to be found in any other nation, there is in India (as Edward Shils recently wrote) 'no intellectual community'. This is due in part to the lack of a hierarchy of cultural institutions in the country; and this in turn is related to the fact that the universities have responded too weakly to the challenge of Asiatic culture.

This failure of the university to meet the challenge of Indian society has many complex causes, but among the causes are undoubtedly the decisions made between 1835 and 1854. To exclude from university studies for half a century the whole of oriental learning and religion and to purvey to Hindus and Moslems a history and philosophy whose roots lie exclusively in the Mediterranean and in Christianity; to communicate the examinable skeleton of European civilization without ensuring that the values and standards which give flesh to these bones are communicated too; to set up the external paraphernalia of a university without the warmth and fellowship of academic society; these are the handicaps against which Indian universities are still struggling and which prevent the university from becoming the centre and focus of India's intellectual life.[2]

11.09. The responsibilities we have discussed so far are those which are specially related to higher education and they should be read together with the general objectives of education stated earlier[3] to which all stages of education must contribute in some measure. For instance, the

1. Chapters VIII to X and XVII.
2. *The Bulletin of International Association of Universities*, November, 1962.
3. Chapter I.

Indian universities must foster national consciousness. They should ensure 'that every student who passes out of an Indian university takes with him some understanding of India's cultural heritage, its past achievements and triumphs in the field of art, philosophy, science and so on. He should, in other words, know what he is heir to. This could, perhaps, best be done at the first degree stage where such a study could form a part of a programme of liberal education. It is noteworthy, in this connection, that all university students in America have to take a course in western civilization.[1]

11.10. We are convinced that a keen awareness of these responsibilities of the universities on the part of all university teachers and students is indispensable to the renovation of higher education we have in view. If we may say so, these are a challenge to the conscience of the university men and women and we trust it will be taken up in all seriousness.

11.11. **Programmes of Development.** To realise these ambitious objectives is no easy task. To do so in all our universities would need an order of investment in physical and monetary terms which is now beyond our reach and a large number of highly qualified and dedicated teachers who are not available. What is necessary, therefore, is a well-conceived and a comprehensive plan spread over the next twenty years and its vigorous and sustained implementation. This plan would include, amongst others, the following programmes which have high priority:

- —a radical improvement in the quality and standards of higher education and research;
- —expansion of higher education to meet the manpower needs of national development and, to some extent, the rising social ambitions and expectations of the people; and
- —improvement of university organisation and administration.

We shall discuss these problems seriatim in this and the next two chapters.

SOME PROBLEMS TO BE FACED

11.12. There is a general feeling in India that the situation in higher education is unsatisfactory and even alarming in some ways, that the average standards have been falling and that rapid expansion has resulted in lowering quality. The examination results, the reports of Public Service Commissions, the views of employers and the assessment of teachers themselves, the results of research done - all seem to support this conclusion. In view of the difficulties inherent in the objective measurement of standards over a given period and as no serious attempt to measure standards has been undertaken so far, it is difficult to say definitely to what extent and in what respects, they have been falling. What is, however, apparent and really matters is that over a large area of education, the content and quality are inadequate for our present needs and future requirements and compare unfavourably with the average standards in other educationally advanced countries. What is worse, the large gap between the standards in our country and those in the advanced countries is widening rapidly. Many of our educationists and public men, however, have not fully realised how serious are the actual conditions, academic and physical, that obtain in the colleges and universities. Even those who are broadly aware of the situation, fail to notice its poignancy because they have become used to such conditions. It would, therefore, be useful to describe them briefly.

11.13. The existing situation in higher education during the academic year broadly alternates between slackness and strain - slackness during the session, strain at the time of examinations. In many of the weaker colleges and universities, a majority of teachers teach mechanically and listlessly. The subjects in which they lecture do not often involve their intellectual passion. They do not usually have a part in the formulation of the syllabus which they are required to teach, nor do they make - with a few bright exceptions - experiments in methods of teaching. There is little enthusiasm for learning or discovery of new truths because research is not considered an integral part of their duties and

1. *Report on Standards of University Education*, UGC, New Delhi, 1955, pp. 4-7.

whatever research is done is usually of unconvincing quality. In the absence of a 'research impregnated' atmosphere, even the intellectually ambitious younger members of the staff are soon caught up in the general atmosphere of indifference or cynicism. A large proportion of teachers suffer from financial worries - particularly in colleges where grades are low - and are often unable to buy any books or journals. Even the physical conditions of work discourage serious, undistracted study or intellectual dialogue with their colleagues. Usually, there is one staff common room which is not large enough even to accommodate all the members of the faculty. In some of the institutions, there are additional factors which are uncongenial for the development of intellectual vitality. The hierarchical concentration of authority within the departments and colleges, the atmosphere of distrust between senior and junior teachers, the cynicism about administrative authorities, the unseemly conflicts about offices and positions and the attitude of envy towards persons of superior attainments - all have contributed to the deadening of the spirit of intellectual curiosity and adventure. Some of the members are diverted from intellectual concerns into intrigue and conflict over the small administrative or financial prizes afforded by Indian academic life. On top of all this, the bureaucratic structure within which research has to be done, the dependence on the approval of indifferent superiors, the elaborate procedures through which equipment made abroad has to be obtained, the difficulties in the maintenance and repair of equipment once obtained and in establishing contact with researchers working on related subjects, have all had a depressing effect on the morale of teachers and on the quality and quantity of their research output.

11.14. The situation with regard to the students is no better. Many now come from comparatively or entirely uneducated homes and are ill-prepared at the secondary level to undertake genuine university work; they have little experience of independent study; their curiosity is unquickened and learning for them is mainly a matter of mechanical memorization. There is, as a rule, little discussion of intellectual matters with their teachers or fellow students; their main duty is considered to be to attend uninteresting lectures usually given in a language which they understand inadequately. When the medium is an Indian language, there is dearth of suitable textbooks and supplementary literature necessary to achieve competence in their subjects. Many of them cannot be expected to read textbooks in English because it has not become for them the language of the library. The capacities of the better students are not fully stretched by curricular offerings or the stimulus which inspiring teachers could provide. In addition, a large majority of students are beset with financial worries which make concentration on academic work difficult.

11.15. This may appear an exaggerated picture. But it is not. If anything, it errs on the side of underestimation. It is, of course, true that there are bright exceptions to this dark picture which one must gratefully acknowledge. But taken all in all, the ideal of academic excellence is confined to a minority of teachers and students who have to keep it alive against the downward pressure of discouraging circumstances.

11.16. This situation has been in existence for a long time. What is new is the magnitude of the problems and their accentuation as a result of the extraordinarily rapid expansion of higher education and the development of new expectations in the post-independence era. In the past, the need for a better, more effective education was not felt so keenly because, so long as India did not supply the higher cadres of its own ruling class - or did so to a limited extent - the efficiency and effectiveness of its intelligentsia was of secondary importance from the point of view of tasks it was expected to perform. Now that the responsibility for the progress of the country squarely rests on us we cannot afford to plead any alibis. The quality of education, therefore, becomes of crucial significance. As the number of jobs and positions to be filled with highly trained persons increases, the discrepancy between need and the capacity to meet the need is widening. It is obvious that, if higher education is not radically improved, our administration and technical progress, our intellectual standards and social advance will all be most seriously handicapped.

ESTABLISHMENT OF MAJOR UNIVERSITIES

11.17. **The Proposal.** While the need to improve higher education is widely recognized, difficulties begin when one tries to discuss the remedies. The most common suggestions put forward in this regard are usually just the reverse of the defects described above. They try to bring the needed reforms into being through administrative measures, without taking into account the limited resources of finance and personnel available for such reforms or the administrative and political inhibitions operating against their realization. Indeed, it might be said without much exaggeration that many of the proposed remedies pre-suppose the existence of conditions which, if they really existed, would have made the reforms unnecessary! It is, therefore, imperative that we should adopt some new plan of action which would be both realistic and effective.

11.18. The new strategy that we propose has two important aspects. The first is the need to concentrate scarce human resources and not to scatter them over too wide an area. Even at present, our own universities and colleges produce a small number of outstanding Indian scientists and scholars who, if they were to enter upon an academic career under the right conditions, would be able to make a great contribution to the improvement of our academic standards. But, apart from the fact that they are too few compared to our inherent national capacity and our population, they are unfortunately scattered thinly and at random over the entire system of higher education and under unfavourable conditions; the burden of a heavy teaching load; large classes of unchallenging students; apathetic or intellectually unambitious colleagues; and an administrative system which intentionally or unintentionally does not encourage and, in some cases, even actively discourages high intellectual vitality and motivation. The able persons, who could have provided the required leavening are thus rendered ineffectual when they are so scattered and what is worse, their own creative powers decay under such conditions. On the other hand, experience has shown that the best results follow where a goodly number of persons of high potentialities come together in face-to-face intellectual communities and, by their constant dialogue and communication, stimulate each other to put forth their best creative efforts. If there is high quality of personnel, it makes all the difference whether people work in relative isolation resulting eventually in stagnation or in vigorous self-activating groups.

11.19. The most important reform that we envisage is the development of five or six of what we may call 'major' universities where conditions may be provided, both as to staff and students as well as to the necessary equipment and atmosphere, to make first class postgraduate work and research possible. The standards of these major universities should be comparable to the best institutions of their type in any part of the world so that really gifted and promising students need not normally have to go abroad for receiving postgraduate or research training. We consider that the development of a few of the most promising universities in India (including, we hope one of the IITs and one agricultural university) to such a standard within the next ten years is definitely practicable and should be taken up as a matter of high priority.

11.20. Why do we make this proposal and regard it as crucial at this stage? There would be several advantages in creating such universities. In the first place, they would make their existence felt by their research and by the high standards of training which they would provide for their students. They would also supply a goodly portion of the outstanding personnel needed for the staffs of universities, colleges and other institutions of higher education. In this way, their graduates may be expected to infuse into them the standards acquired in their own universities and to spread the ethos of genuine intellectual activity and devotion into the institutions where they are employed. It is unfortunate that, at present there are hardly any such universities in the country which perform this vital and catalytic role in the Indian academic world.

11.21. One important advantage of these universities is that we would be able to provide, within the country itself, first-rate postgraduate education comparable to that in educationally advanced nations. The scholars and scientists trained in these universities will feel much more akin to their own centres of creativity. The

importance assigned to foreign degrees whether they are of high or average or poor quality, will be considerably diminished and those who have not 'returned' from abroad would not feel at a disadvantage. We realise that it will still be necessary for Indian scientists and scholars to go abroad for purposes of further training, research or for consultation with their foreign colleagues. We have made certain proposals in the scheme of scholarships for this purpose. But instead of going abroad to receive first-rate post-graduate education,[1] study abroad will primarily aim at bringing first class Indian scholars to work with distinguished scholars of international reputation.

11.22. This concept of providing first-rate postgraduate education to talented young persons within the country received strong support from Prof. F. Seitz, President of the U.S. Academy of Sciences, and Prof. P.M.S. Blackett (President of the Royal Society). It would be worthwhile to quote from the convocation address to the University of Leeds (England) delivered by Prof. Blackett in 1964. His remarks may or may not apply to some developing countries, they are certainly relevant to Indian conditions:

There are three reasons why it seems to be exceedingly important that all developing countries should attempt as soon as possible to create facilities in the major subjects for first class higher degree work, so that normally a student takes his higher degree in his own country. First, the present widespread practice of sending most bright students overseas to take a higher degree makes it difficult to build up creative research schools in the universities because an adequate supply of research students is the life-blood of a creative university postgraduate department. Following this it will be difficult to keep good staff unless they have an adequate number of postgraduate students. Second, the loss of trained people to the developing countries by overseas students not returning to their homeland after taking their higher degrees abroad, will be reduced. Third, it will save much foreign exchange. A three-year Ph.D. course will cost some £ 3,000, taking fees, maintenance and fares into consideration, and this is a direct drain on foreign exchange whether the money is provided by the State or privately.

11.23. In addition, these universities would help Indian academic life to come into its own. At present, the 'centre of gravity' of Indian academic life is largely outside India. That is to say, our scholars and scientists working in fields which are internationally cultivated still tend to look outside India for judgement of their work, for intellectual models of the problems which they study, for the books they read and for their forum of appreciation and approval. This is damaging to our academic life in a number of ways. First, Indian problems are not seen in their concreteness and particularly and, as a result, techniques and theories are not adapted to the Indian situation. Secondly, Indian academics suffer from a certain lack of self-esteem and lose the confidence and courage necessary to try out new ways of attacking intellectual problems. When these major universities, comparable to the best in any part of the world, have come into existence, we venture to hope that our scientists and scholars, instead of having to look to Oxford, Cambridge or Harvard or Moscow or Paris for inspiration, would be able to look to centres within our own country for similar stimulation and guidance. This would be a change of the greatest significance. Once the stimulus has become 'Indianized', it could act much more continuously and be less dependent on costly and infrequent personal contacts. Also by becoming naturalized in the Indian environment, it will be directed more confidently towards problems to which our scientists and scholars could give themselves without feeling dislocated from their milieu.

11.24. This should not be taken to imply that we wish to promote any intellectual isolation or chauvinism - that will be the road to intellectual anarchy and disaster. No country, however outstanding its scientific and scholarly accomplishments, can be entirely self-sufficient.

1. According to the latest available information, 15,393 Indian students and trainees were studying in foreign countries on 1-1-64. Of these, 1,353 students were studying arts, 1,652 were studying science, 4,191 engineering and technology, and 1,402 medicine and veterinary science. The number in the USA was 7,153, in West Germany 4,000, in the U.K. 2,798, in Canada 418, in France 123 and in the USSR 76.

But there is a great difference between participation in the world intellectual community simply from the periphery, as a reproducer or a marginal contributor to what has been discovered or invented elsewhere, and participating as an equal in a process of creating, giving and receiving. We should strive for the latter position.

11.25. A possible objection to these proposals may be that what is proposed here is not quite democratic, that it seeks to institute a system of elite education by favouring certain institutions and impoverishing others. We recognize that our approach does involve at this stage a certain differentiation between the universities. This is, however, not only inevitable in an economy of scarcity but is also the only sure and practicable way to benefit all ultimately in the shortest time possible. Moreover, we must recognize that pursuit of excellence implies and requires a discriminatory approach; and that to provide equal resources to all irrespective of the quality of their performance and potentiality for growth merely promotes mediocrity. We are trying to establish a democratic social order in our country and obviously a democracy cannot flourish unless it has at its disposal the services of a highly trained and powerfully motivated educated class. Unless a system can be devised which will produce such persons in much larger numbers than is being done at present, every aspect of the country's development will be prejudicially affected. In fact, we may go further and say that there is always need for elite from Chicago, Harvard and Columbia. The upper stratum of American higher education was developed in the first quarter of the present century, largely by the Ph.Ds from Chicago, Harvard and Columbia. The development of British higher education in the first half of the present century was largely due to the fact that, until recently, the staff of the new universities in most subjects was supplied by the universities of Oxford and Cambridge which, by 1900, had taken their place as distinguished centres of scholarship and high standards of teaching.

11.26. **Implementation.** We must now examine how these major universities can be developed within the relatively short period of about a decade. The idea of establishing new universities for the purpose should be ruled out (as) it would involve a large and avoidable capital expenditure and delay the entire process of the improvement of higher education. The first step in the programme would, therefore, be for the UGC to select as soon as possible, from amongst the existing universities, about six universities (including one of the IITs and one agricultural university) for development as major universities.

11.27. A university selected for such development will have to do several things. It must make an effort to recruit students sufficiently qualified and endowed mentally to benefit from the superior training to be given. It must get together as quickly as possible an intellectually distinguished group of teachers who will be able to provide the requisite training and make valuable research contributions. And it should make an effort to provide adequate facilities and satisfactory conditions of work. We shall examine these three essential conditions briefly.

11.28. **Recruitment of Students.** At present our students tend, by and large, to be recruited locally or on a State-wise basis and, except for a few all-India institutions, the small number of students of superior capacity are usually swamped by the large numbers of those who are not well prepared for intensive higher education. In such a situation, many of the good students lose their motivation for intellectual work and neither fulfil their own potentialities nor stimulate one another adequately as they normally should in a good institution. They are not numerous and powerful enough to offset the downward drag of the uninterested or apathetic students, and instead of pulling the others upward, they themselves tend to become submerged in the mass. A major university of the kind we contemplate should have a 'critical mass' of students of outstanding capacity and promise. This is possible only if they are recruited on an all-India basis. We, therefore, recommend that a national scholarship scheme combined with a placement programme should be organised - the scholarships being tenable only

at the major universities or at others where well developed centres of advanced study (to be discussed later) exist or in their approved constituent or affiliated colleges. The amount of these scholarships should cover all costs of university education, e.g., tuition and other university fees, maintenance, and allowance for textbooks and a small allowance for personal expenses.

11.29. Each major university should be assigned a number of scholarships for the undergraduate stage which will provide it with enough talented students for its postgraduate classes. The actual number may be decided for each major university by the UGC from year to year, in view of all the factors involved. Of these scholarships, about half should be from outside the area of the university and half for students from inside its area. To avoid loss of time, a beginning may be made by making use of the existing examinations conducted by the universities and the State Boards of Secondary Education supplemented by other data as recommended elsewhere. As far as possible, students should be selected from all the States and Union Territories. Each university may, if it considers it necessary, administer a special test for the purpose or all the major universities may jointly organise a national test as the IITs are doing at present. The scholarships must be continued at the postgraduate level where smaller numbers are involved but the difficult problem of adjusting the standards of different universities has to be tackled.

11.30. **Recruitment of Staff.** In building up a major university, it will be necessary to conduct an energetic search throughout the country for outstanding and promising young persons for its teaching and research staff. We recommend that each department or faculty should have a specially appointed personnel advisory committee, which would work in close collaboration with the appointing authorities of the university, to find faculty members in fields in which it is already distinguished or in which it seeks distinction, It should have, as a major responsibility, the search for the most outstanding and promising Ph.Ds. M.As. and M.Sc's. and even brilliant recent graduates. The great merit of such committees lies in their informality and freedom from rigid procedures and this should be fully ensured. They should scrutinize the lists of Indians abroad and the candidates available within the country and the search for staff, instead of being limited to the State or the region, should be made nation-wide and, in a sense, world-wide. They should actively seek such candidates for appointments and, wherever necessary, offer them advance increments. What is even more important, they should be assured of research opportunities, opportunities for study leave and the possibility of achieving professional excellence. There should be room for flexibility in the appointments and promotions. The UGC should place at the disposal of each university a contingency fund which may be used to provide more attractive salaries to persons of exceptional promise and performance. However, the tendency to use it simply to reward or promote persons who have passed the peak of their creative powers should be strongly resisted. Moreover, it should be open to a university, on the advice of the Head, to reduce the number of posts for lecturers or readers and to use the money so saved to appoint additional professors where this is justified. Care should also be taken not to appoint men or an emergency basis. For instance, the appointing authorities should never say: 'This post *has* to be filled; and, we hope, this person will be good enough'. It is better to leave a post unfilled or to make some temporary arrangements than to fill it with a person whose main qualification is availability. It is only 'inspired men - found, rewarded and planted firmly in the classroom - who can and undoubtedly will give ..... our (universities and) colleges a new lustre, built on the mysterious moments when mind confronts mind and a student suddenly senses the power and richness of his own intellect'.[1]

11.31. **Centres of Advanced Study.** Partly as a preparation and partly as a consequence of the establishment of these major universities, it is necessary to strengthen and expand the UGC programme of the establishment of centres of advanced study. One way of doing this will be to

1. *Times Educational Supplement.*

establish 'clusters' of advanced centres in some of the universities as has been done, for instance, in Delhi University. They will add strength to, and enrich, one another and be specially helpful in promoting inter-disciplinary research. In other cases, a cluster of centres may not be possible and we may have to begin with a single centre. While these centres will be mainly concerned with postgraduate teaching and research, every care should be taken to see that they do not become isolated from the rest of the university and do not develop a kind of academic snobbishness towards other departments or undergraduate teaching. In fact, they are essentially meant to help in raising the standard of the departments and the university as a whole. We would recommend the establishment of about fifty such centres, including some in modern Indian languages over the next five to ten years. At least one of them should concentrate on developing an inter-disciplinary approach to education. The other areas which are not covered in the scheme at present are agriculture, engineering, medicine and modern Indian languages. We recommend that the scheme should be extended to these also.

11.32. **Provision of Facilities.** We need hardly emphasize that it will be necessary to provide adequate facilities and satisfactory conditions of work for this critical mass of gifted students and teachers assembled in the major universities. The programme need not necessarily be very costly, especially if the emphasis is on austerity and utility rather than on ostentation and luxury. In fact, we look forward to the major universities giving a lead to reducing expenditure on buildings and equipment.

11.33. **Some General Suggestions.** We would like to make the following suggestions regarding the selection, periodical review and management of the centres of advanced study:

(1) The administration of a centre, subject to the overall supervision of the university's Executive Council, should be the responsibility of its director assisted by a small but representative committee of his colleagues. This should consist of all the professors in the department and a number of readers and lecturers elected by the staff. We suggest that it might meet at least three times a year to discuss the academic programme of the department and related matters, its proceedings being circulated to the faculty of the Academic Council. In fact, the setting up of such departmental committees would be useful in all departments, whether it has a centre of advanced study or not.

(2) A centre once established should not be taken to mean that it will continue to be there irrespective of its work and performance. The privilege of being a centre of advanced study must, as it were, be continually earned and deserved.

(3) The original selection of a university department as a centre should be made on the basis of the quality and extent of work already done by it, its reputation for good teaching, its contribution to research and its potentiality for further development. The process of selection should be so devised that it will win the confidence of the universities and the academic community generally.

(4) Each centre of advanced study should have, say, once in three to five years, a visiting committee, consisting of outstanding Indian and, where possible and necessary, foreign experts who will conduct a review and appraisal of the accomplishments of the centre. These visiting committees should not include members of the centre under review and they must not hesitate to be outspokenly critical where such criticism is called for. Above all, they must concentrate on offering positive suggestions for the improvement of teaching and research within the centre.

11.34. **Extension of Excellence to other Departments.** Steps should be taken to ensure that the standards of the centres of advanced study, whether in the major or other universities, are extended, as early as possible, to other departments and to affiliated colleges. For this purpose, we make the following suggestions:

(1) The centres within a university should function in close collaboration with other centres and departments which are not centres of advanced study and measures should be adopted to involve the entire staff of the university in functioning as an intellectually effective community.

(2) The major universities should constantly strive to enlarge the area of their excellence. For this purpose, they might be given a grant in proportion to the number of centres they already possess, to be used for the purpose of raising other departments within the university to their level. Such grants, given in the first instance, for five years for what we might call 'aspirant centres' should be used for the recruitment of adequate staff and the acquisition of equipment and books. They may be renewed for a second five year period if the progress is satisfactory.

(3) Centres for advanced study should seek to bring the relevant teachers of their affiliated colleges into closer contact with their work. We suggest that the better qualified and more interested teachers of the affiliated colleges should be encouraged to attend staff and postgraduate seminars of the centre.[1] Opportunities for research within the framework of the centre should be provided for college teachers if they are judged to be qualified for the purpose and their research schemes are approved. They should have the privilege of using the facilities of the centre to supplement the resources of their colleges. Study leave should be permitted for this purpose and, where the college cannot afford to pay the teacher's salary, the expenditure may be met out of the funds of the Centre. It should also be possible to make available, to the major universities, specially earmarked grants for the upgrading of their colleges out of the funds allocated by the UGC for the improvement of colleges. If, in spite of all the guidance and assistance provided, the colleges fail to improve and to produce the desired results, the universities should seriously consider the possibility of using their powers to disaffiliate them.

11.35. **Financial Support.** It is obvious that the development of these major universities, as indicated above, will require considerable investment of funds in capital expenditure and the running costs will also be heavy. It is essential that the expenditure required for their development - both capital and recurring - should be placed at the disposal of the UGC by the Central Government.

IMPROVEMENT OF OTHER UNIVERSITIES AND AFFILIATED COLLEGES

11.36. Side by side with development of these major universities and centres of advanced study, measures must also be adopted to ensure that the excellence generated in them is gradually extended to other universities and affiliated colleges so that standards in the entire system of higher education are upgraded in due course. It is to the discussion of this second part of the programme for the improvement of higher education that we now turn.

11.37. **Supply of Teachers for Higher Education.** One of the important contribution which the major universities can make to the development of the other universities and affiliated colleges, as pointed out earlier, is to provide them with teachers of quality. Steps have to be taken to ensure this and for this purpose, we make the following proposals:

(1) Every effort should be made to induce talented students from the universities to join the teaching profession and to place a majority of them in universities and colleges other than their own, so that they can help to raise standards. The UGC should maintain a central clearing-house agency for the purpose and supply the data about these young scholars to universities and colleges and supply them with information about available jobs.

1. This privilege should also be extended to postgraduate and advanced third-year undergraduate students of these affiliated colleges.

(2) With a view to facilitating the recruitment of outstanding persons to the teaching profession, the UGC should sponsor a scheme for instituting a number of fellowships for the purpose. The fellowships should be at three levels - lecturers, readers and professors. Outstanding persons, who may otherwise be lost to the profession, should be granted these fellowships and seconded to work in suitable departments of universities, care being taken to see that they are appointed against permanent posts as early as possible.

(3) The universities and affiliated colleges should be encouraged, so far as possible, to pre-select their new teachers and attach them to the major universities for about a year during which period they will come into contact with some outstanding teachers in their own and allied fields, will receive orientation towards their chosen profession and perhaps study schemes and techniques of research adopted there.

In course of time, as the graduates of the major universities and centres of advanced study find appointments in the other universities and colleges, they will carry over their traditions of work and scholarship to their colleges and it is likely that they will be more actively receptive to the new ideas emanating from their universities and more disposed to enter into an intellectual dialogue with them. The influence of the major universities will thus pass into other sectors of higher education and help in raising standards.

11.38. This process of extending the standards of the major universities should be fostered by the UGC by adopting, amongst others, the following devices:

(1) Strong inter-university links should be formed among members of the centres of advanced study, members of aspirant centres, leading university departments and outstanding affiliated colleges in particular fields of research. For this purpose, small two to three-day conferences at which a few papers are presented and a critical and constructive discussion forms the main part of the agenda, should be encouraged on a fairly large scale. The funds required for the purpose should be included in the grants to the centres.

(2) Invitations may be given to promising scholars and scientists from other universities or affiliated colleges to do research and to conduct seminars (say for a term or a session) at one of the centres of advanced study. It should contribute to their intellectual refreshment and give an incentive to the staff of the other universities and colleges to strive to win the distinction and the advantages of such an invitation.

11.39. **Development of Other Universities.** The universities, which are not major universities, should also strive to develop high standards, to begin with, at least in one or two departments, by due concentration of resources and by securing competent teachers. If they do so, the UGC should give them special grants on the basis of merit. When a university department is thus raised to a high level, its further elevation to the status of an aspirant centre may be considered; and, if it satisfies the conditions laid down, it maybe assisted financially for a period of five years in the first instance. If its progress is satisfactory, the department could be developed, in due course, into a full-fledged centre of advanced study. We hope that once this process starts, it will be possible to raise quite a number of the universities to a reasonably high standard by the end of the century.

11.40. **Development of Affiliated Colleges.** We have to recognize that the standard of the first degree and other postgraduate work in the bulk of affiliated colleges cannot be, in general, the same as that of the education imparted in university departments. The latter will usually have a more balanced combination of teaching and research than in a college, better staff, better qualified students and better resources.

11.41. At the same time, there are several colleges of long standing which have done and are doing as good work as any good university and it should be an objective of educational policy to encourage them. The major universities should specially help them in every possible way. They

will get many of their teachers from them and will be inevitably drawn in a healthy competition for raising standards. To assist in this process, we make the following recommendations:

(1) Affiliated colleges should be classified in terms of the level of their performance. For instance, the criteria for this purpose may, amongst others, include:

— number and quality of staff;
— number and general quality of students;
— research output;
— library facilities;
— laboratory facilities for science students;
— quality of student discipline;
— performance of graduates of the college in national scholarships examinations;
— innovation in teaching procedures; and
— examination results.

The techniques of applying the above criteria in practice must be worked out and the institutional machinery for the quinquennial reviews of colleges on this basis must also be adequately provided. This classification should be used to provide special 'merit' grants to deserving colleges. For example, colleges which rank high on the list and continue to improve their programmes and teaching should be given certain advantages such as salary bonuses for their teachers, grants for libraries, laboratories and necessary amenities for staff and students, etc., or colleges which have maintained a good and effective library system for a period of, say, five years could be given matching grants to improve their libraries further. Similarly, colleges which, while maintaining other academic standards, have avoided serious breaches of discipline, might be given outright or matching grants for improved staff and student amenities, and so on. We are aware that such a system of college classification and grant-in-aid is beset with administrative difficulties. We, therefore, recommend that the UGC, in consultation with the universities and State Governments, should examine this question of classification of colleges in terms of level of achievement and make use of it in the allocation of grants to colleges under the fourth five year plan.

(2) Finally, we should like to refer to the question of 'autonomous' colleges which has been under discussion for many years. Where there is an outstanding college (or a small cluster of very good colleges) within a large university which has shown the capacity to improve itself markedly, consideration should be given to granting it an autonomous status. This would involve the power to frame its own rules of admission, to prescribe its courses of study, to conduct examinations and so on. The parent university's role will be one of general supervision and the actual conferment of the degree. The privilege cannot be conferred once and for all - it will have to be continually earned and deserved - and it should be open to the university, after careful scrutiny of the position, to revoke the autonomous status if the college at any stage begins to deteriorate in its standards. We recommend that provision for the recognition of such autonomous colleges be made in the constitution of the universities. It should be possible, in our opinion, by the end of the fourth five year plan, to bring at least fifty of the best colleges under this category.

IMPROVEMENT OF TEACHING AND EVALUATION

11.42. **Improvement of Teaching.** One of the most important reforms needed in higher education is to improve teaching and evaluation. The existing conditions in this regard are extremely unhappy. Most of the teaching, till comparatively recently, has been dominated by a syllabus which is many years out-of-date. In fact the position in many universities remains unchanged still. As the performance of students is assessed by a single external examination based on the syllabus, an undue emphasis is placed on unintelligent and selective cramming. The situation is further aggravated by rigid rules which govern the selection of courses, by the inordinate amount of time that both students and teachers spend in formal classroom contacts, with the resulting lack of opportunity for independent study by the students and of adequate time for

lecture-preparation by the teachers. If university teaching is to be vitalised, changes are needed on the following lines[1]:

— more flexibility in the courses offered and more freedom of choice by the students;
— a marked reduction in the amount of formal instruction and a corresponding increase in tutorial work, discussion groups, seminars and in independent study; and
— a change in the character of teaching to discourage cramming drastically and to stimulate curiosity, problem-solving ability and originality.

11.43. The problem of introducing greater flexibility in the courses will be discussed in the next chapter. With regard to the formal lectures, we suggest that, in the universities and the colleges, the number of formal classroom and laboratory hours should be somewhat reduced. The time thus saved should be devoted to independent study, under the guidance of instructors, to assigned reading, writing of essays, solving of scientific and mathematical problems and small research projects in which the student seeks out and learns to use independently the books and documents he needs. Every effort should be made to challenge and stretch the minds of the students by assigning them more exacting reading assignments, asking them to solve more difficult problems and providing opportunities for independent study of subjects in which they become especially interested. In addition, the students should be encouraged to do much more general reading than they do at present both during the academic year and in vacation periods. This highlights the importance of building up good libraries, both in universities and in colleges.

11.44. **Development of Libraries.** With ever increasing enrolment in universities and colleges, the demand for library service has been constantly growing. Unlike the past, the library staff have now to cater to the diverse needs of undergraduates, postgraduates and research scholars. It should be realised that modern university libraries are also required to serve a larger number of academic departments and to perform new functions like indexing and abstracting. Moreover, the present position of expenditure on books and periodicals is not satisfactory. It is only in four universities that expenditure on books and periodicals is more than 5 per cent of the total expenditure as shown below:

Percentage of total expenditure	No. of Universities[2]
Less than 1 per cent	5
1 to 5 per cent	34
5 per cent and above	4

11.45. In this connection, we make the following recommendations:

(1) The Heads of Departments and library staff should co-operate fully in drawing up an integrated plan of library development, from a long-range point of view. Such a plan should take into consideration a number of factors such as the anticipated increase in enrolment, the faculty-wise distribution of students, new subjects and fields of specialisation, special research projects and so on.

(2) No new university, college or department should be set up without taking into account its library needs in terms of staff, books, journals, space, etc. Nothing could be more damaging to a growing department than to neglect its library or to give it a low priority. On the contrary, the library should be an important centre of attraction on the college or university campus.

(3) The utilization of library grants should be suitably phased over a plan period. In other words, there should be regular programme of strengthening of academic departments and the library, instead of haphazardly overfeeding them in one year and starving them in the next.

(4) An essential thing about the development plan of a university library is to lay down physical rather than financial targets. Even more important is a proper use of books by students and teachers. Lectures should be supplemented by tutorial instruction, and thereafter the students should turn to the library to find for themselves, with the help

1. The need to orientate university teachers to new and better methods of teaching has already been dealt with in Chapter IV.
2. Information available for 43 universities.

of reference librarians, the relevant material and knowledge needed. More working hours and working days, easy accessibility to books, adequate provision in terms of staff, multiple copies of textbooks which may be loaned to needy students, better display of new reading material, organisation of book-clubs, separate rooms for periodicals, reference books and research works, are some of the measures that would help raise the standard of library service. The reading habit, which is appealingly low, must be toned up in every possible way.

(5) In addition to having 'departmental' and 'seminar' libraries stocked with a 'working collection of books and journals' the central library should facilitate inter-disciplinary communication as also the work of research scholars in borderline disciplines. This will also be economical in the long run.

(6) With the emergence of active research in our universities, there is a need for conservation of research potential through documentation work and service. It is, therefore, necessary to appoint a team of documentalists in university libraries who can speak the language of research workers and undertake the work of documentation-search, indexing and abstracting. For this purpose, it will be advisable to set up a few regional centres with equipment for photographic reproduction of documents such as microfilming and photostating.

(7) We should completely break away from the traditional view that a library is a conventional but more or less useless accessory. No definite set of standards can be used in developing a university library programme but the essentials relate to competent staff, an adequate collection of carefully selected and well-organised books, well-planned physical facilities and professors-teachers who teach with books.

(8) A collection of books, even a collection of good books, does not constitute a 'library'. Given enthusiastic teachers 'who teach with books', and librarians who can cooperate with them in converting the library into an intellectual workshop, even a comparatively small collection of sensitively chosen books may work wonders in the life of students. Without such a staff, the most luxurious building or extensive book collection, may have no effect at all. The object of library planning is not to build a collection of books unrelated to class-work, laboratory research and conference room. The object is rather to relate book selection, organisation of the books, conditions of access and all library activities to the daily needs and activities of the academic community, both professors and students. The book selection should be oriented toward supporting instruction and research. The teaching and library staff should determine the titles and copies of books to be purchased and periodically work together to discard obsolete books. Many of these can be replaced with microfilms and micro-cards.

(9) The library should

- provide resources necessary for research in fields of special interest to the university;
- aid the university teacher in keeping abreast of development in his field;
- provide library facilities and services necessary for the success of all formal programmes of instruction;
- open the door to the wide world of books that lie beyond the borders of one's own field of specialisation; and
- to bring books, students and scholars together under conditions which encourage reading for pleasure, self-discovery, personal growth and the sharpening of intellectual curiosity.

(10) There is no formula for estimating with precision how much money a university should invest in its libraries.[1] It has been found that the

1. The total annual world book production during the years 1960 to 1963 was of the order of 360,000, 375,000, 385,000 and 400,000 titles, respectively. In 1966 it is expected to reach 450,000 titles. Of these about 18 per cent are in the English language only. This would mean about 80,000 titles covering all branches of learning are produced annually. Even if we were to import 15 per cent of the total titles for use by our universities and colleges, it would mean 12,000 titles to be imported. At an average cost of Rs 20 per title and 250 multiple copies the estimated expenditure would come to Rs 48 million and providing Rs 2 million for books in all other languages, the expenditure on imported books alone would need Rs 50 million annually.

expenditure on library in relation to total educational expenditure of the university, has gone up from 1.88 per cent in 1951-52 to 4.04 per cent in 1960-61, by which time the grants provided by the UGC had begun to make an impact. The University Education Commission had suggested about 6.5 per cent of educational budget as reasonable expenditure on libraries. But this could vary say from 6.5 per cent to 10 per cent depending on the stage of development of each university library. It may also be suggested that, as a norm, a university should spend each year about Rs 25 for each student registered and Rs 30 per teacher.

(11) The foreign exchange needed for university and college libraries should be allocated separately to the UGC.

11.46. It is most important to emphasize original thinking in the study of all subjects and to discourage memorizing. The rate of growth of knowledge is now so great that only a few of the so-called facts which one learns in the university are liable to be useful, or even true, a few years later. This is specially true of the sciences. Till comparatively recently, it was possible for a teacher to provide his students with a map, as it were, which would guide them through life. Now, the best thing he can do is to give them a compass. The function of a modern university is to give that enduring knowledge of the fundamental principles of a subject which would help them to solve new problems as they arise and to keep on learning throughout life. This should be regarded as the distinguishing mark of a 'university mind'.

11.47 There is a practice to assign the youngest, least experienced staff members to each undergraduate classes. Some of them have neither the stature nor the experience nor the poise to win young men and women effectively to the pursuit of knowledge. In a way, effective teaching at this level demands the attention and cooperation of the best teachers available. This does not, of course, mean that there is a possibility of all or many senior and experienced teachers being given undergraduate work. But it does mean that there should be a possibility of undergraduates coming into occasional contact with such teachers, particularly when a new subject has to be introduced for the first time.

11.48 We would like to make the following suggestions for improvement of teaching:

(1) A class hour at the university stage should not be less than 60 minutes. A part of the time, say 10 minutes, should be devoted to answering questions by students and assigning them home work. The content and quality of lectures in general needs to be considerably improved. One way of characterizing the level of class work is that every one hour of instruction should receive about 3-4 hours of study time to digest the lectures.

(2) In several cases, teachers are away, for long periods, from their institutions during term time. This interferes with the smooth working of the institutions and is detrimental to good teaching. It may be laid down as a rule that no teacher should be away from his institution during 'term time' for more than seven days in a year. There should also be a convention that during suggestions for improvement of teach-up assignments which interfere with their teaching duties (*sic*).

(3) All new appointments should be made during summer time so that teachers join their new posts at the beginning of the academic year. Further, unless there be compelling reasons, no teacher should be permitted to leave an institution to take up another appointment during term time.

11.49. We realise that it would be impossible to bring these changes in all the institutions at the same time. They would become possible as better teachers and facilities become available. Most of them are relatively easy to introduce in the universities and their constituent colleges, but more difficult in the affiliated colleges, especially in the small colleges in the rural areas. But this is definitely the direction in which we should move.

11.50. **Experimentation.** We should like to draw attention pointedly to the need for experimentation, which we have stressed in other spheres of education also. There is immense scope for it in our educational system but unfortunately there is little deliberate and sustained effort in this direction. It is necessary both to create the desire and the will for it and to provide the financial and

academic means to do so. There are two important areas in which such experimentation would yield particularly rich dividends.

(1) One large area concerns the manner of handling larger number of students without a proportionate increase in educational expenditure or the number of faculty members. It is by no means clear that a small-sized student body necessarily leads to an improvement in standards or that there is some magically correct student-teacher ratio. Some subjects can be taught as well in large classes as in small ones. There is evidence to show that the classes of intermediate size, say 40 to 80, have little or no advantage over classes of several hundred students. The use of microphones and tape records of lectures by distinguished professors from all over India could be usually tried for this purpose. Many leaders in higher education have come to the view that part of college teaching should be done in large classes and part in small groups of 5 to 20 students, with at least half of student's time being spent on assigned reading, problem solving, and other kinds of independent study. We should also remember that the students usually learn almost as much from each other as from the faculty.

(2) Another desirable experiment would be to have a certain amount of the teaching at the undergraduate stage done by the post-graduate students after their first year. This would have three advantages: the student-teachers would gain valuable experience in teaching, and their ability as teachers could be judged before they are appointed to college of (or) university faculties; the number of teachers at the college level could be increased or alternatively, part of the time of lecturers and readers could be freed for research. It would also be possible to pay postgraduate and research students for teaching tasks and this would help some needy and able students to continue their education.

11.51. **Teaching Methods.** The problem of teaching methods in higher education has been a relatively neglected subject in India so far. We recommend that it may be examined by the UGC through a special committee appointed for the purpose. We also recommend that the schools of education[1], whose establishment we have proposed, should make a special study of the teaching methods, not only at the school stage, but also in the universities and affiliated colleges. Such studies will be of great use in organising the orientation courses for junior lecturers which we have recommended.

11.52. **Examination Reform.** In the present system, when the future of the students is totally decided by one external examination at the end of the year, they pay minimum attention to the teachers, do little independent study throughout most of the academic year and cram desperately for the final examination. The crippling effect of external examinations on the quality of work in higher education is so great that examination reform has become crucial to all progress and has to go hand in hand with the improvements in teaching. The UGC rightly emphasised the significance of the problem and said: 'We are convinced that if we are to suggest any single reform in university education, it would be that of examinations'. One of the earliest efforts of the UGC was concerned with the study of the problem and the report of its expert committee on examination reform is a useful document. But it has not been implemented to any appreciable extent so far. This is one of those areas in education about which one can say the problem is known, its significance is realised, the broad lines of solution - at least to begin with - are known; but for some reason or other, an effort to implement it on any worthwhile scale or in a meaningful manner has not yet been made. What is needed is vigorous and sustained action.

11.53. We make below a few recommendations that might make a welcome break-through in the situation. One line of attack would be to abolish set syllabuses and the external examinations based on them altogether and to replace them by a system of internal and continuous evaluation by the teachers themselves. This is already being done in some institutions like the IITs or the agricultural universities and it could be increasingly extended to others as soon as the necessary facilities and conditions can be provided. We hope that, at no distant date, it will

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be adopted by all teaching universities and that the major universities would give a lead in this matter.

11.54. We realise, however, that external examinations will remain with us for a long time, especially in universities which have large numbers of affiliated colleges of very unequal standards. The main strategy here would be to attack the problem on two fronts: introduction of more frequent, periodical assessment so that the undue emphasis on the final examination as the sole determinant of success is reduced; and reform of evaluation techniques. With regard to the first, a good deal can be gained if the performance of the student is assessed throughout the session in a suitable manner and if periodical tests are held in the middle and at the end of each term. A system of internal assessment should be introduced as a supplement to the external examination, based on such periodical evaluations. The results of these internal assessments should not be mechanically added to the external marks but kept separate and both should be shown side by side in the final certificate. Passes should be required separately in both and the divisions gained in them should be declared separately. Every year, a careful review should be made of the correlation between internal and external assessment separately for each institution. This should be taken as a point for classification of colleges and also related to grant-in-aid so that institutions which tend to overassess their students persistently would stand to lose in status and finance, The regulations may also authorise the university to withdraw affiliation for persistent irresponsible assessment.

11.55. Regarding improvement in examination techniques, we have little to add to the learned literature already available on the subject.[1] As we said earlier, what is lacking is not knowledge, but will, courage and perseverance to work out its implementation. We suggest the following measures.

(1) There is need for a central source to guide and activate a movement of examination reform, without which no early and effective progress is possible. For instance, the activity that one now sees in this matter in the State Boards for Secondary Education is due largely to the Central Examination Reform Unit in the National Council of Educational Research and Training. We recommend that the UGC should set up immediately a similar examination reform unit for higher education at a sufficiently high level which would work in collaboration with the universities. This could become the starting point of an effective programme of reform.

(2) The next step should be to persuade some universities to launch upon the programme in a big way. In addition to major universities which will have to give a lead by abolishing the external examinations altogether, the other universities should set up special units for examination reform and should prepare and implement a programme of reform in consultation with the central unit.

(3) Another important point of emphasis would be the reorientation of university teachers to adopt new and improved techniques of evaluation. A programme of seminars, discussions or workshops should be organised to serve as the spearhead of the reform. This will have to be continued from year to year to evaluate results, to try out experiments and to make further plans. This would be the responsibility of the central and local examination reform units.

We trust that, if a few universities can make a determined attack on the problem and achieve a break-through, the whole programme of examination reform will be greatly accelerated.

11.56. We recommend that the grading or classification of examination results is almost invariably done on an absolute rather than on a relative basis. In our present system of examinations, an 80 per cent mark, say in mathematics, does not convey the same meaning as, say, 80 per cent mark in history or English. Again an 80 per cent mark in one year does not mean the same things as 80 per cent mark in another year because the examiners may be different, and there may be many other variations

1. A special paper on the subject prepared for us by Dr. H. J. Taylor is given in Supplementary Volume I, Part V. We broadly agree with the recommendations made therein.

from year to year. A system of grading must be such as to bring out whether a student belongs, say, to the top 20 per cent of his class or to the bottom 20 per cent. It is strongly recommended that even if the present system of examinations and classifying the results is continued, it should be supplemented by giving, in the same certificate, the relative grading of the student, say on a five point scale. Grade 'A' would mean that the student is in the top 20 per cent of those who have been successful at the examination.

11.57. We recommend that early measures should be taken to abolish payment of remuneration to examiners. Evaluation is a part of teaching and teachers should be willing to undertake it as part of their duties. This is one of the reasons why we have recommended an increase in the salary scales of teachers. However, we recognize that the load of this work should not be too heavy on any teacher and would, therefore, suggest that the maximum number of scripts to be examined by a teacher in a year should not exceed 500.

11.58. **The Medium of Education.** The problem of teaching and evaluation in higher education is inextricably linked with the medium of education and examination. It was pointed out earlier[1] that, as a part of the development of education in our country, we have to move energetically in the direction of adopting the regional languages as media of education at the university stage, that careful preparation should be made for the purpose, (and) that both the manner and the time of transition would have to be left for decision to the university system. We shall now deal with some other aspects of the problem from the point of view of practical implementation:

(1) We would like to emphasize that the medium of classroom communication and examination should generally be the same. The present arrangement under which a large proportion of students, at the first degree stage and even later, use the regional language for purposes of examinations although the classroom instruction is given through the medium of English, is educationally unsatisfactory. If the student can be expected to express himself in the regional language in his examination, it should not normally be difficult for a teacher to do the same in the classroom. In fact, the student's understanding of the fundamental problems and issues would be better and his performance in the examination would improve if, in all cases where the universities have taken a decision to adopt the regional languages as media of examinations, they also decide to adopt them as normal media of classroom communication. However, it must be remembered that the hold of English as a medium in the universities is linked with the use of the regional languages as the languages of administration in the States. So long as the prize posts in administration go to students who have good command over English, it will not be purprisings (surprising) if a substantial proportion of students continue to prefer education given through it.

(2) While the goal is to adopt the regional languages as media of education, we should like to stress again that this does not involve elimination of English. In fact, English, as an important 'library language' would play a vital role in higher education. No student should be considered as qualified for a degree, in particular, a Master's degree, unless he has acquired a reasonable proficiency in English (or in some other library language). The implications of this are two-fold: all teachers in higher education should be essentially bilingual in the sense that they would be able to teach in the regional language and in English, and all students (and, particularly postgraduate students) should be able to follow lectures and use reading materials in the regional language, as well as in English.

(3) Great care has to be taken to ensure that the progress of the student entering the university is hampered as little as possible by complexities relating to the media of education. In a student's life the change from school to college is a crucial stage. On entering college, he finds that there is a greater demand on his powers of understanding and concentration than at school. When to this is added the difficulty inherent in a sudden change in the medium of education, it is not to be wondered at that many students feel bewildered

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and lost and lose zest in their studies. At the earlier stage of the undergraduate course, it will be an advantage if the bulk of class-work is done through the regional language. As one goes higher up the educational ladder and as the student's command over English and his familiarity with its use as a medium of education increases, more and more of the class-work could be in English. At the postgraduate stage, at least for sometime to come, the bulk of the class-work will have to be in English.

(4) To safeguard the interest of minorities, some special steps would be needed. The maintenance of colleges teaching through the medium of Hindi in the non-Hindi speaking areas or of Urdu (which is not a regional language in the sense the other modern Indian languages are) in any part of the country should not only be permitted but encouraged. In so far as colleges teaching through the media of modern Indian languages other than the regional language of the area are concerned, there need be no obligation on the State to provide such institutions, except in cases where an adequate number of students is available. But if any linguistic minority group offers to maintain such an institution, it should be permitted and admissible grants given to it.

(5) As we have recommended earlier, it would be desirable to establish centres of advanced study for the development of modern Indian languages so as to make them fit media for higher education. These should include two centres for Urdu - one in the North and one in the South.

11.59. We are definitely of the view that at the university stage, no language should be made a compulsory subject of study but the classical and modern languages of India and important foreign languages should be provided as elective subjects. As we have recommended elsewhere, there should be considerable flexibility with regard to the choice of the subjects. The compulsory study of a language is likely to make some useful combination of subjects impracticable by placing too heavy a burden on the students. We were concerned to find that in one big university, about 50 per cent of the total time available for education at the under graduate stage was devoted to the study of languages only. It is obvious that under such conditions, the studies of the principal subjects greatly suffer and standards remain loy (low).

11.60. Since an adequate command over a library language is indispensable for a university student, we recommend that adequate facilities should be provided in universities and colleges for the study of English and, where necessary or possible, for other library languages also. For this purpose, we recommend the following:

(1) Special units for teaching English should be established in university and colleges whose main objective would be to give a good working knowledge of English to new entrants by the adoption of modern teaching techniques and in as short a time as possible. A distinction has to be made between the teaching of English as a skill and the teaching of English literature. The teachers in this unit will, therefore, need special training on the lines of the pioneer work being done at the Central Institute at Hyderabad. Moreover, it has to be noted that the students who enter the universities will be at different levels of attainment in English. Some will have come from English-medium schools and be well advanced. Others who come from urban schools with, comparatively speaking, good facilities for teaching English would be at an average level. But a large number who would have come from rural areas or the weaker schools will be at a much lower level of attainment. No single course in English would meet the needs of all these students. It should, therefore, be a responsibility of the English units to adjust their teaching to the needs of the different categories of students and to ensure that they are all given at least that essential command over the language which will enable them to use it efficiently as a library language. While the facilities should be provided in all institutions so far as possible, it should be optional for each student to decide the course he would take to meet his needs or even take no course at all, if his preparation at school stage is found to be adequate.

(2) It would be an advantage to teach some English as a part of the elective subject course in the first year of the under graduate stage. For example, students of economics may study English for about two periods a week as a part of their course in the first year. The object of this teaching would be to introduce the students to literature in economics in English, to the special vocabulary used in the subject and to help them to read with comprehension books and journals in English in their special field. Where such courses have been tried, they have proved quite helpful and have enabled the student to use English as a library language in his own field far more efficiently than a general English course would do.

(3) While English is our most important library language, it is necessary, as we have repeatedly stressed in this report, to develop other important library languages also. Much greater attention should, therefore, be given to the teaching of library languages other than English than is the case at present. In particular, we stress the immediate need to study Russian on a larger scale.

11.61. In major universities, it will be necessary, as a rule, to adopt English as the medium of education because their students and teachers will be drawn on an all-India basis. This is the only feasible approach if their all-India character is to be maintained. But we are not opposed to the possibility of some university, which has the necessary quality of staff and students, trying this experiment in a regional language. We realise that this will involve some difficulties in drawing their students and teachers on an all-India basis; but we are convinced that they can be overcome. The position can be reviewed in due course as the linguistic situation develops.

STUDENT SERVICES

11.62. A major weakness of the existing system of education is the failure to provide adequately for student welfare. This is an aspect of higher education which needs to be improved on a priority basis.

11.63. Student services are not merely a welfare activity but constitute an integral part of education. The following are some of the important services which can be included in this programme.

- — orientation for new students;
- — health services;
- — residential facilities;
- — guidance and counselling including vocational placement;
- — student activities; and
- — financial aid.

Financial aid in the form of scholarships, book-banks and textbook loans and the provision for students to earn while they learn have been discussed elsewhere in the Report.[1] In this chapter, it is proposed to discuss briefly the other forms of student services.

11.64. **Orientation for New Students.** Entry into a college or a university is a very important change in the life of a student, and in some cases, the change is so great and sudden that he is apt to lose his balance. Some deliberate steps have therefore to be taken to facilitate adjustment. We recommend that all institutions of higher education should organise orientation programmes for their new students in the beginning of the academic year. Senior students should be actively associated with this programme. Group discussions and individual conferences can be arranged for the purpose and, where necessary, guided campus tours will also be helpful. No student should be left in doubt about the arrangements for housing and food, days and hours when his classes meet, the fees to be paid and above all the general traditions of the institutions to observe. Each student should also be assigned to an academic adviser, who should be a member of the staff and assist him in planning and formulating his total college programmes and organising his studies to the best advantage. Every member of the teaching faculty should be expected to serve as an academic adviser to a group of students.

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11.65. **Health Services.** Health services for students are generally neglected. The replies to the questionnaire sent by the Education Commission to the different universities on the subject have revealed that few of them have conducted any health surveys of their students and not many have organised systematic programmes of health services for them. In a number of universities, there is no medical examination, even at the first entry stage, and where medical examinations have been conducted, they are often of a perfunctory character without any suitable follow-up work. Society has a special stake in the health and the physical well-being of university students who are (or should be!) the elect of the rising generation and in whom it has to invest large resources and to whom it looks for the advancement of national interests. The organisation of student health services at the university stage, therefore, should receive a high priority.

11.66. We recommend that early steps should be taken to organise adequate health services in universities and colleges. Health centres should be established on every university campus and in townships with a large student population to provide for medical examination, follow-up treatment, and emergency care. The services of part-time doctors should be enlisted for the purpose in smaller mofussil towns. We also recommend that adequate provision should be made for health education of students and for securing their involvement in the organisation of health services - both in policy making and in the execution of programmes. The UGC may explore the possibility of organising health services for university teachers and students on the lines of the contributory health service organised for the employees of the Government of India. A beginning may be made with one or two universities with a large resident student population and, in the light of the experience gained, the programme may be extended to other centres.

11.67. **Hostels and Day-Study Centres.** At present, hostel facilities have been provided for about 18 per cent of the enrolment at the university stage. There is need to expand these considerably and we suggest that an effort should be made to provide hostel accommodation for about 25 per cent of the enrolment at the undergraduate stage and 50 per cent of the enrolment at the postgraduate stage. In professional courses the extent of hostel facilities provided is already fairly high. We do not share the view that all students in these courses should be necessarily provided with hostel facilities. In our opinion, it is necessary to emphasize the provision of hostel facilities for the courses in arts and science, at least for the immediate future. In order to cut down the costs of this programme, it would be necessary to keep the design of the hostels as simple as possible. Moreover, the running costs should be kept down to the minimum and there should be provision for a good deal of self-help by the students.

11.68. For the use of non-resident students who do not have adequate facilities at home - the number of such students is extremely large in the towns and cities - day-study centres and library seats should be provided on a liberal scale. The target to be aimed at should be to provide day-study centres for about 25 per cent of the non-resident students. These should also have subsidized or low-cost cafeterias working on the principle of self-service.

11.69. **Guidance and Counselling.** A guidance and counselling programme which would assist the students in the choice of courses, indicate the lines of remedial action and help in dealing with emotional and psychological problems should be an integral part of the educational facilities provided in institutions of higher education. For an effective guidance service, it would be necessary to have at least one counsellor for every one thousand students on the roll. Smaller institutions may share a counsellor who will work in each of the institutions on a part-time basis. The organisation of such a service will require a large number of professionally trained counsellors. We suggest that a project for their training should be organised in some university competent to do so.

11.70. The employment information and guidance bureaux of the National Employment Service and the student advisory bureaux which have been existing in a number of universities have been doing useful work. The former have

been collecting, compiling and making available to the students occupational and employment market information, information regarding preparation for different careers, training facilities, apprenticeships, scholarships, etc. They have also been placing students in employment. In the absence of counselling services with fully qualified counsellors, they have also been offering advice and help to the students in planning their careers. The student advisory bureaux were originally set up by the Ministry of Education to provide information regarding facilities for higher education abroad, but now also provide information regarding facilities in India. Since educational and occupational information is closely interlinked, it is recommended that these bureaux may be combined to form an information and employment centre which should function directly under the supervision of the dean of students.

11.71. **Student Activities.** It is necessary that students' energies are channelled into meaningful and challenging pursuits. This would be partly achieved through intensification of curricular programmes to which we have already referred. But that is not enough. It is also necessary to develop a rich and varied programme of co-curricular activities, which would include lectures, debates, essay competitions, group discussions, cultural programmes and contests, study circles, social service camps, NCC, tours and excursions, sports and tournaments, publication of students' journals, educational film shows, conduct of student libraries, canteens and cooperative stores and welfare activities connected with financial and medical assistance to students. Many of these activities are even now a part of the programme in good institutions. They are rich in educational stimuli and help to develop and strengthen certain valuable attitudes and qualities such as cooperation, initiative, self-confidence and leadership. These should be organised, not only during termtime but also during vacations which is more suited for some of the programmes.

11.72. **Administration of Welfare Services.** The advice, support and initiative of the vice-chancellor or principal are indispensable for an imaginative and effective programme of student welfare. But such work is so complex and many-sided that it needs a full-time dean of student welfare to look after its implementation. He should be an educationist with tact and vision trained specifically for the job and should be given sufficient status and authority to command respect and cooperation from the students and the staff. He should be expected to participate in academic work to the extent possible and regarded as a member of the academic community.

11.73. **Student Unions.** Student unions represent an important way of providing student participation in university life outside the classroom. Properly organised, they help in self-government and self-discipline, provide a healthy outlet for students' energies and give the students useful training in the use of democratic methods.

11.74. It is for each university to decide how its students' union will function and we would welcome a good deal of experimentation. But some broad principles can be indicated.

(1) Membership of the student unions should be automatic in the sense that every student should be presumed to be its member. But every student should be expected to choose at least one activity organised in the institution e.g., arts society, football club, drama association, etc., and pay the required subscription. There should be no separate payment for the membership of the students' union as such. Each of the activities will thus have funds of its own and these would be handled by appropriate committees. The funds of the central union - to the extent they are needed - would be formed by contributions from each activity committee. The university or college should also give aid to the central union as well as to the different activities.

(2) It may be desirable to elect the office-bearers, not directly by the large body of students (many of whom are freshmen), but indirectly by the different students' societies in the universities who would send selected representatives to the union executive.

(3) There should be some disqualifications for office-bearers. For instance, persons who have spent two or more years in the same class should be disqualified.

(4) The successful working of student unions depends to a large extent upon the mutual trust and confidence between the teachers and the students. Greater teacher involvement in union activities should, therefore, be ensured. We would strongly commend the establishment of a university or college union in which all teachers and students automatically become members. All committees of the union and various activity groups should have teachers on them and it should be their responsibility to guide the students tactfully on right lines without curbing their freedom to decide for themselves.

11.75. In some of the institutions, the educational objectives of student unions are being well realised and they are functioning satisfactorily. But in a majority of institutions, and particularly in recent years, they have tended to function like trade unions presuming to represent students' interests against those of the teachers and authorities. This idea should be firmly and definitely discouraged. A university or college is an academic fellowship of equals where things can be discussed and decided reasonably, and the joint committees of teachers and students which we have recommended have this purpose specifically in view. These should be fully utilized to ascertain and redress the genuine difficulties of students. There is a general and, perhaps on the whole, justified complaint on the part of students that the college or university authorities sometimes take no notice of these difficulties and deprivations till they are backed by some form of so-called 'drive action' which has really no place in an educational institution. When, however, they are confronted by a strike or demonstration or some kind of violence, they sometimes yield abjectly and students get the unfortunate impression that it pays to break the rules of discipline and good conduct. There is no justification for such administration. The members of the staff, the principals and vice-chancellors should all learn to be sympathetic, understanding, responsive and responsible and yet decisive and firm, when necessary, in their dealings with students. What binds together students and teachers in a deep and creative partnership is the sharing of common interests, mutual regard and sense of values, and working together for their main purpose which is the pursuit of knowledge and discovery. Anyone who is not committed to this philosophy or prepared to honour it has really no place in an institution of higher education.

11.76 It would be useful to convene a conference of representatives of the students' unions in universities and colleges once a year, for the purpose of considering various problems of common interest such as the improvement of discipline and the promotion of academic excellence. Such a conference could also promote a sense of participation in the student community in the development of universities and colleges, apart from affording them an opportunity to express their views on matters that concern their studies and well being. We suggest that the UGC should take initiative in convening and financially supporting such an annual meeting.

11.77. **Student Discipline.** In the last couple of decades so much has been written about problems of student unrest, its numerous ugly manifestations and the causes responsible for it that it is not necessary for us to repeat the details. Briefly, there have been many ugly strikes and demonstrations - often without any justification - leading to violence, walk-out from classrooms and examination halls, ticketless travel, clashes with the police, burning of buses and cinema houses and, sometimes, even manhandling of teachers and university officers. There is a variety of causes which has brought about these ugly expressions of uncivilized behaviour, e.g., the uncertain future facing educated young men leading to a sense of frustration which breeds irresponsibility; the mechanical and unsatisfactory nature of many curricular programmes; the totally inadequate facilities for teaching and learning in the large bulk of institutions; the poor student-teacher contact - many a student goes through the entire undergraduate course without exchanging a word with his teachers; the inefficiency and lack of scholarship on the part of many teachers and their failure to interest themselves in the students'

problems; the absence of imagination and tact combined with firmness on the part of heads of institutions; the prevalence of what has come to be known as teacher politics in some colleges and universities; the attempt by political parties to interfere in their work; and, by no means the least, the impact of the conditions of public life in the country, the falling standards of discipline among the adults and a weakening of their civic consciousness and integrity.

11.78 While such incidents and their contributory factors have been a feature of higher education for some years past, what is particularly disturbing at present is the noticeable trend towards a progressive deterioration and the fact that these acts are increasingly committed quite unapologetically and on irrelevant and frivolous grounds. This is specially regrettable in view of the considerable expansion of opportunities of youth that independence has initiated and of the critical challenges that the nation is facing in the fields of both defence and economic and cultural development. In such a situation, sociological explanations are not enough. Indeed, unless they indicate a feasible solution of the problem and lead to effective action, mere explanation is likely to be mistaken for justification. Urgent steps are, therefore, needed to curb these trends and to ensure that, whatever else education may or may not aim at doing, it should at least strive to enable young men and women to learn and practise civilized norms of behaviour and commit themselves honestly to social values of significance. It is also necessary to remember that the responsibility for the situation is not unilateral - it is not merely that of the students or parents or teachers or State Governments or the political parties - but multilateral. All of them share it, together with many factors in the objective situation and no effective solution is possible unless each agency responsible for the malaise does its own duty. Some of the remedies for students' unrest, therefore, go beyond the education system. But even if we leave them out, there are two major things that the education system itself can and must do:

— remove the educational deficiencies that contribute to it; and

— set up an adequate consultative and administrative machinery to prevent the occurrence of such incidents.

11.79. The first of these measures, the improvement of the educational process, is the heart of the problem. The discipline which higher education cultivates should aim at self-discipline - discipline directed from within, which does not depend primarily on external control. Moreover, such discipline can grow only if it is deeply related to the pursuit of deeper goals in life and rises out of interest and devotion to scholarship. In other words, the incentives to positive discipline have to come from the opportunities that the institution presents and the intellectual and social demands it makes on the students. From this point of view, we have emphasised, throughout this Report, the need to improve standards in institutions at all stages of education, including colleges and universities. We have also stressed the need, side by side, for providing a better standard of student services. Unless this is done, a radical cure to the problem is not possible.

11.80 With regard to the second of these measures, we would like to emphasize that the whole of university life is to be treated as one and that all attempts at polarisation between teachers, students and administration should, therefore, be avoided. From this point of view we have made a number of important recommendations such as the appointment of joint committees of teachers and students, the establishment of a central committee under the chairmanship of the vice-chancellor or principal consisting of students and teachers, and where advisable, the association of students with the Academic Council and the Court. What we have to strive to generate is a spirit of comradeship between teachers and students based on mutual affection and esteem and on a common allegiance to the pursuit of truth, of excellence in many directions and of the good of the society as a whole. If this spirit could be created, many of the problems of discipline which bedevil our academic life at present will become easier to solve and will, we hope, disappear in course of time.

BOOK REVIEWS

Srinivasan, K. *Regulating Reproduction in India's Population: Efforts, Results, and Recommendations*, Sage Publications, New Delhi, 1995; Pp. 329, Price, Rs. 350.

A very good book on Indian Demography. The author states in the last chapter that this book is an attempt to find out factors that accelerate the demographic transition to replacement levels of fertility in India and he has been certainly successful in attaining his goal, with thorough and appropriate techniques.

He begins with a review of the family planning atmosphere in India as viewed by the British rulers some of whom were social and political reformers or health and famine administrators. This is set in the background of what was happening in England. Some Indians exposed to the Western world felt the need for population control in India but the Britishers did not want to intervene in the traditional make-up of the society, keeping it undisturbed in its ignorance and complacency. The view of the elite was, of course, different.

The opposition to artificial family planning by Mahatma Gandhi and the Congress Party gave a setback to the free flow of information and promotion of the subject. However, women's organisations and some social reformers, like R.D. Karve and A.P. Pillay, put in efforts to promote artificial family planning methods. It deserves a special mention that a country suffering from the worst population crowding today had the world's first family planning clinic in Bangalore.

In chapter 2, the author describes the population policies and programmes launched since Independence through democratic planning. Many old legacies and institutions of the past, such as caste, *zamindari* system, etc., needed a change, not by force, but by democratic methods emphasising individual freedom and initiative. This political philosophy, no doubt, put constraints in handling the emerging situation in the context of complexity of goals and acceptable techniques, unlike in China where one child family-norm was attained relatively much more easily. In this chapter the author has chronicled the development of population policies and programmes in each of the various five-year plans.

The planned effort in India has been traced from the very first Five-Year Plan to the eighth Five-Year Plan, covering the period from 1951 to 1997. As the author states, from the beginning, the idea was to stabilise the population at a level consistent with the requirements of the national economy. Though no numerical goals were set, people were supposed to go to the family planning clinics on their own in urban areas to get family planning advice. In successive plans they did more of what they did in the previous plan with some changes suggested by their earlier experiences. The third plan is called unique because for the first time a goal was set of achieving a crude birth rate of 2.5 in 1972. Later on, the targets regarding crude birth rate were changed constantly to later dates. In my view, they rarely showed any awareness that, in reality, India was far away from the set goal due to lack of infrastructure needed to get motivation to accept family planning.

The goals were set in terms of sterilisations or their equivalents, and the expenditure was increasing enormously, neglecting sometimes several other requirements of the situatuion. In the fourth Five-Year Plan (1969-74), the author states that the oral pill did not get the acceptance it deserved. But one should not forget that the pill was discovered only after 1965 and was in an experimental stage. With low motivation and low health standards in India, people were not prepared to accept the pill due to its possible side effects with prolonged use.

The author seems to regret that the government laid stress on sterilisation rather than on spacing methods. He forgets how the Intra-uterine Devices (IUD) programme was run in some states, such as Maharashtra, so inefficiently that it fell into disrepute. One may even go to the extent of saying that in the absence of needed motivation and relevant infrastructure sterilisation was the only programme that could be launched, if at all, in the initial stages. One may (with hindsight) find fault with India that it accepted and started family planning when the relevant infrastructure was inadequate for the purpose. Before the fourth Five-Year Plan, no spacing methods were available (especially for the inadequately motivated), except diaphragm, jelly, condoms and the like, and the natural methods, such as rhythm, abstinence and coitus-interrupts which the catholic societies used. But Indian community was not ripe for that. In fact, with adequate motivation anything could be accepted, even sterilisation, with two children.

Towards the end of the fifth Five-Year Plan (1974-79), i.e., during 1976-77, intensive efforts

were made at sterilisation programmes. During this period, more sterilisations were done than the total for earlier four years. According to the author, had it continued for a few more years India would have solved its population problem as dramatically as China did. But with the fiasco that occurred, especially in North India, regarding family planning in 1977 April, the term family planning had to be changed to family welfare. The then new government emphasised raising age at marriage (18 for girls and 21 for boys), expanding facilities for women's education, introducing population education programme in schools, etc. In other words, the government started creating the infrastructure.

The author seems pleased that the sixth Five-Year Plan (1980-85) adopted making Net Reproduction Rate (NRR) = 1, as its goal. It meant replacement of one present female with one in the next generation. This linked family welfare to a fall in death rate along with fall in birth rate. In my view, this adoption made little difference in the programme, except in the use of terminology. From this plan on, the programmes started specifying the expected level of attainment of crude death rate, level of male and female longevity and infant mortality rate as in the seventh (1986-91) or eighth (1992-97) Five-Year Plans. This the author sees as the conceptual departure in setting the goals. But these could not be easily translated into action as, for instance, when one does in terms of couple protection rate to control birth rate.

The author rightly points out how studies, such as by Lapham and Mauldins or Ross and Mauldins, indicated poor performance of India as compared to many developing countries of large size such as Indonesia, Pakistan, Mexico, Nigeria and so on, and there seemed meagre improvement between 1982 and 1989 in India while many other developing countries proved much superior. Such observations as these, no doubt, had their impact on the National Population Policy of 1994. Karunakaran Committee set up for this purpose called an expert group with Swaminathan as the Chairman who helped India to be self-sufficient in food production. Their report was not submitted to Parliament as a National Population Policy. But it contains some shifts in the goals regarding population stabilisation programme. There is change from demographic goals to wider health goals, including basic rights of women, in the National Population Policy. Thus, there is emphasis on gender equity for better life. Remember, this is done after forty years of programme being in the field. There seemed also a belief that democratic decentralisation of political power will help development, including health and family planning.

In chapter 3 the author describes natural fertility and nuptiality in India, pointing out that the traditions and cultural traits had both depressing as well as enhancing effects on fertility. However, on the whole, because of adherence to traditions natural fertility was not on the high side.

In chapter 4, the author describes the demographic and developmental changes in India and compares them with relevant attainments in many developing countries of more or less comparable size. Indian achievements are very meagre in the matter of mortality, literacy, urbanisation, industrialisation or social status of the female. Based on the data of the World Bank on eleven countries, such as China, Indonesia, Brazil, Mexico, Bangladesh, Pakistan, Nigeria, etc., India has shown very little improvement in its ranking during 1965 to 1989. It cannot stand comparison with many countries such as China, Indonesia, Brazil or Mexico. Its mortality pattern has slightly changed so that if by early fifties, it had fifty per cent deaths in childhood, they had come down to forty per cent, increasing deaths in adulthood due to infectious diseases or other stress diseases.

In discussing contraceptive use, the author points out the well-planned strategy since 1980s to de-emphasise sterilisation and increase targets for spacing methods. IUD acceptors in the rural areas increased steadily from 58 per cent in 1980-81 to 77 per cent in 1989-90. Among the various states, Uttar Pradesh accepted sterilisation to the extent of 86 per cent and Kerala 46 per cent, with all India figure at 72 per cent. Urban percentages were much lower: 18 per cent in Uttar Pradesh, 19 per cent in Kerala and 23 per cent in India. With rising contraceptive use, practice of spacing methods even in the rural areas is likely to rise. In India in 1980, sterilisation, IUD and modern spacing methods were practised to the extent of 89.4, 4.4 and 6.2 per cent, which changed to 68.7, 15.1 and 16.2 per cent of total users, respectively, in 1991.

District-wise data covering 90 per cent population were available for 396 districts of

India. There were 26 districts covering 6 per cent population that had less than one-fifth couples effectively protected from conception. These 26 districts were six from Assam, eight from Bihar, nine from Jammu and Kashmir, two from Rajasthan and one from West Bengal. On the other hand, there was no district in Gujarat, Haryana, Kerala, Maharashtra, Punjab and Tamil Nadu that had less than 40 per cent couples practising contraception. When correlation coefficients were calculated between contraceptive use and male and female literacy, they were 0.57 and 0.58 and, with only sterilisation as variate, they were 0.81 and 0.80 (p. 157). Some blame that India's sterilisation programme with incentives to acceptors has attracted the illiterate and the poor to family planning fold. The above analysis does not provide empirical validation for the blame.

The author compares the data from the all-India surveys by the Operation Research Group in 1970, 1980 and 1988 with the service statistics of the government and finds that, during 1970-88, contraception in age group 25-29 years increased almost 30 percentage points. Two thirds of these were sterilised by 1988. Muslims, among the various religions groups, accepted contraception the least. But it was higher than that in Pakistan or Bangladesh. On the whole, during this period of 18 years, there was much upward movement in the practice of contraception.

In this analysis, however, the author finds that couples effectively protected (CEP) were not correlated with the crude birth rate in 1988. He states that this measure (CEP) seems almost irrelevant to assessing the impact of contraceptive use on fertility. Readers feel that there is something wrong with the CEP. It is impossible that the two are not related unless there is enormous waste, such as throwing condoms or pills away without use, or wrong measurement of CEP for various reasons. In a later Chapter one finds that in India the decline in crude birth rate is much lower compared to many other neighbouring countries that started the family planning programme much later. One wonders whether it is partly due to the waste, suggested by the near-zero correlation seen above.

In chapter 6, the author deals with modernisation, contraception and fertility decline. Using Bongaarts model (1978) and Coale-Trussel model (1974), he shows that under completely uncontrolled fertility conditions, Indian women in the present circumstances will produce nine children, if exposed to it throughout the reproductive period (Pp. 185-186). Resorting to multivariate analysis seeking effect of socio-economic and demographic factors on fertility, the author shows that a decline of one birth per woman is equivalent to decline of 36 infant deaths per 1,000 live births. Similarly, it is equivalent, in effect, to an increase of 20 percentage points in female literacy or to an increase of 18 percentage points in contraceptive prevalence. Female literacy was most dominant in affecting fertility and the next was infant mortality. However, the author points out that one-time data do not yield firm scientific conclusion on causal relation among socio-economic variables and fertility change. What is needed is the longitudinal data covering some sizeable time.

From the above kind of measurement, the author found that nuptiality effected a decline of 26 per cent in India while in Kerala it was 54 per cent, the highest in India, and the lowest in Uttar Pradesh, namely, 17 per cent. Female literacy had great impact on age at marriage and contraceptive use and it seemed to hold the key to demographic transition in India.

In chapter 7, the author describes how traditional values, that kept the fertility moderately high for centuries, are breaking down at different paces in different states. Here he demonstrates how three states that are relatively successful in the matter of demographic transition help to bring out the success attained in a variety of ways, depending on the politico-social circumstances. The success is achieved through political will, efficiency of bureaucracy and services of Information, Education and Communication (IEC) which can flow from the Top-Down to the people. The other part of the success comes from the demand from people which can be called Bottom-Up contribution to success. This latter according to the author comes out of factors such as exposure to the West, status of women, high female literacy and low infant mortality.

The author describes three case studies, namely, Goa, Kerala and Tamil Nadu. These have differential proportions of influence of the Top-Down and Bottom-Up influence. The routes to successful and rapid fertility transition are

many. These differ from society to society and can be influenced by the different mechanisms of social engineering. It is not necessary that a population be economically advanced as in Western societies, or urbanized to a large extent, or largely employed in non-agricultural occupations, to have low mortality, high life expectancy and low fertility, in order to have better quality of life under conditions of limited resources.

The case study of Goa shows greater influence of Bottom-Up factors with its exposure to Portugal for more than four centuries. A higher status of women is seen in Goa in the high age at marriage, higher even than that in Kerala, higher percentage of the unmarried until the end of reproductive life, use of natural methods of contraception resulting from the influence of Catholicism. The Top-Down influence in Goa was relatively recent in the sense that it began only after its integration with the Indian Union in 1961. Goa, thus, attained success in getting a small number of children and low infant mortality rate. This was however not publicized much because of the smallness of population in Goa (less than 12 lakh).

The reader, however, misses one thing in this presentation. The mention of exposure to the West through the Portuguese does not drive home the real point in the success of Goa. Thirty-six percent of the population of Goa was Christian even in the 1990s. It could be more before 1961, i.e., the year of integration with the Indian Union. It is Christianity that is at the root of this success which was the result of the conversion to Christianity of the local populace under the Portuguese. It is Christianity which accounts for low growth rate of population in Goa all through the twentieth century, with high age at marriage, abstinence and use of natural methods of contraception. A part of it was probably due to emigration of Goanese men to Africa and other countries, which the author probably hints at in mentioning exposure to the outside world.

The case study of Kerala by the author shows that there is good balance between Top-Down and Bottom-Up forces and Kerala has achieved on their basis the demographic transition comparable to South Korea, Sri Lanka, Thailand or Singapore. With a population of a little less than three crore, Kerala's strong point seemed to be a high level of female literacy for the best of the twentieth century which helped Kerala to attain demographic transition, in spite of its low level of industrialisation, economic backwardness, low urbanisation and poverty.

Kerala was ruled by a succession of enlightened kings who were considered benevolent and scholarly. They promoted gender equality and provided facilities for good public health. Kerala's transition was under unusual circumstances among developing countries. It had higher rate of population growth than India until 1971 after which it came down. In the early part of the century it was double that of India. Some attribute its demographic transition to social justice with communism in the state. But it seems that it was due to only high female literacy, since West Bengal with low female literacy could not achieve it, in spite of its communist rule. Kerala's demographic transition could be a Malthusian reaction of a population to high density, low income, poor employment opportunities, and poverty.

The third case study is of Tamil Nadu which is on the verge of demographic transition, mostly due to the political will, efficient bureaucracy and the IEC services. The success here is mostly due to Top-Down factors, in spite of poverty, relatively lower female literacy (51.3 per cent for ages above 7 compared to 86.2 per cent in Kerala). Mortality differentials still persist in Tamil Nadu with rural infant mortality double that in urban area and, yet, fertility differentials have practically disappeared.

All this may probably be due to a unique social awareness movement since 1920s under great leaders and reformers. Long before the government started the family planning programme, these leaders emphasised the need of liberating women from frequent deliveries, with contraception, two-child family-norm and no marriage before 22 years of age which could avoid four births. This effort worked intensely to diffuse small family norm even in slums and rural areas of Tamil Nadu. Campaigns, like 'one family - one heir', stressing the importance of stopping child bearing when the father was 33 so that when he retired at 58 his last child could be self-reliant, proved very useful. The free hot lunches to nine million children at 80,000 centres all over the state improved their health, with ten per cent budget of the state. Due to this, the children stuck to schools. This programme employed about 200,000

women, raising their social status in slums and rural areas. Thus, this scheme made inroads into just that section of the populace which was most difficult to reach through with the message of family planning. This project came from politicians and administrative leaders at the state headquarters. Within the political and government circles, there is a strong movement for promoting a one-child family norm. Thus favourable political atmosphere and efficient bureaucracy have boosted the demographic transition in Tamil Nadu. Readers certainly sense that Tamil Nadu programme was something the Hindi belt and other states in India can emulate.

Overall achievements in India in the matter of demographic transition have been frustrating. Though India may take pride in accepting the family planning programme at the government level much earlier, many countries in Asia have attained substantially lower levels of fertility though they started much later. For instance, China attained 60 per cent reduction in fertility in a matter of just 10 years. Many other countries have achieved similar reduction. In 1990, in India 2.33 million children died before reaching first birth day, whereas the corresponding number in China in the same year was 0.76 million, in spite of its bigger population. So whatever growth rate that prevailed during 1950-60 still continued at 2 per cent in India and this in spite of increasing inputs in family planning. During forty years of intensive effort, the birth rate declined in India by only 12 percentage points from 41.7 births in 1956 to 29.4 in 1990.

There are two sides of the relevant programme. One is the supply side and the other is the demand side. Supply side including political will, efficient bureaucracy, etc., should provide spacing methods, to the populace. This would help activate the demand side since in Indian situation, political leaders can influence enormously the thought processes of the illiterate masses and motivate them to avail of the services provided.

In the last chapter the author puts in critical issues and the recommendations to improve the programme. He repeatedly stresses the wrong emphasis by the government on sterilisation. In his view, it has hampered the promotion of spacing methods, and this cannot be easily changed. He seems uneasy even with measurement of impact of spacing methods in terms of equivalent sterilisations. To me this measurement seems in order. One does not see why this measurement should affect people's attitudes to spacing methods.

The author sees difficulties in having family planning programme centering round a medical doctor. However readers may feel that there is nothing wrong with centering a family planning programme round a medical doctor though occasionally assistance from other departments may be necessary. Secondly, the author thinks that incentives to doctors, paramedics and acceptors of family planning were an impediment to promotion of spacing methods. He believes that the measurement of acceptance of family planning in terms of sterilisation equivalent was not so useful in monitoring monthly changes of spacing methods. It is difficult to understand this. Right methods can always be devised and sterilisation cannot be blamed for it. Further, the impact of sterilisation is declining for reasons one can easily understand, with less dependence on sterilisation and increasing practice of spacing methods.

Leaving aside this obsession with sterilisation, the book is a thorough-going analysis of the family planning movement in India and is certainly a significant addition to the literature in the field of demography.

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Brunner, Hans-Peter, *Closing The Technology Gap: Technological Change in India's Computer Industry*, Sage Publications, New Delhi, 1995, Pp. 219, Price: Rs 275.

The principal objective of this exercise is to examine the hypothesis that technological change does not follow directly or automatically from uncontrolled market competition but from the forms of industrial organisation and governmental practices which play various mediating roles. According to the author, 'Markets, left to themselves, at times fail to funnel the right amount of financial and human resources to those firms that are intent on acquiring technologies. They may also fail to induce a sufficient level of competition among technologies. Finally, markets may fail to give the

innovator a sufficient return on technological change. A governance of the market can facilitate a diversity of technologies in industries. Greater diversity reduces the inherent uncertainty and thus stimulates a higher rate of investment in technology acquisition, intensifies competition among technologies, and increases an innovator's expected return on investment' (p. 18).

The undercurrent of this hypothesis is the author's postulation that economic development and technological development are closely (and positively) associated and sooner the developing countries bridge technology gap, sooner will they develop economically.

The author has chosen, for examining this hypothesis, the growth of computer industry in India and the role played by the government. He finds that 'Unlike the United States, where in the 1950s the computer was developed with heavy government support, India did not promote a domestic research and production capacity. By the late 1960s India's computer industry was entirely in the hands of the emerging multinational firms. It was in early 1970s that the Indian government began to build computer research and production capabilities to acquire and assimilate the new computer technologies. At that time the technology gap in India was large' (p. 19).

The annual change in this 'gap' has been examined by the author for the period 1975 to 1986. To measure this gap and to examine the various factors influencing the yearly movement of this gap, the author has used some ingenious quantitative methods. These methods deserve some detailed mention in this review. To measure the technology gap, the author investigated into following questions: (i) Can the Indian computer models, introduced during 1972 to 1986, be matched with any of the 651 international models, in terms of product-category, central processing unit and its performance, architectural characteristics, primary memory and price category? And (ii) what is the time lag (in years) between the introduction of the matched models in the markets of the USA and of India?

The author has found that out of 118 Indian computer models, a match could be found for 82 models. (In addition, 19 models were also found to have comparable models in the USA, but for these reliable price data was not found). For the 82 models, with the help of time lag, comparable US prices were determined and a 'relative price-performance difference' was calculated for each model. This was used as indicator for 'technology lag' and taking it as dependent variable and the computer category (mini or micro) and the years (1978 through 1986) as independent variables, the regression coefficient for each year showed 'technology gap' for Indian computers in that year. The author also attempted a simpler regression analysis by substituting the 'lag in years' for relative price difference as dependent variable. The examination of these coefficients has led him to conclude that there has been a decline in technological gap. This decline is not steady, but is wavelike. The gap declines from around eight years to one year between 1976 to 1979; it increases to around four years till 1982 and then again declines to around two years by 1986. The detailed review of the government policy concerning computer industry and the industry structure leads him to suggest that the early decline coincided with the entry to private sector allowed by the government; the later increase since 1979 was probably due to the shift in international technology standards and the decline since 1982 was to be seen in the context of import policy shift and beginning of delicensing from that year onwards.

The author also makes quantitative attempts in describing the Indian computer industry structure. By using Herfindahl index of concentration (that is, a measure of industry concentration which 'is the sum of the squared relative shares of firms' p. 115), he finds that India's computer industry went from a state of monopoly to state of high fragmentation. He then identifies 42 essential innovations in the Central Processing Units and Memory of computers and relates them to 16 Indian firms' market share before and after 1982. The regression analysis indicates that every additional essential innovation increases the market share of a firm by about 2.5 per cent. This leads him to conclude that the 'Herfindahl index is a valid indicator of the degree of Schumpeterian technological competition in the Indian computer industry' (p. 122). Of course, the rigour of this analysis is limited by the fact that, in addition to innovation, there are several other factors (like after-sales service, brand name, price, etc.) influencing market share, which have not been considered in

the regression. Had these factors been included, the regression coefficient for innovation could, possibly, have been different.

The author, then, develops the technology change indices by using the prices of computer and the computer output characteristics (measured in terms of million instructions per second and memory). These indices are then calculated by using various forms of regression functions. Comparison of these indices indicates a broad congruence among themselves as also with the technology lag. This demonstrates that the technology gap narrows when technological change in India is rapid.

While this trend is overall true, the author also demonstrates how the government policies have temporarily halted and speeded up the process of technological change during the period of study.

Even if the period of nine years, between 1978 and 1986, can be regarded as a short period, the author has not only marshalled all the available secondary data but also has taken pains to collect primary information from individual computer companies and used all the analytical tools at his command to examine the validity of the neo-Schumupeterian, evolutionary process theory for technology development. Having provided the justification for the role of government in the development of technology, the author states : 'The experience of the Indian computer industry demonstrates that protection from foreign competition has to be accompanied by a high level of domestic competition' (p. 178). He also suggests policies which encourage a move towards a 'medium level of concentration', entry of subsidiaries of multinationals and increased incentives to export hardware.

While the study does bring together all the available information on the computer industry, it does not take cognizance of the fact that the growth of this industry, in a country like India, is dependent upon the price of computer, development of software and the acceptability of its use. The present price of a computer is still beyond the reach of several potential consumers; the availability of local language software is also limited or, for certain applications, non-existent. The reforms in administration and management, which generally precede the use of computer, are also yet to take place. In fact, the fruits of the declining technology lag are yet to reach the masses. There is no wonder that out of 118 Indian computer models, 101 found their 'matches' in the USA. Almost all the micro-computers (which are the subject of this study) are assembled in India, with almost all major parts imported from abroad. Those who use them, can afford their relatively high prices. There is, therefore, no difficulty in importing, whenever the government permits it, the parts of the latest computers from abroad and assemble them over here. The introduction of Pentiums in India or softwares like WINDOWS 95, only months after their release abroad are indicators of 'bridging' the technology gap. But they hardly indicate the technological change that the potentially vast number of consumers in India need. The technological gap, which is relevant for India, is not so much between the technologies of the USA and those of India, but between what the hitherto untapped market needs and what the industry delivers. While the former may be closing rapidly, as the study under review has shown, the latter, unfortunately, has probably remained as wide as before. There is, no doubt, justification for a greater role of the government in encouraging the computer industry in India. It is, however, far wider in scope than the author prescribes.

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Basu, Anuradha, *Public Expenditure Decision Making: The Indian Experience*, Sage Publications, New Delhi, 1995; Price Rs 350.

This study looks at public expenditure decision making in a new way. Traditional theory of public finance treats government as a single decision-making unit acting for society as a whole and allocating public expenditure among alternative uses by supposedly maximising a well defined social welfare function. More recent politico-economic and public choice theories regard government decisions as the collective will of rational individuals who maximise stable and comprehensive utility functions in terms of their private interests (power and economic gain). These theories include models of the budget maximising bureaucrat, of politicians seeking to maximise votes or power, or interest group

models including the Marxist models of class interest. In these theories decision makers exhibit what might be called 'substantive' rationality.

An alternative theory propounded by Herbert Simon rejects such rationality because of the bounds imposed on it by uncertainty about the future consequences of actions and human cognitive limitations. He argues that economic agents do not necessarily maximise any objective function because maximisation requires an exorbitant amount of information and calculation. They may prefer to have rules of thumb which may not lead to optimal results but may lead to what he calls 'satisficing' results. Such behaviour is called 'procedural rationality' by him. This study seeks to find out to what extent public expenditure decision making in a large country like India is an exercise in 'procedural rationality'. It tries to assess the nature and effectiveness of institutional procedures of government expenditure decision making given the uncertainty, human cognitive limitations, goal conflict and ambiguity.

It seeks answers to such questions as: How do government decision makers determine the level of aggregate expenditures each year? What is the process by which they focus on one set of issues rather than another? How do they determine priorities and allocate funds among various sectors and spending ministries? How do they choose between competing projects and schemes? How are conflicting interests and perceptions resolved in an uncertain world? Is governmental decision making based on deliberation and (informal) reasoning relying on information and past experience? Or are most decisions *ad hoc*, the result of sudden whims of bureaucrats and politicians?

What is rationality in public sector decision making, in particular, procedural rationality? It is postulated that the methods or institutions of public expenditure decision making are procedurally rational, if they contribute towards the following:

(1) improving the focus of attention of decision makers so as to narrow the agenda and to reduce goal ambiguity;
(2) lowering information costs to enable decision makers to process key (relevant) information within a limited time span;
(3) lowering negotiation costs so as to manage conflicts of interests, ideas and information asymmetries among decision makers and to enable them to choose among alternatives within a given time frame;
(4) lowering costs of coordinating parallel activity and monitoring the large number of public expenditure decisions made each year; and
(5) learning from experience to improve decision making over time.

These criteria take into account the special nature of public expenditure decisions, namely, (a) these decisions are strictly time bound because revenue and expenditure estimates have to be put into the annual budget; (b) multiple decisions have to be taken on a whole range of complex spending issues in a short span of time; and (c) public expenditures decisions have to be made in the context of scarce resources since demands for expenditure invariably exceed the availability of resources.

The government's decision making machinery has, therefore, to be such that it simplifies their task by enabling the decision makers to focus their attention on a few important problems and reducing the cost of information processing, negotiation, coordination and monitoring, all of which would result in delays. At the same time decision making procedures should be such that they can incorporate learning from experience and increase the possibility of reaching reasonable or good decisions rather than bad ones.

Since the object of the study is choice behaviour and decision making processes rather than the outcome of decisions, the principal methodology used is that of in-depth interviews with government officials and ministers involved in public expenditure decisions, supplemented by an analysis of time series data on public expenditure and a study of government documents and memoranda.

There is a very detailed examination of the expenditure decision making process in India, both with regard to short term expenditure and long term investment expenditure, plan and non-plan expenditure, and committed, obligatory expenditure and 'postponable' expenditure. The role of institutions, like the Planning Commission, the Finance Ministry and, to some extent, the Prime Minister's Office, in such decision making is explored and their interaction

with spending ministries and departments delineated. The amount of information that is available, the way it is processed for decision making, the ways in which priorities are decided, negotiations held and conflicts resolved are carefully described. The study also attempts to find out to what extent expenditure decision making has learnt from past experience.

There are three case studies which seek to illuminate the abstract analysis. They are on decision making in fertiliser investment and fertiliser subsidy, in irrigation and education. The choice of these sectors has been based on the following considerations: the first sector illustrates how investment decisions in a few well-defined projects are made at the Centre and what kind of procedures govern the grant of fertiliser subsidy. In irrigation the focus is on the interaction between the Central and State governments, the choice between a large number of well-defined major irrigation works and innumerable minor irrigation schemes which are not so clearly defined. In education the focus is on a sector which is important but which has received consistently meagre resources because of the intangible nature of benefits and because of the absence of precise awareness of the benefits of education on the part of the beneficiaries and the decision makers.

Is public expenditure decision making in India governed by procedural rationality? The study's findings seem to indicate that it is. Various formal and informal institutions are commonly used by the Indian government to tackle the various dimensions of procedural rationality described above and to reach collective decisions. They are: (a) Medium term planning is a formal institutional mechanism adopted by policy makers to clarify long term development agenda and make strategic choices on inter-sectoral priorities. (b) Distinction is made between plan and non-plan expenditure whose initial rationale was to distinguish expenditure on *new* projects set up in accordance with the country's development strategy from expenditure on *existing* projects. (c) There has been greater decentralisation by the Central government delegating greater financial powers to administrative ministries and public sector enterprises and extending financial support to State governments in the form of block grants and loans. Special bodies and advisory committees, appointed to assess performance of projects and suggest procedural or policy changes, provide multiple sources of advice. Similarly, special monitoring units provide information on project performance and implementation. In spite of this increase in information, annual budget allocation decisions tend to be made on the basis of very limited data. This may be a method of lowering information processing costs, owing to pressure of time. (d) Policy makers have set up interdepartmental committees to coordinate projects undertaken in different sectors. (e) Conflicts with respect to allocation of expenditure between ministries and competing programmes are supposed to be resolved by referring to the inter-sectoral allocation in the prevailing five year plan.

Since the plan does not provide enough guidance for shortterm economic management, several informal mechanisms and rules of thumb have been adopted. They are postponability criterion for prioritising competing project expenditures and reducing negotiation costs; bargaining and the adversary principle to apportion funds among the spending ministries, depending upon their political clout *vis-a-vis* the Ministry of Finance; the use of incrementalism for recurring non-plan expenditures, so as to minimise processing and speed up decision making. A three stage decision making mechanism (involving political and economic judgement and social and administrative factors) is used by decision makers to formulate the public sector agenda so as to simplify and expedite decision making. This priority-based framework involves the exercise of broad judgements and makes relatively small demands on the information processing capability of decision makers.

A comparison of the three sectoral case studies points to the conclusion that as the degree of complexity of decision problems increases procedural rationality becomes more difficult to attain. Complexity is defined in terms of the number of levels of decision making or the number of participants involved; the number of decision items or public expenditure programmes; the number of interest groups to be satisfied; the number of goals that decision

makers aim to achieve; the extent and quality of feedback available; and the degree of tangibility of the benefits and costs. Thus investment decision making machinery for fertilisers scores a slightly higher mark in terms of procedural rationality than irrigation and education because the complexity in the case of the former is less.

The final verdict of the study is that though the public expenditure decision making machinery tries to be procedurally rational it suffers from several defects. Many investment projects suffer from time and cost overruns. There has been a political failure to devise machinery to prevent vast projects being mounted on inadequate grounds. Proper prioritisation of expenditure seems to elude them in many important areas. Nor is there any machinery to regulate non-plan expenditure. The reasons for these procedural defects are problems of bounded rationality, the hidden agenda of government (euphemism for electoral gains, serving class interests or para personal gain?) and inertia or organisational rigidity. Some of these defects may be unavoidable because there is no feasible better alternative or because costs of rectification may exceed benefits.

Some possible reasons why no efforts are made to remedy these defects are: difficulty of moving away from established situations; learning from experience being slow and limited; problems of collective action in a large federal democracy; the fact that nobody in government wants to relinquish power; and apathy or a lack of responsibility (who suffers when a government programme fails as a cynical interviewee seems to have put it).

This is an extremely interesting study. The author, Anuradha Basu, is to be congratulated on a perceptive and diligent study which moves away from political economy and concentrates on details of processes. It is to be hoped that policy and decision makers will go through the book and seek to inject not merely more rationality but greater effectiveness in public expenditure decision making. The process is however bound to be slow because it is intimately connected with the evolution of Indian democracy.

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Prakash, B.A., (Ed.), *Kerala's Economy: Performance, Problems and Prospects*, Sage Publications, New Delhi, 1994; Pp. 418, Price: Rs 375.

The genesis of this book is the need for comprehensive literature on the economy of Kerala for students in universities in Kerala who have to study the subject for their postgraduate degrees. Since this was not available in any one place, Mr. Prakash has undertaken the task of getting various scholars in Kerala to write on different aspects of Kerala's economy and rounding it off with a longish introduction. It is hoped that the material provided will be useful not only to students and teachers but also to researchers and general readers. The contributors are scholars from different universities in Kerala and the Centre for Development Studies, Thiruvananthapuram, and a couple of government officials.

The book is divided into five sections: (i) demographic trends, employment and migration; (ii) agriculture and allied activities; (iii) industry and power; (iv) labour, education and trade; and (v) state finance. There are altogether nineteen papers covering different aspects under each major heading.

Kerala has been one of the poorer states in India and continues to be so even today. In 1971, per caput income of the state was 94 per cent of the average for the country as a whole; in 1986 the gap had widened to 80 per cent, indicating much slower growth of the Kerala economy. The average annual growth rate of the net domestic product had come down from 2.5 per cent during 1960-61 to 1965-66 to 1.2 per cent during 1980-81 to 1985-86. In the following two years it had become slightly negative.

This was because of the near stagnation of the primary sector throughout the twentyseven year period (1960-61 to 1987-88), except during 1965-66 to 1970-71. The secondary sector growth rate also fell steadily from 5.8 per cent during 1960-61 to 1965-66 to 0.6 per cent in 1980-81 to 1985-86. It was only the tertiary sector which grew at a reasonable rate, though even here the rate decelerated from 4.4 per cent during 1960-61 to 1965-66 to 2.6 per cent during 1980-81 to 1985-86.

This is reflected in the rate of growth of workers in different sectors between 1961 and 1981. The

annual average rate of growth of workers in the primary sector was only 1.1 per cent and that of workers in the secondary sector was 1.9 per cent. There was actually a decline in the number of cultivators and household industry workers. In contrast, the growth rate in the tertiary sector was 4.5 per cent. The category of construction workers registered the highest growth rate, 10.7 per cent, followed by trade and commerce (7.3 per cent) and transport and communications (7.3 per cent).

Various surveys of unemployment in Kerala point to an enormous increase in the number of unemployed between 1965-66 and 1987. The percentage of unemployed persons to the total labour force rose from 9.1 per cent in 1965-66 to 40 per cent in 1987. The latter figure was split up into 25.8 per cent openly unemployed and 14.2 per cent underemployed. 75 per cent of those who were underemployed in the survey carried out in 1987 were in the age group 15 to 29; and 29 per cent of the total unemployed were educated.

The trend in poverty is also equally depressing. The Centre for Development Studies, using a poverty norm of 2,200 calories, had estimated that in 1961-62, 47 per cent of the rural population and 54 per cent of the urban population were undernourished. An official estimate using a slightly higher calorie norm had concluded that at the beginning of the seventies, 60 per cent of the rural population and 66 per cent of the urban population were below the poverty line. Yet another official estimate gave the figures for 1977-78 as 68 and 78 per cent, respectively.

In spite of low growth, high unemployment and increasing poverty, Kerala's achievements with regard to the physical quality of life are quite remarkable. The birth rate has fallen from 38.9 to 19 between 1960 and 1990. In the same period, the death rate has come down from 16.9 to 5.9 and the infant mortality rate from 120 to 17. Life expectancy has gone up from 46.2 to 67.1 for men and from 50 to 73.1 for women between 1960 and 1987. Similarly, the literacy rate has gone up from 55.1 per cent to 90.6 between 1961 and 1991. As a matter of fact, Kerala is held up by developed countries and international agencies as an example of how the quality of life can be improved even in a poor country.

Why is Kerala industrially backward and why is its overall economic performance unsatisfactory, in spite of the fact that it has several ingredients necessary for growth, such as high literacy rate, low population growth and large remittances from the Gulf by migrant workers? Leftists place the responsibility for this on the discriminatory treatment of the Kerala Government by the Centre, the crisis ridden nature of capitalist development and the inadequacy of institutional finance. The rightists emphasise unsound development policies of successive governments, the undue expenditure on social welfare measures leading to a lack of funds for development, and aggressive trade unionism.

The editor's own views are somewhat eclectic. One of the most important factors not normally noted is the severe shortage of rainfall during the sixties. This affected severely both irrigation and electricity generation in a state almost wholly dependent on hydroelectricity. It first affected agricultural production adversely which was compounded by high wages due to trade unionism among agricultural workers. Secondly, as not much success seems to have been attained with regard to the development of HYV seed suitable to Kerala's agronomic conditions, there was a shift to less labour intensive crops like coconut.

With regard to industry, the severe shortage of electricity intermittently affected production as well as the investment climate in the state. Also the strong trade union movement affected the working of the existing public and private sector units in the state, led to a migration of small scale units to neighbouring states and discouraged private investment in particular, both local and from outside the state. The public investment policy of the state was both unsound and inadequate, because of lack of resources and the poor implementation of both, infrastructure and industrial projects.

The greatest failure of the policy seems to have been with regard to the utilisation of remittances received from migrant workers in the Gulf. Instead of leading to development, it led to a boom in housing and luxury living on the part of those who had been extremely poor until the other day! The government did not develop any imaginative ways of diverting this inflow to more productive ends!

The Kerala model thus seems to emphasise the need for a development environment which is imaginative and which minimises the role of the state when the political system is fragmented by many political parties which are not averse to

promoting their own narrow interest at the expense of the general interest!

The book serves its objective as a text book admirably. The general reader also will get a better understanding of how the economy of Kerala works (or does not work)!

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Saini, Debi S. (Ed.), 1995; *Cases on Labour Law: Minimum Conditions of Employment*, Oxford & IBH Publishing Company, Pvt. Ltd., New Delhi.

Generally, laws enacted for the protection of labourers are classified into (i) wages, salaries and other monetary payments, like allowances, bonus, provident fund, gratuity and superannuation benefits; (ii) terms and conditions of employment other than monetary; and (iii) labour relations including trade unions, collective bargaining, strikes, settlement of disputes, etc. However, an additional branch is mentioned in this book under review. Apparently all the labour laws are divided into four parts, namely, (i) minimum conditions of employment, (ii) wages and monetary benefits, (iii) social security, and (iv) industrial relations (p. 1). Thus, a project of four volumes has been undertaken by the Gandhi Labour Institute, Ahmedabad, in order to present in abridged form the landmark judgments in labour laws. Of these volumes, the present compilation is the first one prescribing the minimum conditions of employment.

Labour legislation is customarily based on Articles 39, 41, 42, 43 and 43A in the Constitution which pertain to workers' health, education, right to work, living wage, equal pay for equal work, just and humane conditions of work, maternity relief for women, participation in management, etc. These Articles form part of the Directive Principles of State Policy, and as such may be just directives to the state and not enforceable in courts but the provisions in the Acts based on them are. Hence, their breach entitles workers to approach the court and seek redressal. In addition, courts take the aid of such enforceable Articles as Articles 21, 23 and 24 of the Fundamental Rights Part in the Constitution, and construe them in a manner favourable to workers for upholding their right to minimum conditions of work, such as conditions relating to protection of life and of personal liberty. Similarly, under these Articles, forced or bonded labour, which is proscribed under any circumstances, and child labour, which is prohibited in certain hazardous occupations, are both held unconstitutional. Further, constitutional support is sought in labour litigation through the use of concepts like the quality of life or human dignity, which are elucidated in many public interest litigation (PIL) cases. The liberal interpretation of the rule of *locus standi* (right to go to a court) in PIL helps to challenge the malpractices in employment. Therefore, such leading decisions as interpret the key concepts in the relevant constitutional provisions as well as in ten central Acts mentioned below are selected for this volume. The central Acts are: (i) the Factories Act, 1948, (ii) the Mines Act. 1952, (iii) the Dock Workers (Regulation of Employment) Act, 1948, (iv) the Beedi and Cigar Workers (Regulation of Employment) Act, 1966, (v) the Working Journalists and Other Newspaper Employees (Conditions of Service and Miscellaneous Provisions) Act, 1955, (vi) the Motor Transport Workers Act, 1961, (vii) the Child Labour (Prohibition and Regulation) Act, 1986, (viii) the Contract Labour (Regulation and Abolition) Act, 1970, (ix) the Inter-State Migrant Workmen (Regulation of Employment and Conditions of Service) Act, 1976, and (x) the Bonded Labour System (Abolition) Act, 1976.

These Acts help to maintain minimum standards of industrial safety as well as to ensure that the worker's health and welfare are protected at least to the minimum extent, in spite of the high incidence of unemployment and under-employment in the country. The judgments are rendered in abridged form, and are first grouped act-wise, and further concept-wise. A summary of the facts of the case precedes each judgment included in the volume; but the judgment itself is not summarised, only its relevant excerpts are given. Thus, the volume is supposed to elaborate on 'problems of conditions of employment in non-agricultural occupations' (p. 1).

While reviewing a casebook like the present volume, only jurists are in a position to comment on the contents (judgments). It would amount to evaluating the law laid down in a judgment, a sort of case commentary. However, that is not the purpose of this review. It is a review by a layperson who seeks to evaluate the selection of judgments, the manner in which they are presented and their editing, in order to find out whether the casebook has achieved its avowed purpose. It is stated in the Introduction by the Editor that 'all important aspects related to a branch of law should be covered by a collection of cases. This casebook seeks to make such an attempt in the area of minimum conditions of employment' (p. 2). The law relating to the conditions of employment is further divided into protective laws for different classes of employees and prohibitory laws banning certain age-old malpractices in employment, like bonded labour or child labour. Yet, not all central statutes governing the conditions of employment, leave alone the state statutes which are really more relevant, are incorporated in this casebook, e.g., the Industrial Employment (Standing Orders) Act, 1946 aiming at curtailing several malpractices, is left out. This Act requires employers in industrial establishments to formally define conditions of employment. Rightly, certain central statutes are excluded for lack of leading judgments based on them, e.g., the Plantations Labour Act, 1951. But certain other statutes like the Apprentices Act, 1961, the Boilers' Act, 1923, the Cine-Workers and Cinema Theatre Workers (Regulation of Employment) Act, 1981 and Sale Promotion Employees (Conditions of Service) Act, 1976 are not even mentioned. Why? It is not that courts have not delivered significant judgments based on these Acts. Exclusion of state statutes too appears superficial in a thematic volume intended to elucidate concepts. When a casebook is prepared 'to articulately(?) grasp the correct legal position relating to complex concepts involved' in labour law (p. iii), such distinction as is based on legislative authority hardly matters. For, most of the state statutes when related to one particular branch of law have several concepts common with central Acts pertaining to that branch. For instance, the concept of leave facilities is dealt with in the Factories Act, 1948 (central statute), with the inclusion of Chapter VIII (Sections 78-84) in 1954. The same concept is used in a number of state statutes- Shops and Establishments Acts. Further, many of the central Acts empower the states to modify the provisions of their sections, in view of different local conditions, like the Factories Act, 1948. Besides, a few central Acts have state amendments without any such specific provision, e.g., the definitions of 'adolescent' and 'child' in the Motor Transport Workers Act, 1961 are amended in Tamil Nadu. Finally, almost all the central Acts confer the rule-making power to states and it is the rules framed under a statute that actually define workers' conditions of employment. One expects to find a collection such as the present one at least to enumerate exhaustively all the employment-governing statutes, central or state.

Regarding the selection of judgments to be abridged, it is unfortunate that there is no mention of the criteria laid down, except that a judgement which 'deals with some matter of law of far-reaching importance' is deemed worth including (p. 1). The volume intends to elucidate the key concepts used in labour laws, but at times different labour statutes define a particular concept or term differently, e.g., the concepts of factory and manufacturing process, the first set of concepts dealt with on Pp. 9-19 in the volume. These concepts are differently treated in the two Acts, namely, the Factories Act, and the Employees' State Insurance Act. Here the judgment- *Nagpur Electric Light and Power Company Ltd.* v. *Employees State Insurance Corporation*- is included to illustrate these concepts. It is stated in the judgment itself that the definitions and the object of the two Acts are different (p. 17). Since the issue involved in this case relates to the provision of insurance security for workers, sub-stations and zonal stations of the *Nagpur Electric Light and Power Company* are held as work-places, so that the staff employed there get insurance protection. In the subsequent judgments, both of the Supreme Court and of the High Courts, it is held that no manufacturing process takes place either in the sub-stations or in zonal stations of an electricity supply company and that they do not satisfy the definition of 'factory' under section 2(m) of the Factories Act (*Workmen of Delhi Electric Supply Undertaking* v. *The Management of Delhi Electric Supply Undertaking*, 1972-II *Labour Law Journal* 130, a judgment given by the three judges of the

Supreme Court; also *Gujarat Electricity Board* v. *State of Gujarat and Another*, 1984-II *Labour Law Journal* 370, a judgment given by the Gujarat High Court). Placing the *Nagpur Electric Light and Power Company* judgment under the Factories Act in the volume and lack of any mention whatsoever of the latter judgments are likely to lead to misinterpretation of the definitions involved.

The second concept elucidated with judgements is that of 'worker' (Pp. 19-33). The first judgment in this section, *Dharangadhra Chemical Works Ltd.* v. *State of Saurashtra* is again erroneously included under the Factories Act, 1948 when there is no reference to this Act in the judgment. It is entirely based on the definition of worker in Section 2(s) of the Industrial Disputes Act, 1947 and not on the one given in Section 2(l) of the Factories Act, 1948 (p. 24). The Statement of Objects and Reasons for the Factories Act, 1948 cites as its main concerns industrial safety, occupational health hazards, and health and welfare of the worker. In the light of these objectives, Section 2(l) of the Factories Act defines the term worker as 'a person employed, directly or by or through any agency (including a contractor) with or without the knowledge of the principal employer, whether for remuneration or not, in any manufacturing process, or in cleaning any part of the machinery or premises used for a manufacturing process, or in any other kind of work incidental to, or connected with, the manufacturing process or the subject of the manufacturing process, but does not include any member of the armed forces of the Union'. On the other hand, Section 2(s) of the Industrial Disputes Act defines a workman as 'any person (including an apprentice) employed in any industry to do any manual, unskilled, skilled, technical, operational, clerical or supervisory work for hire or reward, whether the terms of employment be express or implied, and for the purposes of any proceeding under this Act in relation to an industrial dispute, includes any such person who has been dismissed, discharged or retrenched in connection with, or as a consequence of, that dispute, or whose dismissal, discharge or retrenchment has led to that dispute, but does not include...'. This definition aims at achieving the object of the Industrial Disputes Act, viz., to provide for resolution of industrial disputes through adjudication by forums, which are not restrained by statutory control and are free to devise their own norms and, thereby, facilitate improved industrial relations and peace. If the same term is used in two Acts and the scope of its definition is identical, the Act passed later, generally, does not provide any definition for it but refers to the earlier Act for that purpose. For instance, the definition of the term 'wages' in the Payment of Wages Act, 1936 is used in the Inter-State Migrant Workmen (Regulation of Employment and Conditions of Service) Act, 1979. When, however, the term used may be the same in two statutes, yet its scope, inference, context, etc., are not the same, both the statutes provide definitions of that term to serve their specific purpose, as is done in the case of the Factories Act and the Industrial Disputes Act. Courts too, interpret such a term in the setting of the Act concerned. Hence it is misleading to cite a judgment based on the Industrial Disputes Act for expounding the definition of worker in the Factories Act.

Further, certain judgments of the High Courts reported in the volume are controversial and if a judgment upholding one interpretation is reported in the volume, it is expected that the alternative or contrary reading upheld by some other High Court is too placed before the readers, since the Supreme Court would ultimately overrule one of them. Unfortunately, this is not done here. The judgment in *W.S. Industries (India) Ltd.* v. *The Inspector of Factories* on Pp, 36-38 is given by a single judge of the Karnataka High Court, who interprets here the proviso introduced to section 2(n) of the Factories Act by an amendment in 1987. This section defines an 'occupier' as 'the person who has ultimate control over the affairs of the factory, provided that in the case of a company, any one of the directors shall be deemed to be the occupier'. The Karnataka High Court holds 'that not only the person in ultimate control of the factory, but also the persons categorised in the proviso, are liable to be deemed as occupier' (p. 37). Thus, it adheres to the reading that the proviso does not override the main part of the section, to create a substantial, parallel specification. On the contrary, a totally different understanding of this proviso is accorded by a Division Bench of two judges of the Allahabad High Court in *Bhatia Metal Containers* v. *State of Uttar Pradesh*, 1990-II *Labour Law Journal* 534. The Allahabad High Court holds that only a director can become the 'occupier' in the case of

companies and the company cannot nominate anyone else, except the director to that designation. Thus the main section- 'the person who has ultimate control over the affairs of the factory'- is redundant in the case of a company [Bakshi, 1992, Pp. 181-182]

Part VII of the casebook is devoted to the Child Labour (Prohibition and Regulation) Act, 1986. It is commendable, since most of the books on labour laws forget to refer to the Child Labour Act. However, this Part delineates on only two judgments on the Act, and one of them, though concerned with children, 'does not pertain to the Child Labour (Prohibition and Regulation) Act, 1986' (p. 228). According to the Editor, the propriety of including it lies in that 'it helps to understand the importance of a conducive environment surrounding children' (p. 228). It is difficult to agree with the Editor, particularly when many judgments on child labour need to be highlighted. Further, the Children (Pledging of Labour) Act, 1933 as amended in 1951 and 1970 is nowhere mentioned in the casebook.

The Acts covered in the volume are further subdivided into categories, such as the Factories Act which is further classified into 'worker', 'safety', 'overtime', 'annual leave with wages', etc. Cases are grouped under these sub-categories; however, it seems this pattern is not strictly followed, e.g., a case dealing with the question of overtime wages, *Hindustan Machine Tools Ltd.* v. *Labour Court* (p. 67), based on Section 59 of the Factories Act, has been placed in the sub-category of annual leave with wages, provided under Section 79 of the Factories Act. It is not explained why the classification is not adhered to. Hence, it appears to be an instance of oversight.

One fails to understand the propriety of posing questions at the end of only a few excerpts of cases, like at p. 299 or p. 382. Also, it should have been clarified what the 'Notes' at the end of some of the cases, such as on p. 147 or p. 308, are. They are not footnotes, for their serial numbers are not cited in the text. Are they explanatory notes?

All law-reports present judgments that are edited with headnotes. Usually, judgments have more than one headnote, for a number of legal issues are involved in every case. A case may concern conditions of employment; yet, some of the other arguments may be constitutional, others procedural- like the limitation of period, within which a case is to be filed, or jurisdictional, i.e., whether it is filed at the appropriate court. All such issues and arguments in a case are, therefore, classified and then reported. Every headnote prefaces one issue or argument. It not only quotes the exact Act, section, sub-section, clause or sub-clause involved and expounded in the judgment but also refers to its key concepts that are interpreted. Besides the headnote ends citing the number/s of the exact paragraph/s in the judgment, in which this interpretation is analysed. This practice facilitates a quick reference to and an easy grasp of the issues involved in a case. The utility of the present casebook would have immensely increased, had it adopted some such method for providing paragraph headings when a new issue is taken up for delineation.

There are quite a few instances of overlooking minor details. For example, on page 18, it is stated: 'Take the case of workers mentioned in Appendix III'. But no Appendix III is given. Similarly, on pages 283 and 285 (last paragraphs) and page 295 (second paragraph), cases are mentioned with '(*supra*)' at the end; but they are not given earlier, in fact, not at all given in the volume under review. On the whole, the volume appears to be a very worthwhile project though completed in haste.

REFERENCE

Bakshi, P.M., 1992; 'Proviso in Legislative Drafting', *Journal of the Indian Law Institute*, Vol. 34, No. 2, April-June 1992.

Suneeti Rao,
Indian School of Political Economy,
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Structural Adjustment in India: An Assessment, by Alternative Survey Group, New Age International Ltd, New Delhi, 1995, Pp. 249, Price 175.

The structural adjustment Programme or the New Economic Policy (NEP) in India was initiated by the present Narasimha Rao government, which came to power in mid-1991. By the end of 1994-95, it had completed 45 months in office. This book, containing 28 individual articles by as many authors, makes an assessment of the NEP at the end of these 45 months. It generally concludes that the NEP has failed and puts forth a belief that 'the Indian

economy can be steered into an alternative path of people-oriented development'.

It must be remembered that almost all shades of political opinion in India, from the *swadeshi*-oriented Shiv Sena - Bharatiya Janata Party (Sena-BJP) government in Maharashtra to the working-class oriented government in West Bengal, have accepted the basics of the NEP. It will be shown below that even this book, which sets out to propose an alternative path unwittingly accepts the NEP. Its criticism is directed not to the basic strategy of the NEP but to the wide range of activities proceeding under it, reaching down even to the foot-valves of the irrigation pumps, which, it points out, need to be made more efficient (p. 209). It examines whether nutrition standards have improved under the employment generation and poverty-alleviation programmes (pp. 64 and 72); whether the Nitrogen-Phosphate-Potash (NPK) balance has been maintained in the use of fertilisers (Pp. 80-81); and so on. With such a wide coverage packed in just 249 pages, we get, so far as the NEP proper is concerned, less of discussions and more of opinions and conclusions. We get a taste of these opinions on the very first page where the government is held guilty of a 'stubborn refusal to learn anything from the current experience' and, on the contrary, flaunting 'a boastful bag of achievements'. Such expressions are scattered throughout the book, which also takes satisfaction in what is perceived as a rejection of the NEP by the people through last year's elections in which the Congress (I) was defeated in many states. The authors ignore the fact that the winners of the elections are all following the NEP (p. 230).

While discussing the NEP, it is first necessary to recall what led to the giving up of the earlier policy. Under that earlier policy, generally called the Nehruvian Policy, the strategic thinking was that the state would take up several important productive activities through the Public Sector Under Takings (PSUs), that these PSUs would generate surpluses, and that these surpluses, since they would be wholly in government's hand, would provide enough funds for further investments. That policy, pursued for about twenty years, did create a strong infrastructure but failed to generate surpluses in government hands and the central government as a separate accounting unit began to get into trouble. It could not even service its borrowings. It, therefore, stopped expanding its entrepreneurial activity, began to give a greater role to private sector and restricted itself to a regulatory role. This role also was not successful and, by 1990, the economy got into a crisis. Large government deficits, a high rate of inflation and an external debt-trap were the principal features of that crisis.

At the heart of this crisis was the inability of the economy to generate disposable surpluses. Since the public sector could not generate these surpluses, the new strategy was, as put forward by the Prime Minister himself, that the surpluses would be generated by the private sector, and that a part thereof, flowing to the government through taxes, would provide the latter with funds for social development programmes. Another basic strategy of the NEP is what is called globalisation. Contrary to what Ashish Kothari has said, this globalisation is not a 'drive towards an export-led model of growth' (p. 142). Exports amounting to about 8 per cent of the GDP, and still falling short of the foreign exchange (forex) requirements for imports of fertilisers, Petroleum Oil and Lubricants (POL) and capital goods - which, as T.M. Thomas has noted, are the major items of imports - can hardly be looked upon as a major player in the process of growth. Exports, for India, have only a modest objective, that of being able to pay for badly needed imports. But even for achieving this modest objective, we have to conform to the international business practices. We also need foreign private capital for the exploitation of our natural resources. Giving reasonable incentives to that capital naturally forms part of globalisation.

Let us now see what the present authors say about these two basic aspects of the NEP. K Ashok Rao disapproves of it by saying that 'the ideological basis for structural adjustment is profit' (p. 104); but Balraj Mehta remarks that '... borrowings when not deployed in productive and profitable avenues ... swell the already enormous internal debt of the government' (p. 112), and that '*mobilisation* of a part of incomes and wealth .... is indeed the only authentic and effective instrument of *mobilising* resources by non-inflationary means' (p. 117 - emphases added). Neither Balraj Mehta nor any of the other authors is proposing that the public sector should and can generate the surpluses. Balraj Mehta clearly envisages that surpluses will be generated by the private sector and a part thereof will only

be mobilised by the government for its own expenses. As regards the second basic aspect of the NEP, namely, globalisation, B.B. Bhattacharya actually wants it to proceed further. He even advocates a proper exit policy for attracting foreign capital (p. 43). Arun Kumar has only this to say that 'the country now needs to ponder over how to globalise keeping the national interest in mind' (p. 35). As stated in para 2 above, these statements by various authors amount to a virtual acceptance of the basic strategy of the NEP.

We now come to the results of the NEP. The present book is based on 45 months of its operation. Twelve more months have since passed and now, at the near-end of 1995-96, we are getting the confirmed results for 1994-95 and preliminary estimates for 1995-96. The macro-results certainly look good, in contrast to the gloomy forecast made by Balraj Mehta. Inflation is down to less than 5 per cent. GDP grew by 6.2 per cent in 1994-95 and is expected to rise to the same extent in 1995-96. The growth in industrial production during 1995-96 is expected to be more than 11 per cent. The rates of savings and investment which were at their lowest in 1992-93 made a dramatic turn-around in 1994-95 reaching 24 to 25 per cent of the GDP; and are expected to be of the same order in 1995-96. Government's tax revenues are buoyant. The Foreign Direct Investment in India is also expected to be a good 2 billion in 1995-96. Thus, in spite of the weaknesses in the balance of payments position and the government deficits, the macro-economic situation seems to be quite under control.

The main concern of the authors, and it is a very legitimate concern, is that the benefits of the NEP are reaching only about 300 million people and that the masses are left only to face the inflation and the exploitation of their environment. A good deal of attention has been paid in this book to the condition of the poor. Their condition does not remain as bleak as might be supposed. While Kamala Prasad says that 'the growth scenario of the reforms is biased against the poor', (p. 65), elsewhere, Jayshree Sengupta, while questioning the benefits claimed by the Planning Commission in this domain, admits to a 'continuous and steady decline' in poverty due to 'sustained efforts at poverty reduction', from the 1980s to the present day, except during the first year of the reforms, i.e., 1991-92 [*Sunday*, 4-10 Feb, 1996].

With the government committed to raising more resources for poverty-alleviation programmes through the NEP, it is not true to say that the NEP has an anti-poor bias.

However, mere poverty-alleviation cannot be an objective of an economic policy. The masses have right to a richer life. If there is any alternative strategy to achieve that, it must be given full consideration. Arun Ghosh has in this book presented an alternative strategy which can be summarised as under: (i) greater taxation of incomes, wealth and black moneys; (ii) infrastructure, including that in the rural areas to be developed by the public sector; (iii) other development in rural areas to be brought about through a growth in rural demand based on rural employment; (iv) land to be given to the tiller and water-shed area management to be entrusted to rural communities; and (v) since rural development is to be handled by state governments, more revenues to be transferred to state governments.

It is difficult to say that this alternative strategy is 'comprehensive and practical' - the test laid down by one of the authors themselves (p. 157). It depends on the generation of surpluses through the present NEP. The above elements of the alternative strategy have not been worked out in detail to enable one to judge whether it would be practical. One can see many difficulties in it. What level of taxation will, without harming the private generation of surpluses, provide enough funds to the government to be invested in rural infrastructure and in giving subsidised credit and other inputs to the rural sector? If development in rural areas is to be brought about through increasing the rural demand, does not this strategy involve a market economy? Since such a market economy and activities like water-shed area management are to be handled by rural communities, don't the 'feeble articulation of NGO (Non-governmental Organisations) involvement' and the weaknesses of the Panchayat institutions, already noted by Kamala Prasad (Pp. 74-75), make the third and fourth elements of the plan rather problematic? The same applies to the idea of giving more prominence to the state governments. Merely giving more power and funds to the state governments does not change the ground realities in the rural areas.

To conclude, while this book is eager to find an alternative economic strategy which will serve 'the interests of 700 millions deserving poor' (p. 14), it accepts the two basic tenets of the NEP - that surpluses are to be generated by the private sector and that globalisation has to be accepted. The details of secondary policy decisions have not been worked out. The book recognises that some decisions can be taken only if there is a political will (p. 241). The authors also imply a dependence on the private sector for fulfilling a supply-side role as a counterpart to the demand generated by the public-sector investment in infrastructure. Now, as regards political will, if it is to be a democratic product, it has to get built up from below and not imposed from the top. As regards the supply-side role of the rural people or even their role as an agency to carry out public sector investment, these roles call for an entrepreneurial and transactional ability in the masses. It is because the society lacks this ability that, as the Comptroller and Auditor General points out (p. 66), programmes like the Integrated Rural Development Programme (IRDP) become relief programmes rather than poverty-alleviation programmes. Efforts at changing the society have been on for a long time. From the government's side, education and local-self-government are being expanded. The people on their side are learning through their participation in the political and market processes. But the change will take time. The success or failure of the NEP should not be judged on the basis of what it did in 45 months regarding this question of social change. As already stated, the NEP has done well in inching towards its macroeconomic objectives. No one denies that within the satisfactory economic aggregates one can come across many individual failures. Those, of course, have to be examined and corrected.

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BOOKS RECEIVED

Currently, a large number of books are being published on Indian economic, political and social problems and developments. We give below a list of books we have received with a request for a review. For want of editorial resources, it is not possible to review all of them though many deserve a critical review. Interested readers are requested to write to the editor indicating which of the following books he would like to review or write a full review article on. We shall be glad to do the needful. Readers are also welcome to review books recently published, but not appearing in the following list. As the contributors to this Journal are aware, all contributions published here are adequately remunerated.

Central Statistical Organisation, 1995; *Economic Census, 1990: All India Report*, Department of Statistics, Ministry of Planning and Programme Implementation, Government of India, New Delhi; Pp. (iii)+104.

This Report of the third Economic Census covers the entire country, except Jammu and Kashmir. The Economic Census was conducted in April-October 1990, along with the houselisting operations of the Population Census, 1991. It incorporates all enterprises engaged in non-agricultural and agricultural economic activities except plantation and crop production. Some of the particulars about the enterprises collected are (i) location, (ii) nature of operation, (iii) type of ownership, (iv) social group of owner, (v) power/fuel used, (vi) number of persons employed and categories by sex and state, and (vii) hired persons. A comparison with the second Economic Census, 1980 is made in the final chapter. There are charts and annexures enclosed in the Report.

Confederation of Indian Industry, 1993; *India: Destination In South Asia, Exposition on Civil Aviation, Background Paper Indian Aviation Industry- At the Threshold*, Confederation of Indian Industry, New Delhi; Pp. 17+(48 Data sheets).

Civil Aviation sector in India completed its half a century with the announcement of OPEN SKY POLICY. It is the most crucial phase of development for the Indian civil aviation industry. Therefore, in December 1993, the stakeholders in the aviation industry of the world over were invited by the Confederation of Indian Industry to New Delhi, to participate on a common platform, to deliberate on the key issues and chalk out a policy framework for its modernisation and commercialisation. This publication appended by a number of data sheets comprises the background paper to the meet. It provides, in brief, a pragmatic assessment of the available infrastructure and resources as well as of the future projections for growth of the civil aviation industry.

Dhawan, B.D., *Groundwater Depletion, Land Degradation and Irrigated Agriculture in India*, in S.N. Mishra, (Ed.), Studies in Economic Development and Planning, Series No. 60, Institute of Economic Growth, Delhi, Commonwealth Publishers, New Delhi, 1995; Pp. xvi+200, Price: Rs 300.

Today, India has the largest irrigated area potential in the world, with an irrigation capacity, which can provide productive as well as protective benefits to about 80-90 million hectares of crop area. This capacity is almost equally divided between surface water-based (public canals) and groundwater-based (private wells) irrigation sources. Of the many issues involved in irrigation development, two are focussed in this book, namely, canal-related waterlogging salinity and groundwater depletion. Regarding the former, the author's findings are: 1. The magnitude of land area degraded due to waterlogging salinity (including alkalinity) is, approximately, 12-16 million hectares, i.e., one-tenth of 175 million hectares under all types of degraded lands in the country; and at least half of it is waterlogged/salinised due to natural factors. 2. The land affected by canal-related waterlogging salinity suffers varying levels of degradation and is not totally unsuitable for farming. 3. Its incidence varies from canal to canal and also from state to state. 4. This incidence

shows decline in the recent years, not because of remedial or preventive measures, but due to farmers' investment in well irrigation, that serves the incidental purpose of vertical drainage of the seeped-in canal waters. And 5. investment in land reclamation is a viable proposition, although the returns to investment would be modest. To reclaim the 6 million hectares of already degraded area, investment of Rs 6,000 crore is required.

As regards the second issue, that of groundwater depletion, the author comes to the conclusion that the incidence of groundwater exploitation for the country as a whole is low, the aggregate groundwater use for irrigation purpose constituting hardly one-third of the utilisable groundwater resource. Punjab is the only state fully tapping groundwater resource. However, certain districts within states far from full exploitation may experience overexploitation. Also, overexploitation may be encountered even within parts of certain districts still distant from the critical point of full exploitation. This conclusion is based on volumetric data on groundwater, and is contrary to the findings based on area statistics of the Planning Commission.

Hanumantha Rao, C.H. and Hans Linnemann, (Eds.), 1996; *Economic Reforms and Poverty Alleviation in India*, Indo-Dutch Studies on Development Alternatives (Series), 17, Sage Publications, New Delhi; Pp. 271, Price: Rs 350.

This book is based on the papers and an address presented at a seminar on 'Structural Adjustment and Poverty in India: Policy and Research Issues' organised by the Indo-Dutch Programme on Alternatives in Development at The Hague on 29-30 November, 1994. There are eight papers analysing the major issues involved in the ongoing economic reforms and their short-run consequences, particularly, for the poor in India. The analysis is made in the relevant theoretical framework, and in the light of the experiences of several countries in Latin America, Africa and Asia which underwent the adjustment process during the 1980s. The measures, taken to achieve the twin objectives of the reforms, namely, stabilisation and structural adjustment, are evaluated with the help of contemporary empirical data. Despite the vast experience having been accumulated elsewhere, the content and sequencing of the reform package for India remained a standard one with little adaptive innovation. But, the most striking finding in the volume, taken as a whole, is a significant rise in poverty in the immediate post-reform period, reversing the earlier trend of a decline in poverty. It is pointed out that such actual rise in poverty is not an inevitable short-term consequence of economic reforms and could have been avoided, at least reduced, had the vulnerability of the prevailing inegalitarian socio-economic structure, especially in the rural areas, to the shocks of adjustment been taken into account by the policy-makers. Hence, policy correctives are suggested for mitigating the severe impact of the reform measures on the poor, such as a more inclusive adjustment strategy, which gives priority to the structural transformation of the rural economy by both, raising agricultural growth through greater labour-absorption as well as stepping up human resource development.

Housing Development Finance Corporation and Industrial Credit and Investment Corporation of India, (Pubs.), 1995; *India in Transition through the Eyes of a Visionary: Writings of H.T. Parekh*, 2 Vols., HDFC and ICICI, Bombay, Pp. 602+679.

These two volumes, a posthumous tribute to H.T. Parekh, are brought out by the two organisations with which he was closely associated. They comprise a collection of all his published articles written during the years, 1940-90, which approximately coincide with the post-Independence 'Indian drama of economic development'. The subjects covered include the capital market, credit policy, gold policy, development banking, economic and industrial policy in general, rural development, social infrastructure, planning, and international and regional cooperation. Many of the articles demonstrate an anticipatory quality. For example, the need to free the holding and import of gold, low interest rate regimes, the importance of investment in housing and the need of an

institutional mechanism for housing finance, or South Asian coalition of nations are some of the themes espoused in the collection. It is preluded with a foreword by I.G. Patel.

Indira Gandhi Memorial Trust, 1993; *The Fourth Indira Gandhi Conference, 1993: Redefining the Good Society*, Indira Gandhi Memorial Trust, New Delhi, Pp. 76.

In this summary of the Fourth Indira Gandhi Conference, the theme, *Redefining the Good Society*, is discussed in six sessions which are devoted to its following aspects: liberty in a modern society, equity in a modern society, fulfilment in a modern society, nation community and world community, science in society, and towards a non-violent world order. Individual's rights, group's rights, the role of family, gender, religion and ideology, development and environment, tyrannies of technology, and such other issues, which profoundly concern human civilisation, are diagnosed. Excerpts from speeches and discussions are quoted.

Industrial Credit and Investment Corporation of India, 1995; *Export Performance of Companies in the Corporate Sector: 1989-90 to 1993-94*, Industrial Credit and Investment Corporation of India, Bombay; Pp. 78.

This study of 470 exporting companies is brought out by the Industrial Credit and Investment Corporation of India (ICICI); it is an update of its earlier five-year trend analysis of 455 exporting companies for the years 1988-89 to 1992-93, published in 1994. The present study, divided into seven chapters, first surveys India's trade policy, industrial exports and exports of the sample from 1975-76 to 1993-94. It examines the performance of the exporting companies, both at the aggregate level as well as by classifying them as earners and spenders, so that the capacity of exports to finance imports of raw materials and capital goods is probed. The export performance is judged by the net foreign exchange earnings and export intensity (exports to sales ratio) rather than the f.o.b. value of exports alone. The performance of the sample companies is further analysed by grouping them according to their export status, and also by classifying them into companies with and without foreign collaboration, both financial and/or technical. Performance of the first 5, 10, 25, 50 and 100 largest exporters in each category is evaluated. Finally, factors influencing export performance are also identified and scrutinized.

Industrial Development Bank of India, 1995; *Financial Performance of IDBI Assisted Companies in the Private Corporate Sector, 1994-95: Preliminary Study*, Industrial Development Bank of India, Bombay, Pp. 47.

This is an appraisal of the financial performance of 520 public limited companies in the private sector during the fiscal year 1994-95. They have been assisted by the Industrial Development Bank of India (IDBI), under its various schemes of Direct Finance. They belong to the group of non-finance companies, engaged in manufacturing and service. The study is based on their audited annual reports. Growth in sales, exports, gross profit (after depreciation), profit before tax (PBT), profit after tax (PAT), gross fixed assets, value of plant and machinery, stock of raw materials, investment portfolio, average return on capital employed, dividend rate, etc., of the sample companies are assessed. Ratio analysis provided for them include assets-liabilities ratios, assets-utilisation ratios, profitability ratios, capital intensity ratios, stock-turnover ratios, etc.

Institute of Rural Management, 1993; *Symposium on Management of Rural Cooperatives (December 7-11, 1992): Summaries of Workshops and Abstracts of Papers*, Institute of Rural Management, Anand; Pp. (vi)+176, Price: Rs 100.

This is a compilation of (a) the summaries of Workshops conducted on 15 themes related to rural cooperatives, their management and other policy issues; and (b) the abstracts of about 200 papers included in these Workshops. The 15 Workshops delineated and deliberated on such diverse themes as state and rural cooperatives, design and operation of political processes in rural

cooperatives, accounting, financial planning and control in rural cooperatives, economic theory of the cooperative firm, etc. These 15 Workshops formed the Symposium on Management of Rural Cooperatives held in the Institute of Rural Management, Anand, in 1992. The objective of the Symposium was to establish a national tradition of rigorous research in India's rural cooperatives and to evolve a framework for assessing their role in development. The compilation is divided into 15 parts, each part further sub-divided into two sections- (i) salient features of the Workshop, and (ii) abstracts of papers for that Workshop. Workshop-wise, title-wise and first author-wise lists as well as an author index are provided in the volume for quick reference.

Ministry of Finance, 1995; *India's External Debt: A Status Report*, Department of Economic Affairs, Government of India, New Delhi, Pp. 23.

This White Paper presented to Parliament in December 1995 is the second in the series of status reports on India's external debts. It reveals the position of debt stock as it stood at the end of March 1995. Also, impact of changes in Exchange Rate on the US dollar value of debt, and debt service payments are analysed in the White Paper. International comparisons and certain additional features incorporated in it throw more light on India's external debt position. Finally, it articulates the government strategy for external debt management, which is aimed at maintaining the debt obligation within reasonable levels.

Ministry of Power and Non-Conventional Energy Sources, 1992; *India's Electricity Sector-Widening Scope for Private Participation*, Edition- 2, Department of Power, Government of India, New Delhi; Pp. 52.

This publication from the Investment Promotion Cell of the Department of Power deals with the government scheme formulated for encouraging greater participation by private enterprises in electricity generation, transmission and distribution. It outlines the electricity scenario in the country as well as the organisational framework of the Department of Power. It describes, in brief, the procedures for project clearance which are simplified recently. There is a brief sketch of the two-part tariff system devised by the government, in order to guarantee returns to a generating company. A list of the projects to be awarded to the private sector, with their location, capacity and other details, is included. Also enclosed are the gazette notifications of the Government of India and the press releases from the Reserve Bank of India in this regard, and a proforma data sheet to be submitted by an interested company to the Investment Promotion Cell for assistance.

Ministry of Surface Transport, 1994; *Roads: Widening Scope for Private Participation*, Government of India, New Delhi; Pp. 17+(27 Maps).

Between 1951 and 1992, cargo and passenger traffic by road increased from 6 billion tonne per km (BTK) and 23 billion passenger per km (BPK) to 295 BTK and 1,200 BPK, respectively. The vehicle population also grew from 0.3 million to 23 million. In contrast, the road network expanded during the same period from 0.4 km to 2 million km only. Hence, there is an urgent need to upgrade the road system in the country. Road improvements would also result in considerable fuel saving. About 15 per cent of the vehicle operation cost would be reduced per year. In order to bring the road network to this level of serviceability, higher investment in the road sector is required than what the government is presently able to provide. The private sector including the non-resident Indians and foreign investors are, therefore, permitted to finance, construct, maintain and operate identified highway and bridge projects from their own resources, both financial and managerial. The present publication lists in brief the legal and other measures taken so far as well as intended to be taken in the near future for the purpose; it also gives brief information on the incentives provided, and the project clearances required and from which authority to obtain them. But, its

utility lies in its main section which provides vital details and maps of the projects offered so far to the private sector.

Paranjpe, K.G., 1991; *Pune Action Plan: Report of the Working Group Appointed to Recommend an Action Plan for Improvement in Civic Services in Pune and Pimpari-Chinchwad Region*, Government of Maharashtra, Bombay; Pp. 130.

Although the title of the Report indicates that civic problems of both municipal areas, Pune and Pimpari-Chinchwad, are analysed, in reality, only one chapter is devoted to the problems of Pimpari-Chinchwad, the rest dealing with problems of Pune. Such aspects of the civic administration in Pune as roads and traffic, garbage disposal, water supply and sewerage, slums, environment, development plan and resources are discussed in detail. The Action Plan is divided into three time-frames, namely, immediate, short term, i.e., up to 2001 and long term, i.e., up to 2011. The three phases would require an outlay of Rs 137, 319 and 302 crore, respectively, thus requiring an annual capital investment of Rs 45 crore at 1991 cost. Some means to mobilise finance for the Action Plan, such as increase in municipal taxes, octroi cordon, appointment of Municipal Finance Commission, etc., are suggested at the last end.

Sahoo, Basudeb, 1996; *Tribal Labour in India*, MD Publications, New Delhi; Pp. 145, Price: 225.

This book presents a socio-economic profile of tribal labourers in India, and particularly in Orissa. Almost all the aspects of the tribal workforce in Orissa are covered in the volume, such as their percentage distribution in population, male-female ratios, literacy rates, work participation rates in different sectors of economy, earnings, migration, and so on. Particularly, the impacts of the opening of new mines and industries in the region and of the consequent urbanisation on the tribal labour, their social, cultural, and educational levels, their ethnic identity, life-styles, income, expenditure and saving patterns, as well as their migratory movements are analysed in detail. It is based on data from the Censuses of India, the quinquennial surveys of employment and unemployment by the National Sample Survey Organisation since 1972-73, the *Reports of the Commissioner of Scheduled Castes and Scheduled Tribes*, etc.

Sant, Girish, Shantanu Dixit and Subodh Wagle, 1995; *The Enron Controversy: Techno-Economic Analysis and Policy Implications*, Prayas, Pune; Pp. 68, Price: Rs 15.

This collection comprises five independent papers analysing the Enron controversy from techno-economic and policy perspectives. The first paper is devoted to Power Purchase Agreement (PPA) between Dabhol Power Company and Maharashtra State Electricity Board (MSEB)- its structure and implications. The next three papers elucidate (i) the overall economies of and justification for the first stage of the Enron project, (ii) viable immediate and long-term alternatives to the Enron project, and (iii) Enron's international image and claims of providing development assistance to India. The last paper presents a brief overview of the problems and challenges in power sector policies, particularly, its fundamental ills. The collection clarifies important issues, like the real price of Enron power, performance guarantees and the related penalties in case of default promised by Enron to the MSEB, and the argument that 'no power is costlier than any power'.

Singh Narindar, 1996; *The Keynesian Fallout*, Sage Publications, New Delhi; Pp. 257, Price: Rs 295.

This essay 'seeks to change the very problematic of macroeconomic research from mere cyclical unemployment to chronic misemployment' (p. 16), to re-examine the very axioms of what has so far been regarded as science. The problem of misemployment arises when orgiastic state spending attempts to raise the *level* of employment without caring for the *content* of employment. The Keynesian doctrine of raising Effective Demand to a level high

enough to ensure Full Employment has led to today's frenzied military industrialism and the reckless pursuit of consumerism, resulting ultimately in irreversible depletion of the finite resources of the earth and a concomitant disruption of her biosphere. Hence, Keynes is accused of generating this crisis of global ecology - 'taking life as a whole, a minimum of 140 plant and animal species are condemned to extinction every day' (24). It is alleged that these crises of deforestation, soil dissipation, ozone depletion, global warming, and of the very survival of the human species on the planet are a direct ominous consequence, the fallout of the short-sighted remedies Keynes had proposed for the first crisis, which was 'the breakdown of a theory which could not account for the *level* of employment' (p. 12).

Analysis of Keynesian fallout could not be complete without reference to Adolf Hitler and Paul Samuelson. The former launched a programme of 'public works', including preparations for war as the antidote for economic depression even before Keynes preached it, while the latter, an ideologue of consumerism, glorifies the role of spending in the economy, ignoring the distinction between expenditure on needs and that on wants. This polemical critique is indeed focused on the military-industrial civilisation of our time, and evaluation of Keynesianism is incidental to it. Keynes is blamed for adhering to the *ceteris paribus* formula, for not challenging the basic credentials, the validity and the legitimacy, of the existential conditions today, especially when 'all things are getting worse'- *omnibus peioribus*.

The World Bank Atlas, 1996, International Bank for Reconstruction and Development/ The World Bank, Washington, D.C., 1995, Pp. 36.

The World Bank Atlas is published in three languages- English, French and Spanish- in unison since 1970. It aims at illustrating, with maps and statistics, the disparities in the conditions of living in the world, both between and within regions. It presents key social and economic information in three broad areas- the people, the economy and the environment. The choice of these themes for organising the information indicators emphasises their relevance to the development process. *The World Bank Atlas, 1996*, which is incidentally the twenty-eighth World Bank Atlas, provides information derived from World Bank data files for the period ending 1994. Statistical offices of the various countries, the U.N. Population Division, the U.N. Statistical Division, and other specialized U.N. agencies, such as the ILO and the UNESCO are the source of the data used. The 'Technical Note' at the end of the *Atlas* gives the details of data- definition and coverage of indicators- and also briefly explains the methodological and technical issues involved.

Demographic data pertain to indicators such as population figures, life expectancy, total fertility, infant mortality, levels of child malnutrition, employment status of females, etc. Economic data include GNP per capita converted to U.S. dollars at purchasing power parity, GNP per capita growth rate and shares of agriculture, exports and domestic investment in GDP. In order to emphasise the synergy between environmental quality and economic growth, testable measures reflecting some general conditions of the environment, such as energy use, water use and forest coverage, are presented in the *Atlas*.

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FORM IV

(See Rule 8)

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