Nutrition in India

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FOREWORD

Viewing improved nutrition as an outcome of development processes expands the area of concern for policy–makers and practitioners who seek to combat malnutrition. These processes operate at different levels in society, from the individual through to the whole arena of governmental policy and indeed international relationships. The SCN, in deciding on initiating a series of country–wide reviews of nutrition–relevant actions in 1990, aimed to provide a rich base of documented experience of why and how such actions were undertaken and what was their effect on nutrition.

This country–wide approach built on the progress made at the 1989 workshop on "Managing Successful Nutrition Programmes" held at the 14th IUNS Congress in Seoul. The focus here had been on nutrition programmes, and the essential factors determining their success, and the synthesis of findings and individual case studies were later published as ACC/SCN Nutrition Policy Discussion Paper No. 8.

Two other influential documents were the SCN's "Nutrition–Relevant Actions" that emerged from the 1990 workshop on nutrition policy held in London, and UNICEF's 1991 Nutrition Strategy document. Together these provided both a common analytical framework for organising the reviews and a common language for discussing the various actions that impinge on nutrition. The value of such a framework has been demonstrated by the ease with which it lends itself to analyses of both the nutrition problem and its potential solutions. The food – health – care triad of underlying causes of malnutrition, in particular, proved to be a very useful framework for orienting the inputs and subsequent discussions at the 1992 International Conference on Nutrition, co–sponsored by FAO and WHO. Communication and thus advocacy are facilitated when people share such a conceptual understanding.

UNICEF had originally proposed that a series of country–wide reviews be undertaken and the results presented at the 15th IUNS Congress in September 1993. At the time of writing, preparations for this workshop are well underway –– in fact, the richness of documented material has necessitated the organisation of an additional two–day satellite meeting in Adelaide. We are extremely grateful to UNICEF for their financial support throughout this exercise. The series editor for these country reviews was Stuart Gillespie, and the SCN Advisory Group on Nutrition (AGN) also technically examined the drafts as these emerged. In addition, I would like to express gratitude to the external technical reviewers, selected for their in–depth knowledge of particular countries, who provided the authors with comments and suggestions on initial drafts.

The essential value of these country case studies lies in their ability to describe the dynamics involved when a national government attempts to combat malnutrition. Questions such as the role of the political economy in determining policy options, obstacles met in implementation, how programmes are modified or expanded, and how they are targeted, are all addressed. The need for actions to be sustainable to achieve results over the long–term, and the importance of both measurable objectives and a system of surveillance to monitor progress, are examples of important conclusions. These reviews thus provide valuable insights into the questions of "how" as well as "what", in terms of nutrition policy.

The country reviews are intended for a wide audience including those directly concerned with nutrition in developing countries, development economists, and planners and policy makers. Along with the output of the Adelaide meeting, they will be valuable for advocacy in underscoring that effective actions w*ill* improve nutrition. It is hoped that these reviews and the proceedings of Adelaide will provide guidance for a strengthening and expansion of future actions for reducing nutritional deprivation.

Dr A, Horwitz
Chairman, ACC/SCN

PREFACE AND ACKNOWLEDGEMENTS

ACC/SCN has undertaken a series of country case studies to examine the global and regional trends in nutrition and review the current policies and programmes. This document depicts the nutrition scenario in India. Bulk of the information on nutrition trends covered in this report is derived from the large database generated by NNMB, established at the National Institute of Nutrition, Hyderabad, through its countrywide surveys. The Institute, now stepping into its Platinum Jubilee year, is generously endowed with requisite material and manpower resources and facilities for comprehensive researches into basic and applied aspects of nutrition and public health relevant to this part of the globe (Annex on last page gives more details).

The report is divided into two parts. The first part comprises a detailed national nutrition situation analysis, with data as far as possible disaggregated by state. It includes data on nutrition and mortality outcome vis–a–vis age, sex and socioeconomic status. Changing trends in food consumption and nutritional status of children and adults are described. Data on other nutrition–related indicators such as food production, population growth, health services and environmental conditions are also included for better understanding of the observed trends in nutrition.

In the second part, Andhra Pradesh and Tamil Nadu – the two neighbouring South Indian states were chosen for an indepth review of policies and programmes, with a view to understand what worked and why in effecting the observed nutritional improvement in these states. The two–tier (Centre and State) system of government with nutrition–relevant actions consequently differing to some degree between states, necessitated such a state–wise analysis to reveal the essential driving forces behind nutritional change. It is hoped that this review would be useful to planners and policy makers to strengthen the ongoing intervention programmes and to mould long–term policies for sustained improvement.

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Director, NIN

PART I – NUTRITION ASSESSMENT AND ANALYSIS

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MAP OF INDIA

SUMMARY

India has the second largest population in the world, after China, estimated at 844 million in 1991. The most populous states are Uttar Pradesh (139 m.), Bihar (86 m.), Maharashtra (79 m.), West Bengal (68 m.), and

Andhra Pradesh (66 m.). Population is growing at an annual rate of 2.11% and is estimated to reach one billion (1,022 million) by the year 2000. Every year during the last two decades, the country has been adding 11 to 16 million people (equivalent to the population of Australia) to its population. The growth is fuelled by a fall in the mortality rate from 22.8 per 1,000 in 1951 to 10.2 in 1989, which is greater than the fall in the birth rate from 41.7 per 1,000 to 32.0 during the same period. The majority of India's population (74% in 1991) live in rural areas of the country, although the urban growth rate is well ahead of the rural rate, due to migration.

Trends In Nutrition

A comparison of two surveys carried out in the mid−1970s and late 1980s basically showed that the situation has remained static with respect to food consumption at the household level, although there has been a significant improvement in the dietary intake and nutritional status of preschool (1 to 5 year−old) children. (It should be noted that these surveys, carried out by the National Nutrition Monitoring Bureau (NNMB), sampled 10 states with a bias towards southern and central states.) The percentage of underweight children (i.e., below −2 s.d. NCHS weight−for−age median), particularly those severely underweight, declined in all states to varying degrees. Overall for the country, the prevalence of underweight children among 1−5 year olds fell from 78% in 1975−77 to 69% in 1987−89. (For comparability of prevalence figures elsewhere in this report, recalculated prevalences for 0−59 month old children, of 71 % in the 1975−77 period to 63% in the 1987−89 period are used in the graph.) Most of this reduction was in the more severe grades (less than −3 s.d. median) which dropped from 38% to 27% in this period. The decline of severe grades was highest in Maharashtra, while in Gujarat and Madhya Pradesh, it was minimal. Severe stunting and wasting in under−fives also declined. The reduction in the prevalence of severely underweight children appears to have been driven by the reductions in severe stunting, indicating a more long−term change. A fall was reported in the prevalence of clinical signs of malnutrition, such as marasmus (1.3 to 0.6%) and kwashiorkor (0.4 to 0.1%) during the same period.

Vitamin A deficiency has decreased in prevalence from 2.0% in 1975−79 to 0.7% in the 1988−90 survey. The problem of iron deficiency is still widely prevalent, particularly among pregnant and lactating women (e.g., in villages outside Calcutta, 90% of the population are anaemic). Iodine deficiency, while varying markedly by region, is also very common; it is estimated that more than 54 million people in India are currently suffering from goitre and 8.8 million (roughly 1% of the total population) from different grades of mental/motor handicaps.

The under−five mortality rate has fallen from 282 deaths (per 1,000 live births) in 1960 to 149 in 1988 (the average for developing countries in 1988 was 121). The all−India infant mortality rate (IMR) also fell from 129 in 1971 to 91 in 1989, although there is still a wide variation among states, ranging from 28 in Kerala to 123 in Uttar Pradesh (1988 figures). States with the highest IMRs (between 97 and 123) are clustered in the central−northern heartland − Rajasthan, Uttar Pradesh, Madhya Pradesh, Orissa, Bihar, and Assam. Factors found to be associated with these high infant deaths include early marriage and motherhood, low levels of education, and low socio−economic status.

Economic Trends

In 1990, India's per caput GNP was US$350. The GNP per capita grew by 3.2% a year from 1980 to 1987, a rate which is considerably better than the 1965−1980 period's rate of 1.8% a year. Overall during the 1980s, there was about a 32% increase in per caput GNP at constant prices. While the Government of India has continued to be guided by the principle of economic growth with equity, in practice the economy has been two−track − with conventional growth on the one hand and special poverty alleviation programmes ostensibly for those groups not benefiting, on the other. Since the late 1970s, the government's economic policies have tended towards liberalization of trade, with flexible exchange rates to encourage the growth of exports. The value of the rupee has steadily fallen against the US dollar (US$1 was equivalent to 9 rupees in 1980−81 compared to 26 rupees in July 1991). Foreign debt has risen, due partly to a disappointing export growth and reluctance on the part of the government to raise taxes, thus creating the need to borrow from other countries for revenue. The debt service ratio was 9.1% in 1980, rising to around 32% during 1986, then dropping to 26% in 1989. Debt grew from 5% of the GDP at the end of the 1970s to 10.1 % of GDP in 1985−90. By March 1990, the total amount India owed to foreign creditors was US$63 billion.

Food Security − National Level

The near famine food−crisis of the mid−1960s preceded the bold 'green revolution' gamble on a technological package of a semi−dwarf wheat and dwarf rice varieties, irrigation, and complementary inputs. After the. US PL480 food aid programme was halted in 1971, India struggled to become more self−reliant in food in a

difficult economic environment of global food crisis and oil price hikes. There were also unfavourable weather Conditions including droughts, especially in Western India, and severe floods during 1974 in the Northeast. Yet India came through the early 1970s crisis period with the two pillars of its food strategy – a political commitment to self–reliance in food and a determination to prevent famine – strengthened by these experiences. The “green revolution,” which enabled farmers to cultivate crops with much higher yields, has helped agriculture keep pace with population growth, and led to national self–sufficiency. There are now signs, however, that it is running into diminishing returns (recent yields in wheat and rice per acre have not seen any improvement). Although the technologies involved have been shown (by the mid–1980s) to be scale–neutral, despite an early bias towards richer farmers, they are still only effective if a constant supply of water and fertilizer can be assured. In the villages dependent on rainfed agriculture(usually poorer), there has been no “revolution,” and here lies a challenge for the future. This is also reflected in comparisons by state: the “green revolution” has been most effective in Punjab, Maharasthra, Andhra Pradesh, and Karnataka.

The decade up to the beginning of the Seventh Plan in 1985 saw large increases in per caput production of wheat and, to a lesser extent, rice, as the use of inputs and the area irrigated expanded. The food production per caput index, with 1979–80 as base (=100), indicates an increase early in the 1980s followed by a levelling off in the mid–1980s, a drop in the drought years 1986–87, then a marked increase to 1990. The drought was the worst since before independence, driving the agricultural strategy off–course, and necessitating the importation of cereals on a significant scale in 1988–89 (even though the drought broke in mid–1988).

Agriculture remains by far the most important area of the Indian economy, accounting for about 63% of the labour force in 1985–1987, although its importance has decreased over the years. In 1989, it accounted for 28% of GDP, compared to 43% in 1973, indicating low agricultural labour productivity. About two–thirds of the crops cultivated for domestic markets are grains, mostly rice, wheat, sorghum, and maize.

In the past 20 years, the food production strategy has had built–in biases. While it has been dependent on wheat and rice, the growth in output has been concentrated in the northwestern states and in the regions of irrigated rice. Its impact has been relatively disappointing in the densely peopled, poorer eastern states that now contain much of the unutilized potential for irrigation and for higher productivity rain fed rice. The dryland areas of the centre and south were also not sufficiently involved, and despite anticipated linkage effects, the strategy has not yet had a substantial impact on the structural problem of rural poverty. It now appears that the intensification of production has been associated with environmental degradation and pressures on renewable rural energy resources have become even more severe. The focus of planning has hitherto see–sawed between a desire to maximize growth in food production on the one hand and a concern, not so powerfully articulated, for regional equity on the other. Regional equity is now of paramount importance. Easily available means of growth in foodgrains production have now been exhausted and there are probably diminishing marginal returns to the most productive land.

Food Security – Household Level

In the decade from 1978, the Indian Planning Commission reported a drop in the percentage of people living below a national poverty line from 48.3% to 29.2%. The improvement to the early 1980s has been attributed in part to the success of several targeted poverty alleviation programmes, while economic growth in the mid–1980s was felt to have been the main driving force behind the more recent change. There are marked variations by state, with percentages “in poverty” (in 1987–8) ranging from 40.7% in Bihar to 7.0% in the Punjab. In terms of numbers, the greatest concentration of poor people occurs in the states of Uttar Pradesh (42.2 m), Bihar (33.6 m), and Madhya Pradesh (22.3 m), all neighbours.

The average Indian per caput income, when corrected for inflation, rose by Rs 515 between 1980–81 and 1988–90, although the purchasing power of the rupee was declining and forcing the consumer to continuously alter allocation of resources between food and non–food necessities.

Since the mid–1970s, just as food production had been fairly stable at the household level, calorie and other nutrient consumption has remained more or less unchanged. In the 1980s, calorie consumption per adult equivalent was around 2,300–2,400 kcals, according to NNMB data. Of the seven states for which data are available, figures ranged from 2,614 in Madhya Pradesh to 1,871 kcals/AEU/day in Tamil Nadu, in 1988–90. There was some indication of reduced inequality of consumption as the energy intakes of landless laborers increased slightly during the decade, unlike other occupational groups. The calorie intake of preschool children also increased, suggesting an intrahousehold adjustment.

The main types of actions that affect the underlying household food insecurity–related causes of malnutrition in India were the Public Distribution System (PDS), and the poverty alleviation programmes, such as the

National Rural Employment Programme (NREP) and the Integrated Rural Development Programme (IRDP). During the 1970s and 1980s, the large and costly buffer stocks of grain procured by the government to provide a food security net became the symbol of self−reliance. The PDS involves the distribution of subsidized foodgrains via a network of fair−price shops to the eligible poor with ration cards. States differ as regards the coverage, efficiency, and effectiveness of the PDS, with states with a better infrastructure (e.g., Punjab and Haryana) often being better served, despite the lower relative need vis−a−vis poorer states, such as Bihar, Orissa, and Uttar Pradesh. Better rurally−targeted PDS schemes such as those implemented in the states of Kerala, Tamil Nadu (and to a lesser degree in Andhra Pradesh) were more successful.

The poverty alleviation programmes were either of the asset− endowment type (e.g. IRDP) or wage employment (e.g. NREP). As regards reaching the poorest of the poor (who will also be the most nutritionally vulnerable in most cases), the NREP was the most successful. It had the advantage of being self−targeting in that the wages, while reasonable, were only sufficient to attract those workers who do not have any other work options. Where it was designed to improve community−owned assets in resource−poor areas, it was also of particular long−term value. And, finally, the large degree of women's participation in the NREP (particularly in Tamil Nadu and Andhra Pradesh where female participation was 44% and 42% as compared to 20% nationally) was also likely to have been nutritionally beneficial. The NREP certainly offers potential for driving future nutritional improvements if a guarantee of an increased number of days work per year to fewer poorer people (particularly women) in resource−poorer areas can be achieved through more decentralized planning. Evaluations of the Integrated Rural Development Programme (IRDP) have suggested that its nutritional impact has probably been relatively limited.

Health and Control of Infectious Diseases

Financial outlays under different five−year plans indicate that overall investment on the social sector is low. As a percentage of total plan outlay, the shares for education and health are significantly lower in the seventh plan (1985−90) than in the first plan (1951−56). Even within the education and health sectors, allocations for elementary education and primary health care have declined relative to higher education and curative care, respectively.

India, thus, ranks low among developing countries in per caput health expenditure, despite the relatively developed and widespread infrastructure. In 1986−87, the combined state−level per caput expenditures on health, family welfare, and water supply, ranged from Rs. 44 in Maharasthra to Rs. 15 in Bihar. While the government's spending on health and family welfare has been steadily increasing in absolute terms, the proportion of plan outlay spent on health care has been declining from plan to plan (it was less than 2% in the 1985−90 plan). Within the health sector, the order of priority has been on family planning, hospitals and dispensaries, communicable disease control, rural health including mother and child health, and education and training.

There is a strong urban bias in the pattern of health expenditure and the rate of utilization of the rural health budget is low. Urban areas have greater access to health services, safe water, and sanitation facilities. About 54% of the population were defined as having access to health services from 1980 to 1986 (80% for urban areas, and 47% for rural areas). Only 2% of houses in rural areas had sanitation facilities, compared to 31 % in urban areas (on average for developing countries, the respective comparative figures are 14% and 61%). With respect to access to safe water, 16% rural as compared to 76% urban population used a tap as a major source of drinking water.

The total expenditure on education increased from 1.2% of the GNP in 1950−51 to about 4% in 198'6−87, against an optimal target level of 6%. Per capita expenditure also increased steadily from Rs. 20 in 1970−71 to Rs. 113 in 1986−87, although when corrected for inflation, this increase is not much. In real terms (at 1980−81 prices), the state−level per caput expenditure on education in 1986−7 ranged from Rs. 103 in Kerala to Rs. 37 in Bihar (as with health, by a factor of three). The share of education as a proportion of plan outlay in the public sector has fallen through the plan periods. Within the education sector, the share of elementary education has been falling from 56% in the first five−year plan to 29% in the seventh plan; higher education has benefited at the cost of primary education.

India spends a greater percentage of its GNP on education than it does on health. In terms of education outcomes, the literacy rate (expressed as a percentage of the adult population) rose from 34% in 1970 to 43% in 1987, and 52% in 1991. These figures, however, mask a high disparity between adult female and male literacy rates, between states and also between scheduled castes and tribes and the rest of the population. The 1981 census reveals that while the literacy rate for the whole population was 36%, the corresponding figures for scheduled castes and scheduled tribes were 21% and 16%, respectively.

Women and Care Factors

In developed countries there are slightly more females than males. In India, this ratio (expressed as number of females per 1000 males) continues to be the reverse, with a persistent declining trend i.e., from 933 in 1981 to 929 in 1991. This indicates a disturbing disparity in the survival of men and women in the country.

Women generally occupy a very under–privileged position in Indian society, although there are significant regional variations. Discrimination against females is generally more pronounced in north India (particularly Rajasthan, West Bengal, Uttar Pradesh, Punjab, and Haryana), and may not be significant in many parts of southern India, although female infanticide has been reported in the southern state of Tamil Nadu. Where it does exist, discrimination begins early in life, with more females than males dying in infancy and childhood. In contrast to most of the rest of the world, female mortality is greater than male mortality up until the age of 35. It has been shown that if India had the female–male ratio prevailing in Sub–Saharan Africa (around 1.02) then, given the number of Indian males, there would have been 37 million more women in India in the mid–1980s. The average age of marriage in India is one of the lowest in the world (18.3 years in 1981) with child marriage still prevalent, despite being illegal. Child bearing also begins early, with 8% of the births in India occurring to mothers less than 19 years of age. Family size tends to be large. The average Indian woman has from 6 to 7 pregnancies, giving birth to 5 or 6 live infants. Four to five of these will survive to reach the age at which they can reproduce. In India, as in many developing countries, maternal mortality accounts for the largest or near–largest proportion of deaths among women in their prime years. It is estimated that out of half a million maternal deaths in the world each year, about 20% are in India.

Only an estimated 32% of rural births, and 74% of urban births are attended by qualified personnel (these figures show wide regional disparities, and in Jammu and Kashmir, Rajasthan and Madhya Pradesh, fall to less than 10%). Abortion is yet another problem that Indian women must face. Although legal in India, abortions are still performed in unsanitary conditions. Indian women desperate for an abortion will go to unsanitary clinics sometimes because of the ignorance of the law, and other times because a government–run clinic which offers relatively safe abortions is inaccessible. Sex selective abortion is problematic because of anti–female bias; for example, according to a 1984 report from Bombay on abortion, after prenatal sex determination, 7999 out of 8000 foetuses aborted were female.

Health services are used less often by women than by men. Parents take sick sons to the health clinics at an earlier stage in an illness than a daughter. A 1982 study in Rajasthan demonstrated that the ratio of male to females coming to government health centers for treatment was 5:1. Another study in Uttar Pradesh showed that only about 9% of cases of female illness went to a health center for treatment. While mixed evidence has been found regarding intra–family distribution of food in India, inequalities in health care utilization and general care can, on their own, yield excess female mortality rates.

Regarding female education, the percentage of girls in an average class in primary school rose from 38% in 1978 to 41% in 1986. A census from 1981 estimated that around one–third of urban girls, and two–thirds of rural girls aged 6 to 13 years do not attend school. Again there are regional variations, with the states of Bihar, Rajasthan, Madhya Pradesh and Uttar Pradesh having the lowest levels (in each case with less than 1 in 5 girls between 6–14 years of age attending school). Lower female education levels are due to a variety of reasons. The daughter is often seen as only a temporary member of the family who will enter the family of her husband upon marriage. Daughters also greatly help the mother in her work at home, and therefore keeping her at home is seen as more useful for the family than improving her education. Schools in which there are male teachers and male students, and to which the girl must travel long distance may be seen as threats to the girl. Also, the dowry for a less educated girl is usually less debilitating. Such perceptions, beliefs and practices are pervasive.

Female literacy levels improved threefold from 1961 to 1991 (from 13 to 39%), although they are still much lower than males levels which rose from 34% to 64% during the same period. The female rate however is still much lower than that of males. The regional variation with regard to female literacy is striking. In the 1981 census, the highest effective female literacy rate (i.e., 5 years and above) of 79% is registered by Kerala. Among the 14 most populous states, four states – Rajasthan (28%), Madhya Pradesh (32%), Uttar Pradesh (31 %) and Bihar (30%) – ranked the lowest, and accounted for half the illiterate rural women in India. There are also marked rural–urban differences; for example, Bihar has an adult female literacy rate of 14% in rural areas, and 41% in urban areas, and in Rajasthan only 9.8% of the rural females (and 41% of urban females) are literate.

Nutrition Programmes

The two main integrated nutrition interventions in India are the national−level Integrated Child Development Services (ICDS) and the Tamil Nadu Integrated Nutrition Project (TINP). The TINP particularly has been demonstrated as being successful, and there is much scope for mutually beneficial lessons to be learned as both these programmes expand. Integrated nutrition and health programmes such as TINP and ICDS are essentially relevant and appropriate in design although (particularly in the case of ICDS) their targeting and implementation could be strengthened. At present, ICDS, like many other interventions in India, tends to exist and work best in those areas where it is, in a sense, least needed i.e. those areas with a more developed infrastructure for delivery. Area targeting to more remote, usually poorer, areas, might be supplemented with targeting to under−three year old children from the poorer households at village level. The lessons learnt from TINP (regarding targeting, implementation, training, supervision, monitoring) should be utilized fully to optimise results. The weak points in ICDS implementation, such as poor interdepartmental coordination, irregular monitoring, unsystematic evaluation without adequate arrangements for feedback and corrective action, might be eliminated through instituting an effective management information system at District/Taluk/Block/village level.

Conclusions

The trend in nutritional outcomes in India during the last fifteen years or so then has been positive but modest, manifesting itself mainly in the reduction of proportion of preschool children who are severely underweight. Although average figures on calorie consumption have remained nearly unchanged since the mid−1970s, it is likely that household food security among the poorest social groups may have improved given the reported reductions in people living below the poverty line, and the fact that food consumption per caput of landless agricultural workers has risen. This is in line with reductions in underweight prevalences of 0.5 percentage points per year in preschool children. Famines have been completely eliminated in India in the last two decades − a major achievement of government policies on food security.

On the agricultural side, there are signs of future problems and constraints as the population growth rate remains high, while the new technologies introduced in the 1970s may now Be less effective in catalyzing growth in food production. Concern for people's livelihoods may need to be increasingly reflected in agricultural strategies which take account of the fact that an increasing proportion of households are relying more on the market for food purchases than sales.

There is increasingly serious population pressure on land resources, which highlights the urgency of adopting a more evenly spread, environmentally−sustain−able agricultural development strategy − one that considers livelihoods as a more important goal than production per se.

Before such a strategy bears fruit, the national food security safety net of the Public Distribution System (PDS) remains important, particularly if it is more appropriately targeted. During the 1980s, it was patchy in terms of both coverage and effectiveness. Household food security actions, such as the poverty alleviation programmes and the PDS, certainly contributed to the reductions in poverty and inequality during the 1980s. The PDS and probably the NREP also are thought to have a significant nutritional benefit, although explicit evidence does not exist yet.

Despite the levels of governmental expenditure (in both absolute and relative terms) on health, education and social welfare remaining low during the 1980s, there has been a steady improvement in the quality, outreach and utilization of primary health care facilities. Furthermore, India's decades of experimentation with nutrition and health interventions since the Applied Nutrition Programmes of the 1950s seems to be beginning to bear fruit, with integrated programmes such as the ICDS and TINP.

Regionally, as well as the differences discussed with regard to agriculture, there are also highly significant state−by−state variations in many other nutrition−related variables discussed here, with many factors associated with nutritional problem areas clustering particularly in the states of Rajasthan, Uttar Pradesh, Madhya Pradesh, Bihar and Orissa. Anti−female bias in food provisioning, health care utilization, and general care may be particularly severe also in these northern states, and reflected in the regional differences in juvenile sex ratio. By contrast, the one state that ranks highest with respect to many nutrition−related indices is Kerala − where a sustained political commitment to human (particularly women's) development through preferential state government support to health, education and welfare sectors, has paid rich dividends.

I – INTRODUCTION

In this first section of the report 'Nutrition in India' we carry out an assessment and analysis of the nutrition situation in India and, as data permit, the trends over time of various nutrition–related indices. The report is structured in the following way. Firstly, a brief introductory picture of the current demographic and macroeconomic conditions in India is painted as context to the main analysis. Secondly, an assessment of the nutrition problem is undertaken which includes various nutrition and mortality outcome data, disaggregated as far as possible by factors such as age, sex, socio–economic group, season and time (trends). Infant mortality, energy malnutrition and micronutrient deficiency disorders in children and adults is described here. The immediate causes of these outcomes relate to disease and dietary intake, and the type and extent of problems in these two areas are examined next with the aim of explaining the patterns in observed outcomes. Moving another stage out following this, the analysis of the problem is structured according to the three recognised underlying preconditions for adequate nutrition –– food, health and care (see UNICEF 1991). Food security is dealt with first, at the national and household levels. Health services and environmental conditions are then described –– the level of resources allocated to health and welfare sectors, and how that money is actually spent. The degree of health care coverage, its relevance and quality, along with the population's access to safe water and sanitation systems are included here. Finally, the subject of maternal and child care is explored. This is taken here to encompass the behavioural intra–household decisions and actions relevant to nutrition. How resources are used and services utilized, how households, particularly women, cope. Breastfeeding, child caring practices, health care utilization, and time allocation are all germane to this area. We push the analysis further in this section, in an attempt to understand the main factors that determine the social and economic status of women in India, and some of the gender differentials in health and nutrition–related variables that relate to this.

II – SOCIO–ECONOMIC TRENDS

Demographic Trends

India is one of the most highly populated countries in the world. In 1991, the population was 844 million constituting about 16% of the world's population. The most populous states are Uttar Pradesh (139 million), Bihar (86 million) Maharashtra (79 million), West Bengal (68 million), and Andhra Pradesh (66 million) (Registrar General of India 1991).

The population is growing at an annual rate of 2.11 % and is estimated to touch a billion mark (1022 million) by the year 2000 (Ghosh 1991). Every year, the country has been adding 11 to 16 million people (equivalent to the population of Australia) to its population base during the last two decades.

Change in population, is a function of the natural growth of population which in turn depends on death and birth rates. The main cause of the increase in India's population is the fact that the fall in the crude death rate from 22.8 (per 1000 population) in 1951 to 10.2 in 1989, is greater than the fall from 41.7 to 30.5 in the birth rate, during the same period (Registrar General of India 1991). The density of population per square kilometer has increased from 177 to 267 between 1971–91 (Table 1).

The majority of India's population (74.3% in 1991) live in rural areas of the country, although the urban growth rate is well ahead of the rural rate (Registrar General of India 1981). During the last two decades the annual growth rate in urban areas (4.0%) is more than double the rural (1.8%), the main cause being rural–urban migration rather than differences in natural growth.

Table 1: Trends in population

Census year	***Population (m)***	***Decennial change (%)***	***Sex ratio (females per 1000 males)***	***Population density (per km^2)***	***% urban to total popn.***
1951	362	13.3	946	117	17.3
1961	439	21.5	941	142	18.0

1971	548	24.8	930	177	19.9
1981	685	25.0	933	216	23.3
1991	844	23.5	929	267	25.7

Source: Registrar General of India 1991

Age–sex structure

The age–sex pyramid of India shows a wide base and narrow apex with a high proportion of children – typical of a developing country. The population of 0–4 years had declined from 14.5% in 1971 to 12.6% in 1981 (Registrar General of India 1981). The sex ratio (the number of females per 1,000 males) in developed countries favour women since they are biologically the stronger sex. In India it continues to be the reverse i.e. for every 1,000 men there are fewer women, with the trend being downwards, i.e. from 933 in 1981 to 929 in 1991 (Table 1). This persistent declining trend in the sex ratio over the past several decades indicates a disturbing disparity in the survival of men and women in the country. The imbalance is due to many causes of which the preferential 'cultural access' for males to social services – such as health and education – and the consequential wide disparity between male and female literacy rates, are important (see later section "Gender Issues in Child Care").

Life expectancy

Expectation of life at birth reflects overall health conditions of the people. In India, the expectation of life at birth was 45 years during the decade ending 1971, 54 years in 1981 and 62 years in 1991 indicating progressive improvement. The sex differentials seen in earlier decades (the females having relatively lower expectations of life) are narrowing (see Table 2), suggesting the excess female child mortality is being balanced or exceeded by higher male mortality in older age groups.

The Government of India, in its document on National Health Policy (GOI 1983) set goals for some demographic parameters. It envisaged a reduction in annual birth and death rates from 32.9 and 11.8 respectively in 1985 to 21.0 and 9.0 per 1,000 population respectively by the year 2000, so that the rate of population growth is brought down to 1.20% from 2.14% in 1985. The results of the 1991 census however, indicate that the annual growth rate between 1981–91 was 2.11%. At this rate, the country's population is expected to exceed one billion by the year 2000.

Table 2: Life expectancy at birth (*years*)

Year	***Male***	***Female***
1961–71	46.4	44.7
1971–80*	50.9	50.1
1981–86**	55.6	56.4
1986–91	58.1	59.1
1991–96	60.6	61.7
1996–2001	62.8	64.2
2001	64.1	65.6

** Based on sample Registration System (paper 1 of 1984, Series I–India, Office of the Registrar General, India)*

*** Source Report of the Expert Committee on Population Projection, Occasional Paper No. 4 (1981)*

Source: Office of the Registrar General, India (Census Actuarial Reports and Sample Registration System)

Macroeconomic Trends

While the Government of India has continued to be guided by the principle of economic growth with equity, in practice the economy has been two–track – with conventional growth on the one hand and special poverty alleviation programmes for those groups not benefiting, on the other.

During the 1980s, GNP showed an increasing trend both at current and constant prices (base year 1980–81). There was about a 32% increase in GNP at per capita level constant prices (from Rs. 1805 to Rs. 2392 as shown in Figure 1). India however remains one of the world's poorest countries with a per capita income of around US $300 (UNICEF 1990).

In 1986–87, the highest contribution to the net domestic product was that of agriculture, forestry, and fishing (33.5%). During the period 1980–81 to 1986–87, there was a drop in the contribution of agriculture (from 39.9% to 33.5%) while that of the manufacturing industry increased from 17.0% to 20.8%. Other sectors do not register any appreciable change in their contribution to the net domestic product during this period (CSO 1989).

The economic situation of any country cannot be studied in isolation. Imports and exports affect the exchange value and the inflation rate and are in turn affected by both factors. The overall amount of external debt is a good indicator of the economic stress on the country's financial position. During the 1980s India's outstanding debt had increased from US $18,658 million to US $56,253 million, partly due to disappointing export growth and continuing fiscal deficits (the latter arising as a consequence of the decision not to cut back on public expenditures/subsidies). Part of the export earnings were diverted towards the repayment of this debt (principal and interest). The debt service ratio was 9.1% in 1980, rising to around 32% during 1986, then dropping to 26% for the year 1989 (see Figure 2). IMF credit has been increasing during this period. Over the same period, the value of the rupee on international money markets dropped, with the US dollar being able to buy 7.9 rupees in 1980–81 but 26.0 by July 1991 (GOI 1991). The exchange rate indicates the major economic adjustments made, devaluation of the currency being a common feature of adjustment.

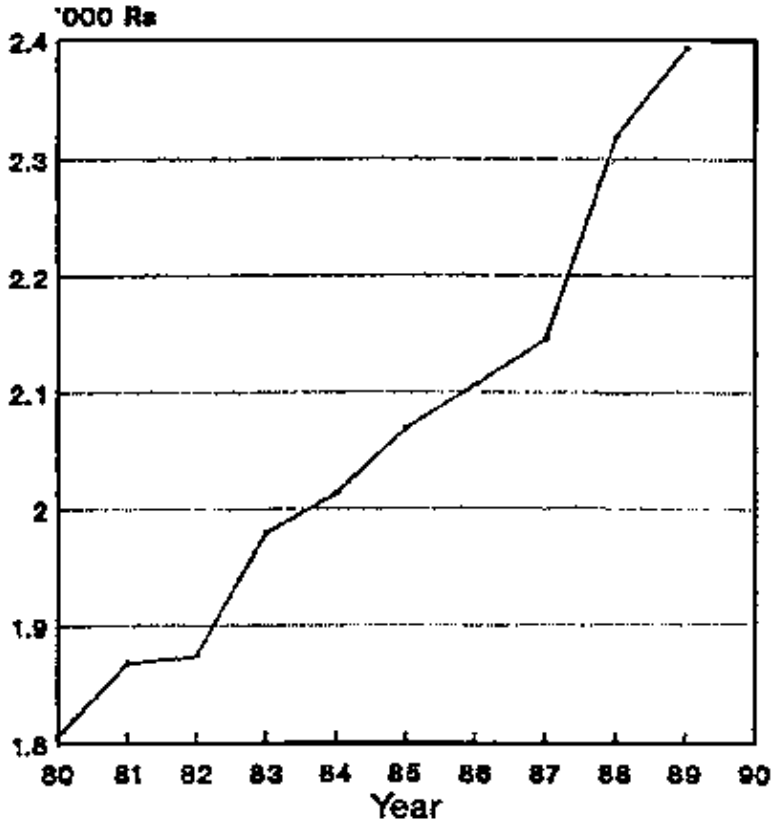

Figure 1. Per Capita GNP – At 1980–81 prices

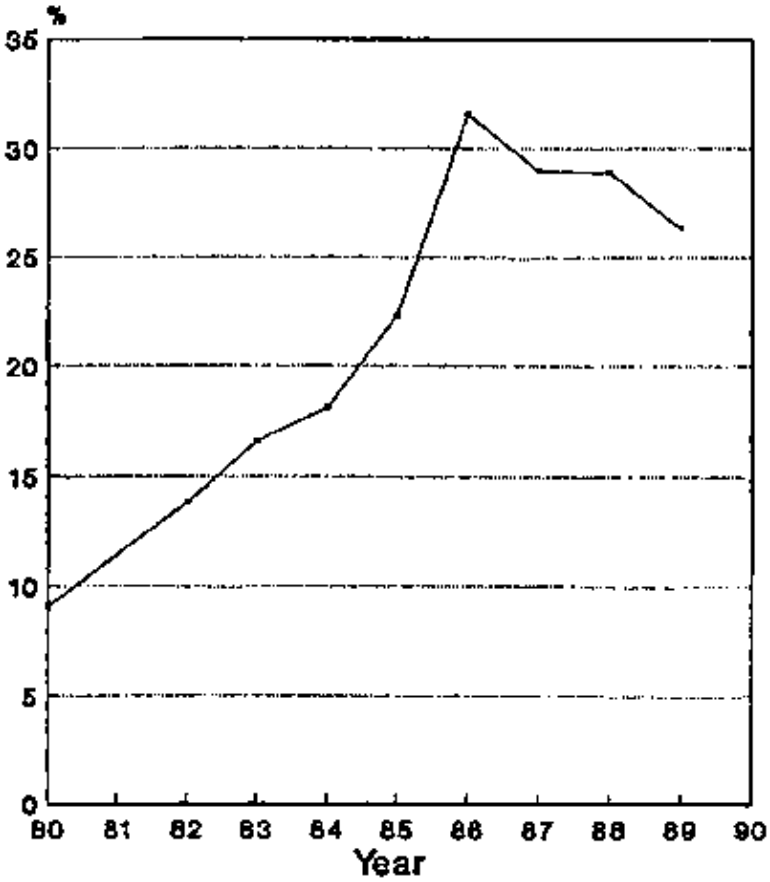

Figure 2. Debt Service Ratio

Source: GOI 1991

III – NUTRITION AND MORTALITY OUTCOMES

Growth Pattern of Children

Anthropometric measurements like height, weight, arm circumference and fat–fold thickness are widely used for the assessment of nutritional status of individuals and communities. These measurements are influenced by age, sex, socio–economic and environmental factors. The National Nutrition Monitoring Bureau (NNMB) of the National Institute of Nutrition (NIN) is the major source of data on heights and weights of the rural population, while special studies conducted in different metropolitan cities provide information on growth and nutritional status of the urban population.

Appropriateness of standards

Assessment of growth involves the use of reference standards. The NCHS standards are commonly used for this purpose, though there is some debate as to whether these are appropriate for the Indian population. ICMR (1968) values of heights and weights have been found to be lower than NCHS standards, although these are based on data obtained mostly from poor rural communities, with constraints of malnutrition and infection, and hence do not reflect optimum growth. Special studies have been conducted among so–called 'well–to–do' school children to assess the normal growth pattern. The study conducted by NIN included a large number of children (Hanumantha Rao and Sastry 1979) aged 5–16 years from 14 public schools. The average weights and heights of these children were comparable to their American counterparts from 5–14 years in boys, but only up to 12 years in girls. Another study was conducted in a high income group, covering older boys (17–22 years) from the Institutes of Technology of four cities. Heights and weights of these boys were close to their American counterparts up to 14 years, but widened considerably during the period 14–16 years and remained more or less constant till 21 years. The differences in weight were more than the

differences in height; the ‘well–to–do’ Indian man is about 5 cms shorter and 9 kg lighter than his American counterpart. The height of an Indian ‘well–to–do’ woman is also 5 cms less while the difference in weight is 6 kg. It is not clear whether these differences are due to genetic or environmental factors.

More recently, studies were conducted by the Nutrition Foundation of India (NFI) in affluent children under five years in seven different cities (Agarwal *et al.* 1991). Heights and weights of children in Ludhiana and Delhi corresponded to the NCHS standards, while the measurements were slightly lower in children of other cities. Although there is some regional variation, the use of NCHS standards has been recommended for all Indian children.

Rural children

Several studies (e.g. Hanumantha Rao *et al.* 1976) including NNMB surveys show that the heights and weights of rural children are lower than ‘well–to–do’ Indian children or NCHS standards. Longitudinal data are also available from special studies of linear growth in Indian children. In a study conducted by NIN, Hyderabad (Satyanarayana *et al.* 1986), a cohort of 700 rural children were followed from the age of 5 years to 20 years. They were classified into different nutritional grades, based on their height at the age of 5 years, and their growth rate was compared with that of ‘well–to–do’ children of Delhi. Peak height velocity was similar in all groups, while the peak weight velocity was lower in undernourished Indian children. Another interesting feature is the age at which the growth spurt occurs. The well–nourished Indian children had a growth spurt around 14 years, similar to that observed in Western children, while among undernourished boys the growth spurt is delayed by about 2 years. The total height gain between 10–20 years is around 40 cm in both Western and Indian boys. However, the rural children are shorter than the ‘well–to–do’ group at all ages, with the deficit in height being noted before puberty and then carried through to the adult stage. Unlike height gain, the increase in weight from 10–20 years was found to be lower in rural boys. If the rural adults are compared with the well–to–do group, the differences in heights and weights are about 7 cm and 10 kg respectively.

The heights and weights of rural girls were also found to be lower compared to the well–to–do group at all ages. The growth process in rural girls continued for a longer period and in fact, the increments in this group were much greater between 14–18 years. This is because the menarche, and consequently the adolescent growth spurt is delayed by 1–2 years in the case of poor rural girls. The mean age of menarche is around 12 years in well–to–do girls and 13–14 years in rural girls. If the rural women are compared to the well–to–do group the differences in heights and weights are about 6 cm and 7 kg respectively.

Secular trends

Aggregate data (pooled for all the States) on heights, weights and BMI over the period show a definite trend towards improvement. The average values of measurements in general, for almost all the age groups in both sexes show an increase; height increments tended to be more in children, with weight increments more visible in adults and adolescents. State–wise data clearly indicate that the heights of children and adolescents, and weights of adults and adolescents in the State, of Kerala and to some extent in Maharashtra and Gujarat were distinctly better compared to the 1970s.

Nutritional Status Of Preschool Children

Preschool children (defined as aged 1–5 years by NNMB) constitute the most vulnerable segment of the population and their nutritional status is considered to be a sensitive indicator of community health and nutrition. The prevalence of underweight, wasting and stunting among children is determined by anthropometric measurements and clinical assessment of deficiency signs. Weights and heights of children are compared with the reference standards (NCHS) and the degree of anthropometric deficit is usually expressed as the percentage of children below a specified cut–off such as 90% of the standard or below minus 2 standard deviations from the median value.

Weight–for–age (underweight)

In the Gomez classification, weight–for–age is used to classify children into different nutrition grades: normal: >90% of the standard, mild: 75–90%, moderate: 60–74% and severe <60% of the standard (NCHS). NNMB surveys between 1975–79 showed that about 6% children were 'normal' and about 15% were severely underweight, while a great majority were in the 'moderate' or 'mild' categories. Surveys repeated in the same areas during 1988–89 showed a decline in the prevalence of the severely underweight from 15% to 8.7% with a corresponding increase in the proportion of normal children (see Table 3). – *There was no gender difference in underweight prevalences.* These trends were observed in all states. The decline of severe grades was highest in Maharashtra, while in the states of Gujarat and Madhya Pradesh it was minimal (see Figure 3).

Table 3: Percentage distribution of children (1–5 years) according to Gomez classification and NCHS weight–for–age standards

Year	***n***	***Normal***	***Mild***	***Moderate***	***Severe***
1975–79*	6428	5.9	31.6	47.5	15.0
1983–84**	2244	5.4	34.7	46.3	13.6
1988–90*	13432	9.9	37.6	43.8	8.7

** repeat surveys, ** linked surveys*

Source: NNMB Reports (1975–91)

The NNMB repeat survey anthropometric data are presented in a way that makes accurate pinpointing of the age at which growth is most severely compromised difficult. Nevertheless, it is clear that the critical time is the period from 6 to 18 months – the time at which complementary feeding needs to be introduced and the infant is most vulnerable to infection (if s/he was relatively protected up to this point by exclusive breastfeeding). From 2 years on, there is apparently little extra growth deficit to that which has already occurred relative to the NCHS standard. Of rural children aged 1–5 years old, 68.6% lie below 2 standard deviations under the NCHS reference standard – that is, over two–thirds (NNMB 1991, see Figure 4a). As described below, around 30% infants are born with low birth weight – about one–third. Thus it seems less than one–third of all children born in rural India can escape the detrimental nutritional consequences of low birth weight and/or growth faltering before their second birthday.

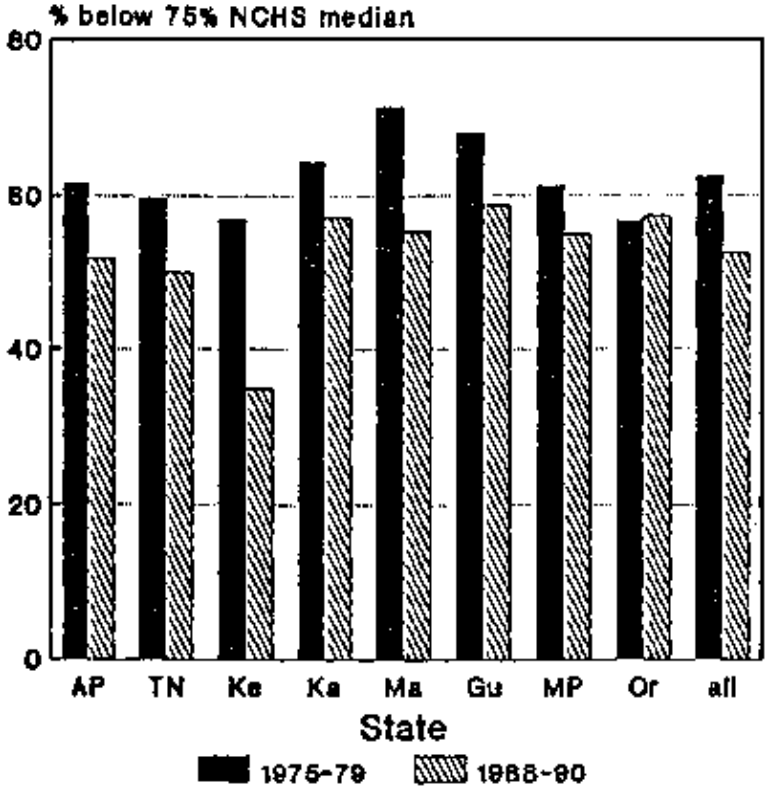

Figure 3. Underweight Prevalences – 1–5 year olds, by state

Source: NNMB 1991

Stunting and wasting

The NNMB repeat surveys also classify children with respect to their height–for–age (stunting) and their weight–for–height (wasting). Children falling between median minus 2 standard deviations (– 2SD) and median – 3SD are considered as moderately wasted or stunted, while those below mean – 3 SD are classified as being severely so. When the data obtained from repeat surveys of NNMB were compared with those of earlier surveys, there was a substantial reduction in the percentage of children suffering from severe forms of underweight and stunting, with a corresponding increase in milder forms from 1975–79 to 1988–90 – a trend similar to that of Gomez classification (see Figures 4a to c). Effectively, this can be seen to be a manifestation of the rightwards shift in the distribution over this period, for these indicators. There was less of a shift in the distribution of proportions of children suffering wasting.

Clinical nutritional deficiency signs

The major nutritional deficiency signs encountered among preschool children are those of protein–energy malnutrition and vitamin A deficiency. The NNMB surveys conducted during 1988–90 showed that the prevalence of deficiency signs was lower compared to the earlier surveys between 1975–79 (NNMB 1991). The prevalence of marasmus decreased from 1.3 to 0.6% and kwashiorkor from 0.4 to 0.1% at the overall level. There were considerable variations between states, with Gujarat showed the highest prevalence of kwashiorkor (1.1%) and marasmus (4.9%). The prevalence of vitamin A deficiency (Bitot spots) declined from 1.8% to 0.7%. These observations thus also indicate an improvement in the nutritional status of children in the last 10–15 years.

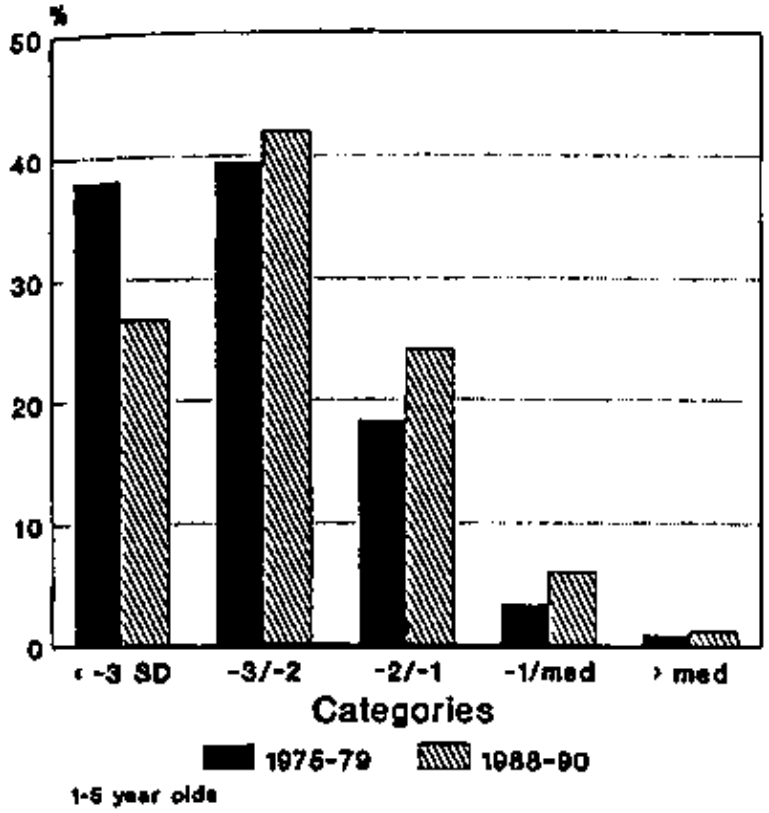

Figure 4A. Weight For Age – Z score distribution

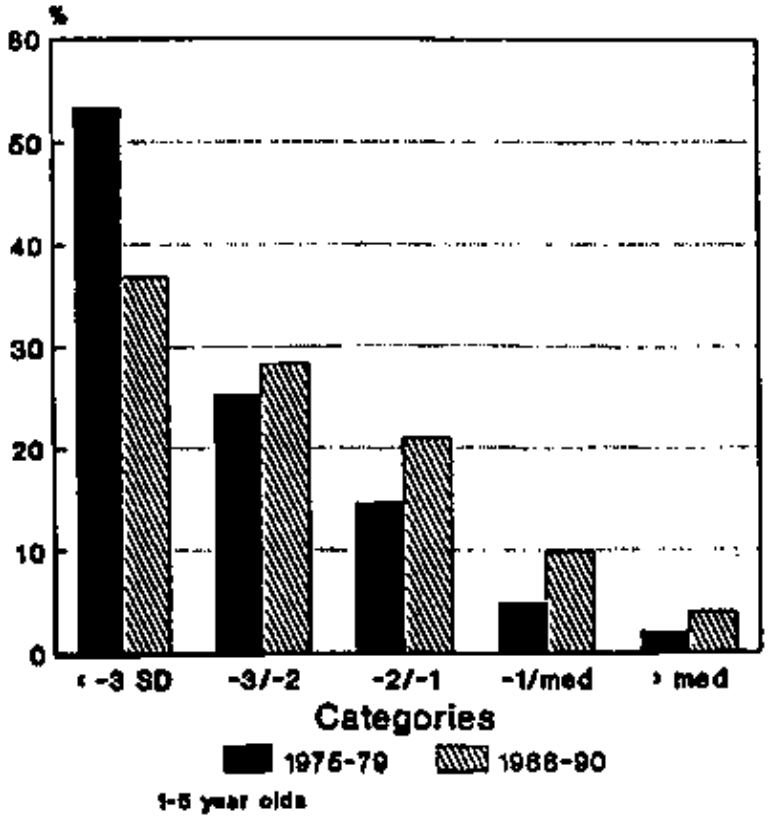

Figure 4B. Height For Age – Z score distribution

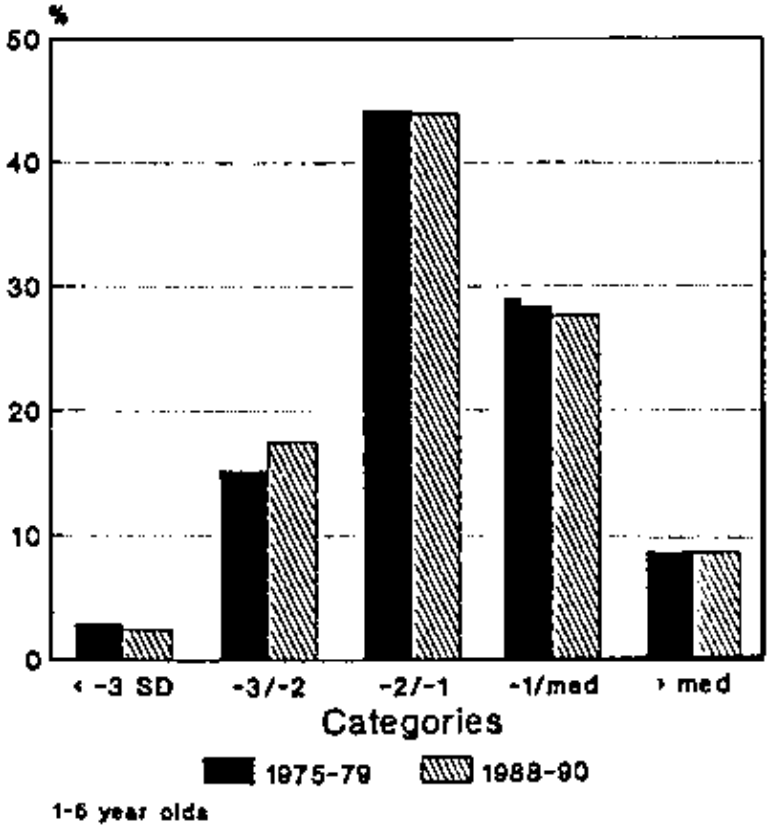

Figure 4C. Weight For Height – Z score distribution

Source: NNMB 1991

Birth Weight

Birth weight, an important determinant of child survival, is influenced by the nutritional status of the mother. National survey data indicate that the mean birth weights in India range from 2.49 to 2.97 kg with about 30% new–borns being less than 2.50 kg. There has been little change in the past three decades (Srikantia 1989). A gender difference has been noted in mean birth weights, female infants tending to be lighter than male counterparts. Hospital–based studies have shown differences ranging from 50–100 gm, while in the well–to–do group the weight difference was more pronounced, ranging from 100–300 gm.

The incidence of low birth weight is highest in low–income groups. A number of factors have been identified as risk factors: maternal age, weight, height, parity, literacy, income, infections and pregnancy–related complications. Even within low–income groups, a gradual increase in birth weight is evident with rising income, the differences between the poorest and the less poor being 100–150 gm (NIN 1983). Differences of a similar magnitude have been recorded between infants born to illiterate and educated mothers. With increasing maternal height from below 145 cm to 160 cm, differences in birth weights are of the order of 200–400 gm. Similarly, with increasing maternal weights from around 35 to 55 kg, differences in birth weights are of the magnitude of 100–250 gm (NIN 1985–86).

A recent study showed a good correlation between birth weights and BMI of mother (Naidu *et al.* 1991). The mean birth weight in women with BMI less than 16 (severe CED) was 2.50 kg and it showed a progressive increase with increase in BMI status of mothers. The mean birth weight was around 2.80 kg in women with BMI 18.5–25. The incidence of low birth weights was highest (53%) in severe CED and gradually declined to about 15% in those with normal BMI.

Anaemia is common among pregnant women, the prevalence rates ranging from 40–50% in urban areas and 50–70% in rural areas (Gillespie *et al.* 1991). A significant fall in birth weight has been observed with decrease in haemoglobin levels. In one study (Ramachandran 1989), the incidence of low birth–weight babies was 40% in anaemic women with haemoglobin less than 8 gm as against 23% in women with normal haemoglobin levels.

One of the goals of the National Health Policy is to reduce the prevalence of low birth weight to 10% by 2000 AD. There is an urgent need to strengthen health care services so as to reach all pregnant women in need and to improve their nutritional status to achieve this goal. In the current programmes, women receive attention only after the onset of pregnancy. The preceding years of adolescence are crucial and special efforts are needed to reach girls at this stage.

Nutritional Status of Adults

Anthropometric data available on rural adults from the NNMB surveys, as well as other studies, show that their heights and weights are lower than Western counterparts. Comparison of the recent surveys of NNMB (1988–90) with the earlier surveys (1975–79) did not show much difference between the two periods. Body Mass Index (BMI) expressed as weight (kg)/height^2 (m^2) is considered to be a better indicator of chronic energy deficiency (CED) in adults. For classifying individuals according to BMI status – a proxy for CED – the cut–off levels suggested are 16, 17 and 18.5 (see Table 4).

Table 4: Classification of adult chronic energy deficiency

BMI class	***Presumptive diagnosis***
< 16.0	CED Grade III (Severe)
16.0 – 17.0	CED Grade II (Moderate)
17.0 – 18.5	CED Grade I (Mild)
18.5 – 20.0	Low Weight (Normal)
20.0 – 30.0	Normal
>30.0	Obese Grade II

Source: Ferro–Luzzi et al. (*1988*)

Studies (e.g. Satyanarayana 1989) in industrial workers have shown that extremes of BMI (severe undernutrition and obesity) are associated with low productivity. Recent studies have revealed the risks associated with low BMI (Pryer 1989). Analysis of maternal anthropometric data has shown a good correlation between BMI of mother and incidence of low–birth weight (Naidu *et al.* 1991). In another study (Satyanarayana *et al.* 1991), mortality rates were examined in relation to BMI status of adult men. BMIs were calculated based on their heights and weights recorded in 1979 when they were aged between 45–65 years. Families of these men were contacted again in 1989 to collect information on mortality. There were 133 deaths among the 792 men during the 10 year period between 1979–89. The mortality rate (deaths/1000 population/year) was 12.4 for younger age group (50 years) and 22.3 for those who were aged 60+ years in 1979. Mortality rate of men with normal BMI was 12.1 and showed a progressive increase with lowering BMI values reaching 32.5 in those with severe undernutrition (< 16 BMI) (see Figure 5), although the proportion of chronic disease sufferers – a potential confounding factor – in this latter group was not specified.

Recently the NNMB data of adults was analysed to see the distribution of BMI in the Indian population (Naidu *et al.* 1991). The average values of BMI were similar for both males and females and the same BMI classification was used for both. About 50% of the population had BMI less than 18.5 and only a negligible proportion (0.2 – 0.5) were found to be obese/overweight. The results thus show that the problem of CED is of primary importance in India, not obesity. Significant inter–state variations were seen in the distribution, as illustrated in Table 5. When the data of 1975–79 were compared with those of 1988–90, a clear shift to right is seen in the distribution of BMI suggesting an improvement in nutritional status of adult population over the period.

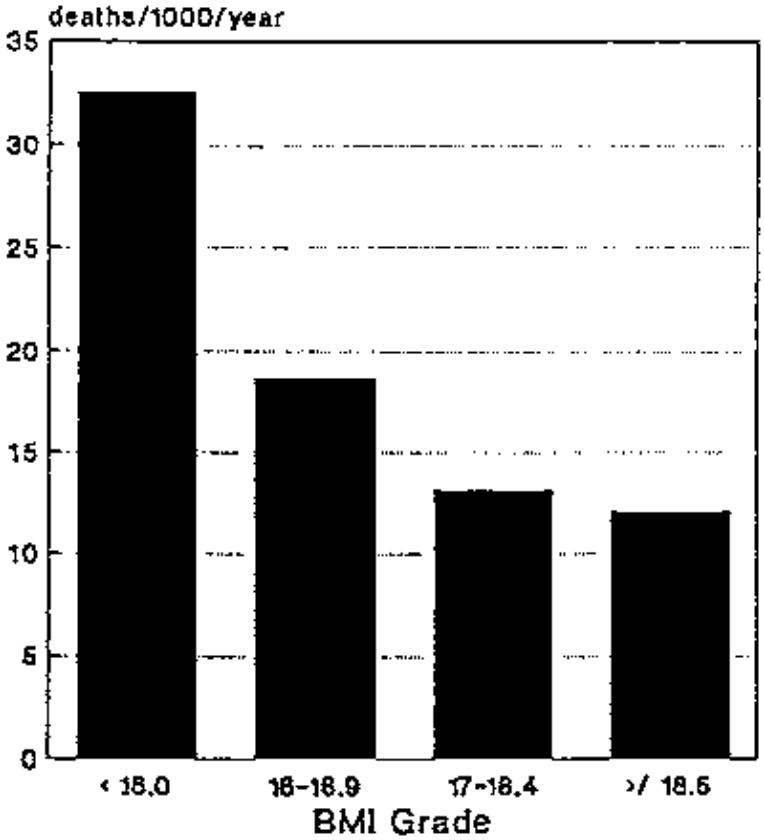

Figure 5. Male Mortality Rates – by BMI Grade

Source: Satyanarayana et al. (*1991*)

Table 5: Inter–state variations in percentages of adults with BMI values less than 17 (1988–90)

	A.P.	***Gujarat***	***Karnataka***	***Kerala***	***Maharasthra***	***M.P.***	***Orissa***	***Tamil Nadu***	***All–India***
Male	20.5	31.3	22.1	20.5	22.9	13.2	16.6	21.1	21.3
Female	26.2	30.5	26.8	18.6	29.6	17.5	23.1	22.9	24.2

Source: Naidu et al. (*1991*)

Relationship between adult BMI and various factors

Socio–economic status. When the BMI values were examined in relation to land ownership, it was observed that adult men and women from households with more than 5 acres of land had better BMI status compared to the landless group. Similarly, cultivators and artisans had a better BMI status compared to landless agricultural labourers (see Figure 6a and b). A strong association was found between per capita income and BMI status; about 60% of adult men and 50% of adult women had BMI values less than 18.5 when the income was less than Rs. 60/month, while the corresponding figures were 36% and 33% respectively in groups having per capita income of greater than Rs. 150 per month (Naidu *et al.* 1991).

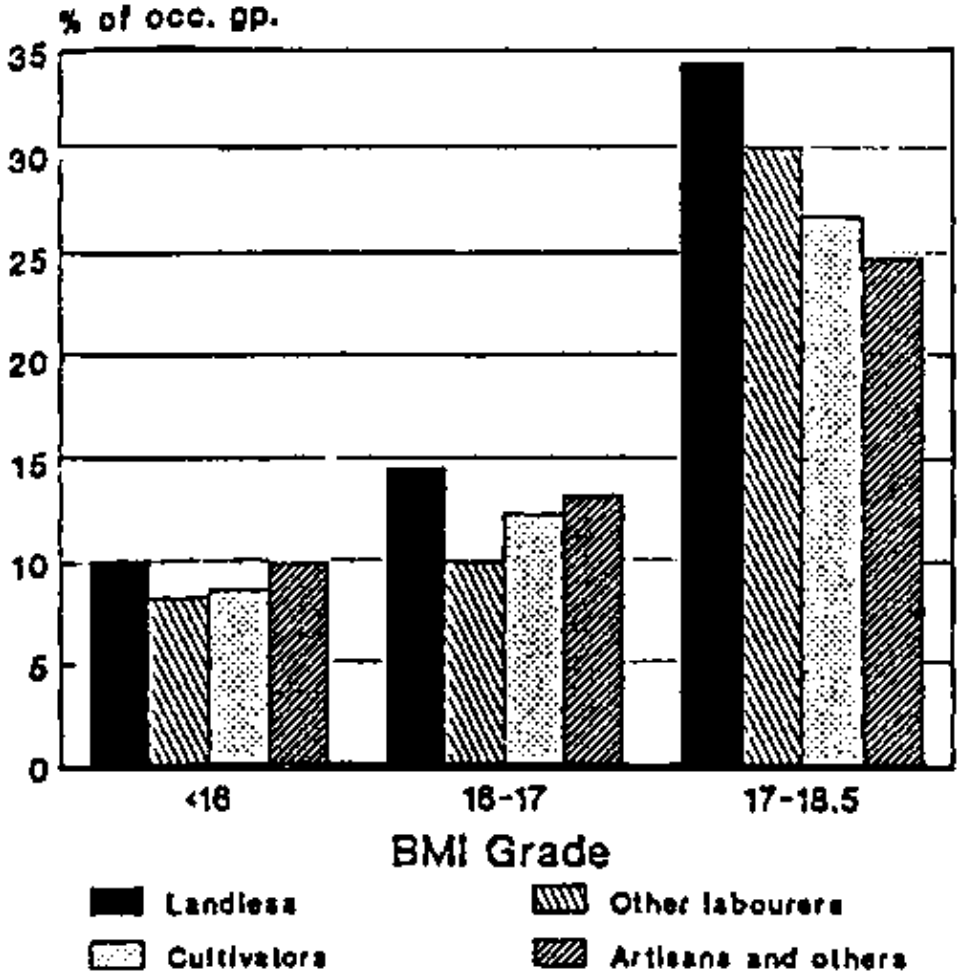

Figure 6A. Male BMI Distribution – By occupational group

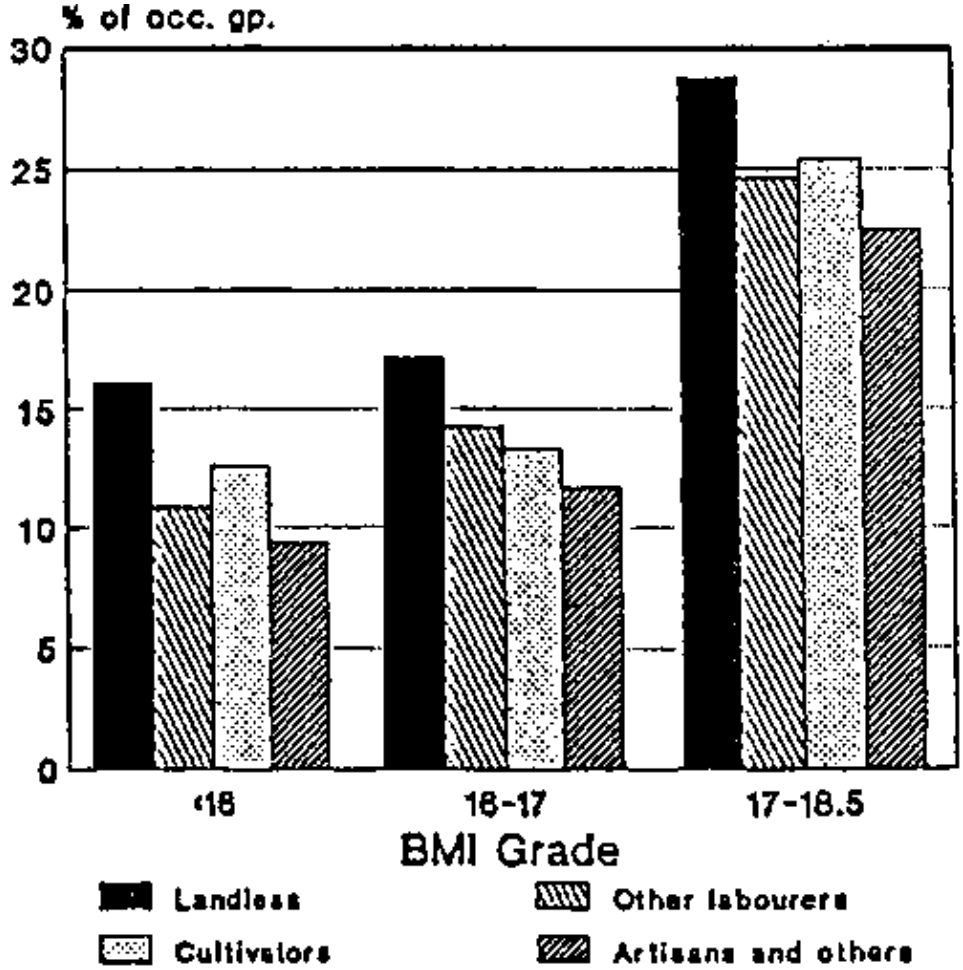

Figure 6B. Female BMI Distribution – By occupational group

Source: Naidu et al. (1991)

Energy intake. An attempt was also made to relate the energy intake data from household food consumption surveys to BMI of adults in the same households. Results showed that the mean energy intake was slightly higher in the households having better BMI (>20) (Naidu *et al.* 1991), although there was no significant correlation between different levels of energy consumption and BMI or any other anthropometric measurements. Assessment of energy intake is through diet surveys conducted on only one day. Considering the wide day–to–day and seasonal variations in the diets of the households, one–day assessment cannot be expected to capture the true picture of the dietary situation. Moreover, BMI status depends on the overall energy balance over a period of time rather than the energy intake on any single day. A study conducted in rural Hyderabad showed that BMI of agriculture labourers decreased by 0.23 units during the peak agriculture season with a fairly long–term negative energy balance.

Child nutritional status. The 'average household BMI' values were derived from BMI of adult males and females in the household (Naidu *et al.* 1991).' Children were classified as stunted, wasted and underweight based on their weights and heights. Bivariate distributions were derived between 'household BMI' values and child nutritional status. The results showed a close positive association between child nutritional status and 'household BMI', particularly with respect to stunting in children and less so with wasting, as would be expected.

Maternal nutritional status

Women of child bearing age constitute the vulnerable segment of the population because of their special reproductive needs. According to the 1981 census there were 143.5 million women of child bearing age, constituting about 21% of the total population. An average Indian woman has 6–7 pregnancies resulting in 5–6 live births, of which 4–5 survive. She is estimated to spend a greater part of her reproductive years in pregnancy and lactation. Chronic maternal undernutrition and overwork among the low income group pose a serious threat to the welfare of the mother and the infant.

Studies in Indian women of a high–income group (Ramachandran 1989) have shown that their dietary intakes range between 2000–2500 kcals per day during pregnancy. In this group, women generally do not perform hard physical labour and there is a reduction in activity during pregnancy (NIN 1983). The average weight of this group ranges between 45–55 kg and the mean weight gain during pregnancy is about 11 kg – observations similar to those reported in women from developed countries.

Studies in urban women of a low–income group have shown that their dietary intakes range from 1200–1600 kcals per day. The average pre–pregnancy weight of these women is around 43 kg and they gain 6 kg during pregnancy. In rural India, dietary intakes of women are slightly higher (1600–1900 kcal). However, rural women have to spend more energy in daily household chores. For instance, they have to fetch drinking water from sources which may be 1–2 kilometers away from home, and gather and bring firewood from forests miles away. Most rural women from low–income groups are heavily engaged in agricultural activities. It is therefore not surprising to find that these women weigh less than the urban women. The NNMB surveys showed that the average weight and height of rural women are 42 kg and 152 cm. About 33% of 18 year old women have body weights below 40 kg and 15 percent have heights less than 145 cms (NNMB 1991). These women fall into high risk category as they are likely to suffer from obstetric complications and give birth to small babies.

Micronutrient Deficiencies

Apart from protein–energy malnutrition, deficiencies of specific micronutrients such as vitamin A, iron and iodine are common in India, affecting large segments of the population.

Vitamin A deficiency

Studies conducted by ICMR during 1965–69 showed that 7% of preschool children had ocular signs of vitamin A deficiency (ICMR 1977); 4.2% had Bitot spots. The NNMB surveys between 1975–79 (NNMB 1991) showed that the prevalence of Bitot spots in preschool children was around 2%. More recent surveys (1988–90) repeated in the same areas showed a decline in the prevalence (to 0.7%). There is a wide variation in the prevalence rate, ranging from 0.5% in Kerala to 1.0% in Andhra Pradesh (NNMB 1991).

Most of the community surveys are based on clinical signs of mild xerophthalmia while severe deficiency resulting in corneal xerophthalmia and blindness is relatively rare; the risk of mortality is also high (60%) in such cases. A nationwide survey conducted by the ICMR during 1971–74 (ICMR 1991) showed that, of the 9 million blind people in the country, 2% cases were attributable to corneal disease caused by vitamin A deficiency. In the more recent survey (1985) 0.04% of the total blindness has been attributed to vitamin A deficiency. This is clearly an underestimate of the problem as corneal scars have been excluded although vitamin A deficiency is an important cause of corneal blindness. Mortality is also high in such cases (Menon and Vijayaraghavan 1980). Assessment of nutritional blindness by cross–sectional surveys does not reveal the true picture since only the survivors can be examined in these surveys. The reported incidence of corneal xerophthalmia among preschool children is 0.05% The estimates based on these figures suggest about 30,000 cases of corneal xerophthalmia per year, of which nearly half would result in permanent blindness.

The Government of India launched the national vitamin A prophylaxis programme in 1971. Under this programme, sponsored by the Ministry of Health & Family Welfare, children between 1–5 years are given a massive dose of 200,000 IU every six months. The programme is now in operation in almost all the states in the country covering about 30 million children. An evaluation study (Vijayaraghavan and Prahlad Rao 1982) has shown that in areas where the vitamin A programme was implemented well, there was a significant reduction in the prevalence of xerophthalmia, while in other areas the coverage was unsatisfactory. Reasons for poor coverage include inadequate supplies of vitamin A, irregular distribution of the dose, poor coordination between the various health functionaries, non–involvement of village level workers and absence of supporting nutrition education. Based on the recommendations of a review committee, the programme is now being modified to improve the outreach of the target population. The new approach involves integrating the vitamin A distribution programme with other child care services and involving village level workers (*anganwadi* workers) in the distribution of the dose.

Iron deficiency anaemia

Anaemia is a problem of serious public health significance, given its impact on physical work capacity, mental performance, maternal morbidity and mortality. The most vulnerable groups are pregnant women and preschool children. A number of sample surveys carried out during 1960s (Ramachandran 1989) showed that more than 50% of the pregnant women have haemoglobin levels below 11 gm/1 and are thus classified as 'anaemic'. More recent surveys indicate that anaemia is common even in other segments of the population. In rural areas around Hyderabad and Delhi, the prevalence of anaemia ranged from 40–70%, while in villages near Calcutta where hookworm infestation was common, more than 90% of the population were anaemic (AJCN 1982). In all the areas, women of child–bearing age had the highest prevalence of anaemia, followed by preschool children, school children and adult men. These data indicate that anaemia in India is much more widespread than hitherto believed and suggests the need to cover the entire population of pregnant and lactating women in rural areas in any intervention programme designed to control anaemia (see Gillespie *et al.* 1991).

The Government of India started a national anaemia prophylaxis programme in 1970 for reducing the prevalence of anaemia in vulnerable groups. The target population comprise pregnant and lactating women, women acceptors of family planning, and children between 1–12 years. Adult beneficiaries are given iron folate tablets containing 60 mg elemental iron and 500 ug of folic acid, while children are given smaller tablets containing 20 mg iron and 100 ug folic acid. The programme is implemented through all the institutions providing MCH services e.g. primary health centres, health sub–centres and maternity clinics. An evaluation study conducted by the Ministry of Health and Family Welfare (1989) revealed a poor performance in all the states. The coverage of pregnant women ranged from 3–26%. The number of children covered was also negligible. The reasons for poor coverage included inadequate supplies of iron folate tablets, poor supervision, and poor compliance of women due to lack of knowledge and ignorance. More than 80% of the pregnant women had haemoglobin less than 11 gm. Thus there was no impact on the prevalence of anaemia. There is an urgent need to strengthen the national anaemia prophylaxis programme with better control over actual delivery of tablets. Adequate supply of iron folate tablets, involvement of village–level workers in the distribution of tablets and a greater motivation of health workers and the community will be important for the successful implementation of the programme.

Iodine deficiency disorders

Goitre has been recognised as an endemic problem in the Himalayan and sub–Himalayan regions in the past half century. Surveys between 1945–53 in sub–Himalayan belt, stretching from Kashmir in the North–West to Nagaland in the East indicated a prevalence of goitre ranging from 26–90% (ICMR 1981). Surveys carried out most recently by the Directorate General of Health Services and other agencies indicated the presence of goitre even outside the conventional goitre belt of Himalayas. ICMR conducted a survey covering 14 districts of 9 states with diverse geological, metrological and geochemical characteristics (ICMR 1989). The study confirmed a high prevalence of goitre in all the areas. In some districts like Dibrugarh, which lies in the Himalayan belt, the prevalence was as high as 66%. In the extra–Himalayan regions the prevalence ranged from 24% in hilly districts to 19% in coastal districts and 12% in the plains, with prevalences higher among tribals than non–tribals. The prevalence rates in each of these districts were well above the level recognised for endemicity. More alarming is the prevalence of endemic cretinism in all the 14 districts surveyed, though in varying proportions, with Manipur having the highest prevalence of 6.1%. Apart from cretinism, children in endemic areas show varying degrees of thyroid deficiency and developmental defects. A study conducted by the All India Institute of Medical Sciences, Delhi revealed a high prevalence of neonatal chemical hypothyroidism (NCH), as defined by thyroxine <30 ug/dl and TSH >50 ug/ml. In one particular district (Gonda) of Uttar Pradesh, the prevalence rate of NCH was as high as 15%. Without treatment, these infants are likely to develop physical and mental defects. In the villages of Uttar Pradesh and Bihar where goitre prevalence was high, deaf–mutism, mental retardation and other clinically detectable problems of environmental iodine deficiency were found in 4% of the children. It is estimated that, today, more than 54 million people in India are suffering from endemic goitre and 8.8 million from different grades of mental/motor handicaps (Khatri 1990). The magnitude of the problem is thus far greater than hitherto believed.

Although the national goitre control programme has been in operation for the last three decades, it has gained momentum only recently. Initially, iodised salt production was managed by the Hindustan Salt Ltd., a public undertaking. The production was grossly inadequate and could not meet the demands of even the endemic areas. Transportation of salt from production centres also posed serious problems, as did poor supervision and the lack of quality control.

Recently, following the recommendations of the review committee, the Government of India has liberalised the production of iodised salt to include the private sector, in addition to the public sector. More important is the historic decision taken in November 1984 to iodate the entire edible salt in the country in a phased manner. The Government of India stands committed to universal iodisation of the entire edible salt supply by 1992. A financial outlay of Rs. 300 million has been provided during the 7th Five Year Plan, and goitre control cells and quality control laboratories are being set–up in all states.

Infant and Child Mortality

The infant mortality rate (IMR) is a valuable indicator of health and development. It has shown a decline from 129 per 1,000 live births in 1971 to 91 in 1989. There is a wide variation between urban and rural areas (see Figure 7) and between states, ranging from 28 in Kerala to 123 in Uttar Pradesh in 1988 (see Figure 8). The data provided by the office of Registrar General of India shows the factors associated with infant deaths. These include maternal age, education, age at marriage, religion, social status and annual income of the household. The figures for 1984 show that the mean IMR for women married before 12 years of age was 135.3 as compared to 78.2 for women married between 21–23 years old. The IMR for Hindu women was highest of religious groups, being 107.6, as compared to 98.9, 54.4 and 40.1 for Muslims, Sikhs and Christians respectively. Scheduled castes had the highest IMR of 126.5, compared to non–scheduled castes and tribes, 99.2. IMR varied markedly with educational status of the mother, ranging from 119.9 for illiterates to 21.0 for women educated to matriculation or above. Household income also had a substantive effect as expected, with IMRs of 124.2 for annual household income below Rs. 5,000, compared to 79.7 for household incomes above Rs. 10,000. There were no gender differences in IMR. The under–five mortality rate has declined from 282 per 1000 live births in 1962 to 142 per 1000 live births in 1990 (UNICEF 1992).

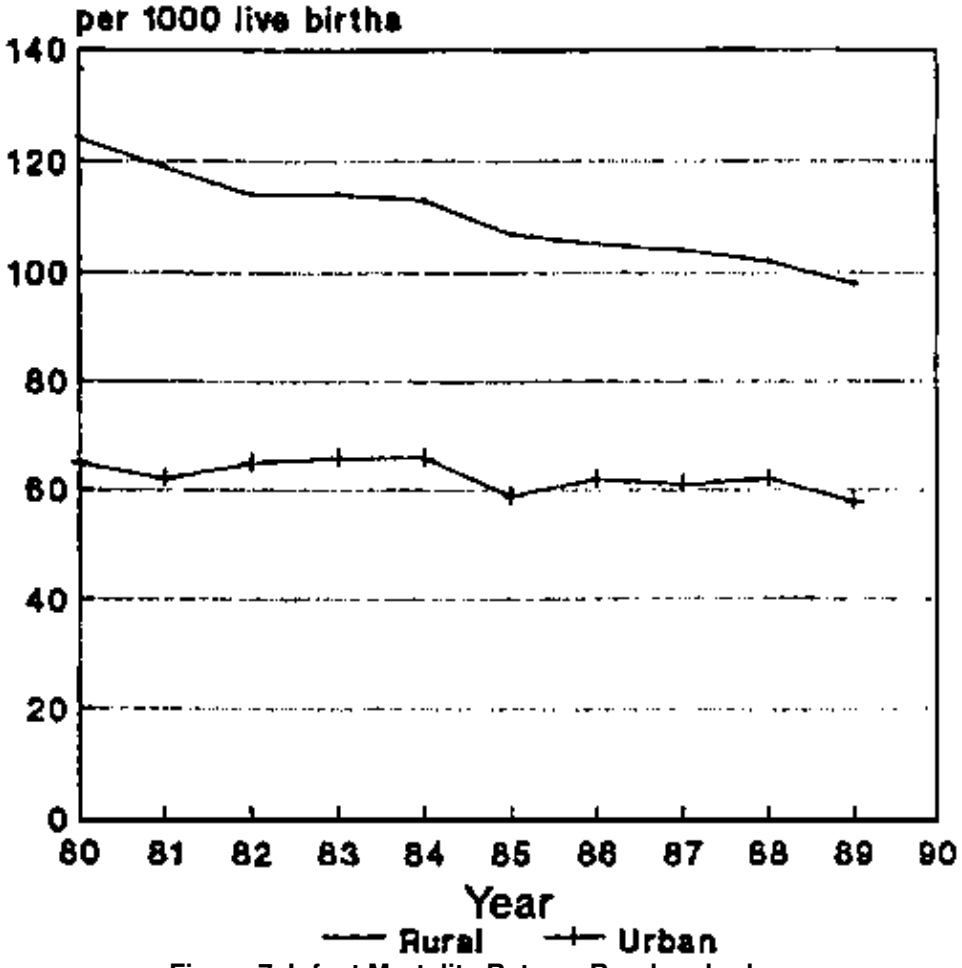

Figure 7. Infant Mortality Rates – Rural and urban

Source: Registrar General at India

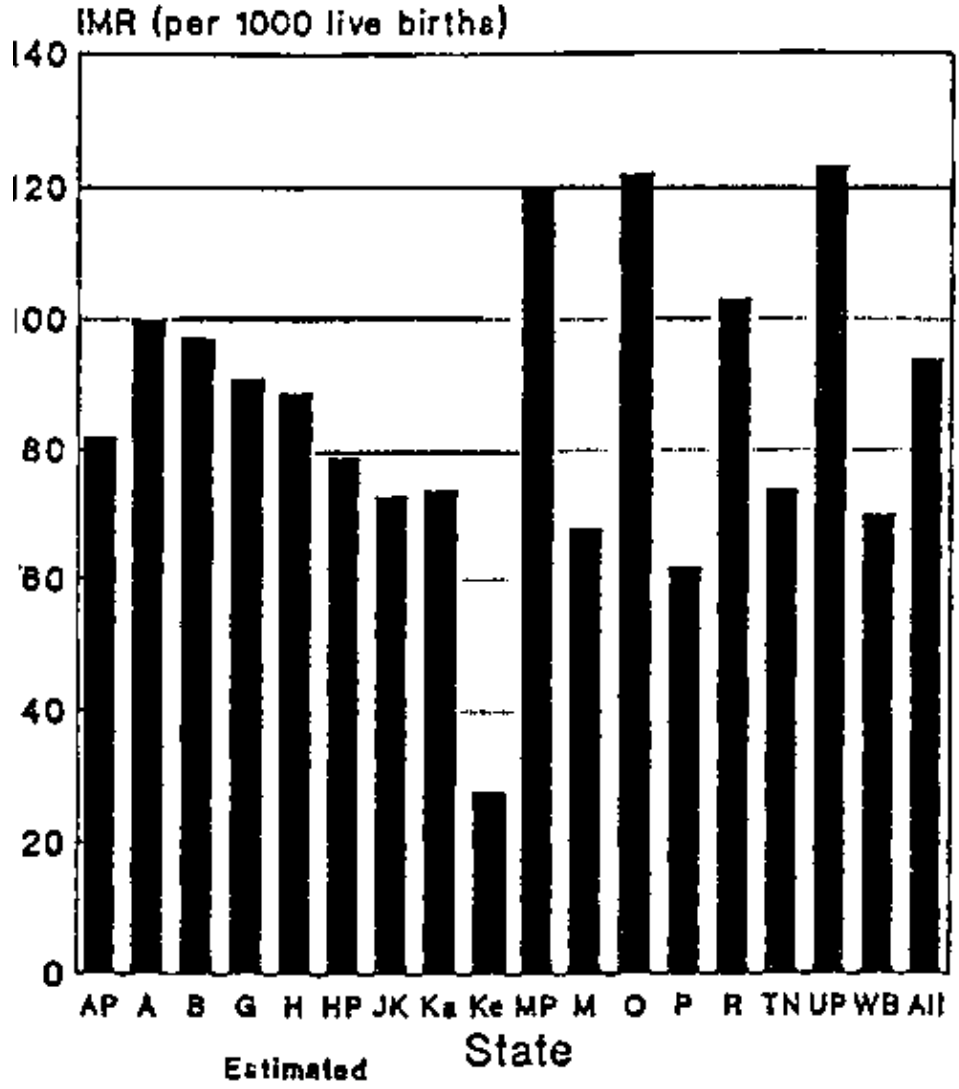

Figure 8. IMR by State – 1988

Source: Registrar General at India

Relation between prevalences of severely underweight and mortality

Data available on the prevalence of malnutrition and child mortality were examined to see the relationship between the two. The percentage of severely underweight children was taken from an ICDS baseline survey of 23 districts in 12 states during 1983–84. The district–wise child mortality rates for 1981 available from the office of the Registrar General, Ministry for Home Affairs were also examined. There was a significant positive correlation between the mean district–level severely underweight prevalences and the child mortality rate among children under 5 years (see Table 6).

*Table 6: Regional nutrition and mortality profile among children in ICDS project areas during 1984–85**

State	***Type of project***	***% severely underweight***		***Child mortality rate****	
		0–3	*3–6*	*0–2*	*0–5*
Andhra	Rural	8.8	11.3	99	142
Pradesh	Tribal	22.2	32.5	169	196
Karnataka	Rural	15.4	12.9	124	182

	Rural	17.2	10.8	109	149
Tamil Nadu	Urban	5.7	4.6	70	80
	Urban	5.7	0.3	74	101
Kerala	Rural	1.2	4.3	66	104
	Rural	0.7	4.0	74	116
Madhya	Rural	34.4	16.9	220	265
Pradesh	Tribal	26.0	17.3	138	174
Uttar Pradesh	Rural	14.6	13.0	163	211
	Rural	6.1	3.1	154	187
Rajasthan	Rural	12.4	NA	214	252
	Tribal	14.2	0.7	170	169
Maharashtra	Rural	22.3	25.1	177	227
	Urban	12.0	10.2	87	107
Gujarat	Tribal	4.6	3.3	91	96
	Tribal	7.3	5.6	115	129
Orissa	Rural	3.2	2.8	196	204
West Bengal	Rural	21.3	12.2	115	149
	Tribal	6.5	8.2	77	89
Haryana	Rural	6.7	4.2	120	146
	Rural	5.5	0.7	114	129

Source: Kakwani and Subbarao (*1990b*)

** The nutritional data are taken from ICDS project–wise progress report for 1984–85, for those projects which were sanctioned during 1983–84. As such, these figures reflect the nutrition situation at about the commencement of ICDS in these districts.*

*** District–wise child mortality rates for 1981 for the 0–2 and 0–5 year olds were made available for the first time in the Occasional Paper 5, 1988 of the Office of Registrar General, Ministry for Home Affairs.*

Maternal Mortality

It is estimated that out of half a million maternal deaths in the world each year about 20% are in India. Maternal deaths are caused either by direct causes arising from complications of pregnancy, delivery or their management; or indirect causes due to aggravation, by pregnancy or child birth, of an existing abnormal condition.

India's maternal mortality rate, estimated at 3.4 per 1000 live births, on average between 1980–87 (UNDP 1990 pp.148) compares with an average of 2.9 for 'all developing countries' and 0.24 for industrialized countries. There is no figure for the maternal mortality rate of the country which can be considered as reasonably conclusive, more so because levels as high as 13 have been noted in certain rural areas. The actual life–time risk of an Indian woman dying from a maternity–related cause is far greater than comparative rates between India and the industrialized countries would suggest owing to the higher total fertility rate (4.0 in 1990 according to the World Bank 1992). Maternal age and number of births have a strong effect on maternal mortality. A woman giving birth to children at 20–35 years of age faces a much lower risk than women below

20 and over 35 years. An estimated 8% of the 26–27 million annual births in India are to mothers below 19 years, whose growth and maturation may be retarded. Maternal illness and death rose significantly with the fourth pregnancy and reached a high level after the fifth. Some 35% of live births in rural areas and around 29% of live births in urban areas are of the fourth birth order and above (Registrar General of India 1984). In India, as in many developing countries, maternal mortality accounts for the–largest, or near–largest, proportion of deaths among women in their prime years (UNICEF 1990 p14). The trend in the percentage distribution of deaths by causes related to child birth and pregnancy in rural India is given in Table 7.

Table 7: Percentage distribution of deaths by cause related to child–birth pregnancy 1981–86

Specific causes	***1981***	***1982***	***1983***	***1984***	***1985***	***1986***
Abortion	13.7	10.1	10.7	10.8	11.5	8.0
Toxaemia	8.0	12.5	12.1	10.8	6.7	11.9
Anaemia	17.7	24.4	18.9	23.3	23.1	17.0
Bleeding of pregnancy	23.4	26.2	23.5	18.8	15.9	21.6
Obstructive labour	9.2	7.2	8.3	6.2	7.7	6.2
Puerperium sepsis	13.1	8.3	11.6	10.8	13.9	13.1
Non–classifiable	14.9	11.3	14.6	19.3	21.2	22.2
Total	100.0	100.0	100.0	100.0	100.0	100.0
Sample number of deaths	175	168	206	176	208	176
Percentage of total deaths	1.0	1.0	1.2	1.0	1.2	1.0

Source: Registrar General of India, Survey of Censuses of Deaths (Rural) 1984 and 1987

In 1987, deaths related to pregnancy and child birth accounted for 13.2% of deaths among rural women aged 15–45 years; and 14.0% of those in the 15–24 years age group. Most of maternal deaths are associated with malnutrition, particularly anaemia. Other major causes such as toxaemia and septicaemia reflect the inadequate health care available to women during ante–natal, intra–natal and post–natal periods. The share of deaths from toxaemia and puerperal sepsis is higher in the 15–24 year age group which also faces a considerable threat from abortion, anaemia and bleeding (the latter two are inter–related). These young women are thus particularly at–risk, in addition to their greater propensity for delivering low–weight babies and to infant loss (Registrar General of India 1987).

IV – IMMEDIATE CAUSES OF OBSERVED OUTCOMES

Disease

There is no systematic plan for obtaining data on morbidity in India. The available data are fragmentary and limited, being based mostly on hospital attendance. NSSO carried out morbidity surveys in the community during 1973–74 and again during 1986–87. In the surveys of 1986–87 the morbidity rate for all age groups was 6% in rural and 3% in urban areas[1]. (GOI 1987)

[1] NSSO definition of morbidity was “any deviation from the state of normal and mental well–being is considered as illness” The reference period is 30 days preceding the survey.

Diarrhoea and acute respiratory infection (ARI) are common causes of morbidity in children. The available data suggest that on an average a child under five years of age suffers three episodes of diarrhoea per year. The incidence of diarrhoea is higher during monsoon. About 10% develop dehydration and 1% require hospitalisation (UNICEF 1990 p156). ARI accounts for 20–30% of deaths among children under 5 years of age with an average number of episodes of 3–7 per year. About a fifth of the mortality in children under five

years of age is contributed to by pneumonia. About 25% of ARI−related deaths are known to be preventable with measles vaccine and DPT (UNICEF 1990 p156).

The office of the Registrar General provides data on causes of death for rural India. Although the data have certain limitations, both in content and coverage, they can be used to indicate general trends. Respiratory and digestive disorders together constitute about 30% of total deaths in the country. There was a slight decline in diarrhoeal deaths between 1979 and 1986 but not much change in other diseases (Registrar General of India 1982 and 1986).

Food Consumption

Information on food consumption at the household level is important not only to understand the dietary patterns of people but also to assess whether their nutritional requirements are met. The National Nutrition Monitoring Bureau (NNMB) and National Sample Survey Organisation (NSSO) are the two agencies involved in collecting data on food intake in India, although the respective objectives and methodologies are very different (see Annex I). While the NSSO assessment is based on consumer expenditure, the NNMB surveys measure the actual dietary intakes of the household and individuals.

The NSSO data show that between 1970−71 and 1988−89, per capita cereal consumption declined in rural areas and narrowly fluctuated with no significant trend in urban areas. In the recent past, figures have been 14.5 kg/person/month (rural) and 11.0 kg/person/month (urban). Important recent evidence (Radhakrishna 1992) has been presented to show that trends in cereal consumption appear *not* to be in line with income growth and relative food price decreases. Such counter−intuitive findings are also not explained by food expenditure elasticities, which are generally high. Rather, a part of the explanation lies in changes in *taste.* A trend analysis suggests a distinct shift in consumption patterns away from cereals since the mid−1970s uniformly across all expenditure groups, including the poorest (Radhakrishna 1992). The proportion of expenditure on non−food items increased from 18 to 25 per cent, while the share of milk and milk products rose from 3 to 5 per cent. More importantly there was a shift from coarse grains to wheat. Among the poorest (defined here as those with per capita expenditure less than 75% official poverty line), between 1970−71 and 1988−89, the share of coarse cereals in cereal expenditure dropped from 33 to 17 per cent, while the share of wheat rose from 16 to 25 per cent. This change may have been in part associated with a demonstration effect of in−kind payments in wheat for agricultural labour, as well as wheat channelled through the PDS.

Two factors appear to be operating to effect these changes − taste and price. Radhakrishna (1992) has recently carried out a few simulations using an integrated demand model to differentiate the relative effects of these two factors during the period 1970 to 1987. Firstly, among low−income groups (bottom 30% population) he found an increase of 133 kcals (rural) and 54 kcals (urban) attributable to favourable price changes alone, in contrast to corresponding increases of 50 kcals (rural) and 33 kcals (urban) for the richest 30% population. As expected, relative food price decreases benefit the poor most, as they have the highest calorie price elasticities. Countervailing these changes there were sharp falls in per capita daily calorie intake due to taste factors alone, ranging between 348 kcals (poorest) and 646 kcals (richest) in rural areas, and 54 kcals (poorest) and 182 kcals (richest) in urban areas. Thus, according to this analysis, *the negative taste effect is stronger than the positive price effect.* However, Radhakrishna suggests, positive growth and price effects together could just balance the negative taste effect − which would account for the stable per capita calorie consumption during the last 15 years, as revealed by NNMB data (see below).

NNMB repeat surveys were undertaken in 1988−90 in the same districts and villages covered between 1975−79 so that the exact levels of change, if any, in the food consumption and nutritional status over the period could be assessed. There was no difference between the two periods in the overall consumption of cereals (wheat and rice) and millets (jowar, bajra, ragi and maize) (NNMB Annual Reports 1975−91). During the entire period (except 1977), cereal and millet consumption was above the recommended level of 460 g, reflecting adequate mean consumption. Pulse consumption on the other hand was below the recommended level of 40 g and showed no change during last 15 years, possibly due to low production and increasing cost of pulses. With increasing income, consumption of cereals declined while that of other foods like pulses, milk, fish, vegetables, fats and oils increased. The protein and energy content of diets also show an increase with increasing income (see Table 8).

During 1980−90, daily average energy intake was around 2300−2400 kcals per consumption unit (CU), similar in fact to the level observed during the mid−1970s, indicating no significant change during the last 15 years (see Figure 9). Intake of other nutrients also did not change significantly.

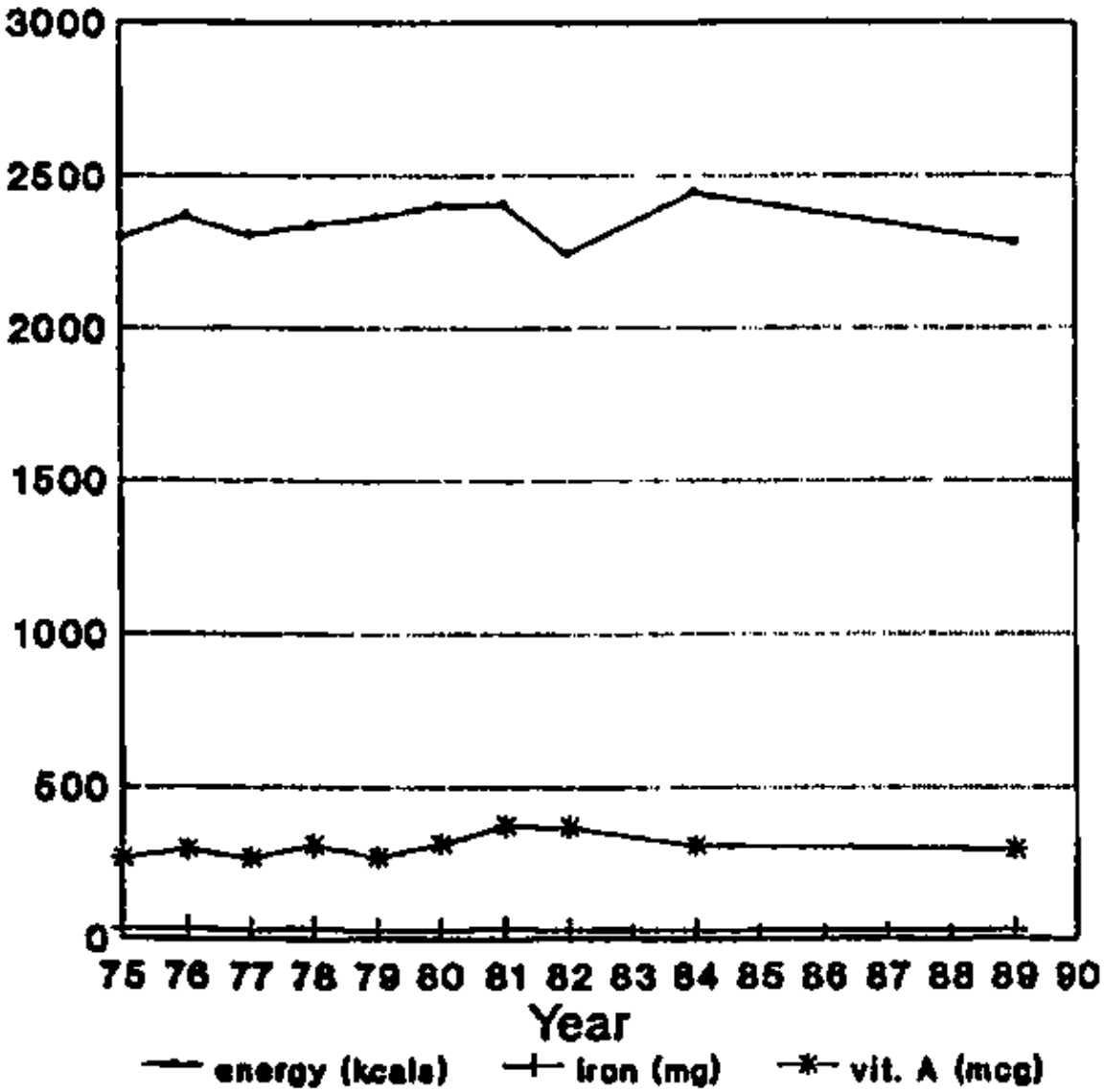

Figure 9. Nutrient Consumption – Per CU per day

Source: NNMB

In attempting to investigate socio–economic differences in food or energy consumption, income may not be a reliable classifying variable, as precise assessment is fraught with methodological errors. Occupation of head of the household is considered a reasonably good proxy for economic status and was used to categorise households into the following four occupation groups: i) landless agricultural labourers, ii) other labourers, iii) cultivators, iv) "others" including artisans, traders and salaried group.

Table 8: Nutrient intake as a percentage of the recommended daily allowance (RDA)

Year	*Protein*	*Energy*	*Calcium*	*Iron*	*Vit A*	*Thiamine*	*Riboflavin*	*Niacin*	*Vit C*
1975	106.5	97.7	137.2	113.5	43.8	139.1	70.0	–	–
1980	103.1	102.2	146.7	105.7	52.1	110.0	65.0	96.2	130
1983–84**	105.6	104.1	127.5	108.5	51.1	109.1	66.4	96.2	102.5
1988–90	103.0	97.1	139.0	101.4	43.0	127.5	67.1	96.8	92.5
RDA	60.0 g	2350 kcals	400 mg	28.0 mg	600...	1.20 mg	1.40 mg	16.0 ug	40 mg

** 4 states pooled (Tamil Nadu, Andhra Pradesh, Gujarat and Orissa)

Source: NNMB Annual Reports (1975–91)

The energy intake of landless agricultural labourers showed an increase from 2043 kcals. in 1975–79 to 2179 kcals. in 1988–90 (see Table 9), while the intakes of other labourers remained more or less unaltered. In the case of cultivators and "others" with better income status, a reduction in intakes was observed, thus indicating a reduction to some extent in the inequality of consumption. These findings may be interpreted in the light of the countervailing taste and price factors mentioned above, with in this case the positive price effect outweighing any negative taste effect on calorie consumption for landless labourers. However, as the group of 'cultivators' is so large and so differentiated, such conclusions may need to remain tentative. Further micro–level studies should be a priority here.

Such a significant effect of taste factors on food expenditure and calorie consumption will have consequences for setting the poverty line (as currently defined). Periodic upward revision of the line would be necessary. Interestingly, according to Radhakrishna, the required upward revision of the line would *not* reveal the declining trend in poverty during the 1980s, that the Planning Commission figures suggest. In addition to the existing lack of unanimity on the calorie norm to be used to construct the poverty line, the lack of such a revision further questions the validity of the official poverty line.

Table 9: Mean energy intakes (kcal/CU/day) by occupational groups

Period	***Landless agric. labour***	***Other labour***	***Cultivators***	***Others****
1975–79	2043 (892)**	2123 (1978)	2514 (4510)	2244 (3126)
1988–90	2179 (675)	2118(619)	2356 (2116)	2168 (1756)

* includes artisans, traders and salaried group

** sample size in brackets; unfortunately standard deviations not available to enable tests of statistical significance.

Source: NNMB (1991) Repeat Survey Report (data from 7 States)

The levelling off of cereal and calorie consumption (despite improvements in real incomes of the poor and favourable food price trends), is cause for concern as current levels are too low to translate into nutritional adequacy. As well as the taste factors mentioned, the increasing de–linking of food production and food entitlement may have contributed to this – expansion of the 'green revolution' has left more households with a net dependence on the vagaries of the market for food (making the food more expensive). Recent employment growth in agriculture (where payments may be in–kind) has been sluggish, and payments for any off–farm employment found are in cash.

In the long–term, conservatively assuming no further taste changes, Radhakrishna projects per capita cereal consumption to grow at 0.5 per cent per year during the 1990s, with coarse grain consumption actually dropping by 0.5 per cent. In contrast, expansion in expensive calories – foods like milk, meats, eggs, fish, etc – will be considerable (up to 4.3 per cent for milk and milk products). Induced demand for fodder may result in competition for scarce land, leading to supply–side constraints on cereal production in the future. If cereal prices are allowed to rise (so as to integrate the domestic and international markets) and further taste changes occur, raising the income of the poor may only have a beneficial impact on food consumption in the long–term. Short–term measures such as the Public Distribution System (PDS) – described below – are all the more important when seen in this light.

V – FOOD SECURITY

At the national level, food security essentially refers to the capacity of a country to provide sufficient food for its population, and it will depend on such factors as food production, imports, food aid and within–country food distribution (in India's case, this is state–level food security). The ability to absorb shocks to such a system from drought, floods, civil strife, etc. is also relevant. At the household level, food security is here defined as access to food, that is adequate in terms of quality, quantity, safety and cultural acceptability, for all household members (Gillespie and Mason 1991). While many definitions of household security exist, they virtually all hinge on a household's ability to get sufficient food to the household door. The two main factors determining household food security – poverty and food prices – are investigated here. The cost of achieving and maintaining food security is important and can be revealed through an analysis of the proportions of either

income or expenditure that is allocated to food.

National Food Security

Agriculture

Agriculture remains by far the most important area of the India economy, accounting for about 63% of the labour force in 1985–1987, although its importance has decreased over the years. In 1989 it accounted for 28.2% of GDP, compared to 42.8% in 1973, indicating low agricultural labour productivity. About two–thirds of the crops cultivated for domestic markets are grains, mostly rice, wheat, sorghum and maize.

In India cropping activities are year–round provided water is available for crops. In Northern India there are two distinct crops seasons – the *kharif* (July to October), and the *rabi* (October to March). In some parts of the country there are no such distinct seasons. Based on the crops, the country can be divided into the following agricultural regions.

i) The rice region including a very large part of the north–east and south–east of India, with another strip along the western coast.

ii) The wheat region, occupying most of the northern, western and central India.

iii) The millet–sorghum region, comprising Rajasthan, Madhya Pradesh and the Deccan Plateau in the centre of the Indian Peninsula.

iv) The temperate Himalayan regions of Kashmir, Himachal Pradesh and Uttar Pradesh where potatoes are as important as cash crops and tree fruits form a large part of agricultural production.

v) The plantation crop regions of Assam (tea) and South Indian hill regions (coffee).

Rice is grown in high rainfall areas or where supplemental irrigation is available to ensure good yields. In southern states, namely Andhra Pradesh, Tamil Nadu and Kerala, rice is grown in more than one season and mostly under irrigation or under sufficient rainfall. Together these three states have over 6.0 million hectares representing over 17% of the all–India area under rice. Important alternative crops in Andhra Pradesh are pulses, groundnut, millets, maize, sugarcane and tobacco. In Kamataka, alternative crops to rice are *ragi,* millets, cotton etc. In Maharashtra rice is grown mostly in the Konkan area, over 1.3 million hectares, along with *ragi,* pulses, oil seeds, groundnut etc. In the states of Gujarat, Jammu and Kashmir, Rajasthan and Himachal Pradesh, rice is a minor crop. Rice is grown on more than 50% of cropped area in Orissa and on 4.3 million hectares (11.7% of the all India rice area) in Madhya Pradesh. In West Bengal and Uttar Pradesh rice is grown on 14.2 and 12.4% respectively of the all–India area.

Generally wheat and gram are concentrated in the sub–tropical region in northern India, where they can substitute for each other. The core of the wheat region responsible for 70% of the area and 76% of production comprises Punjab, Haryana, Delhi, Uttar Pradesh and Gujarat in the west and Bihar and West Bengal in the east.

With the increase in population, irrigated area is increasing, and as agricultural science advances, most of the extensive *cropping* patterns are giving way to intensive cropping. The development in minor irrigation works has provided farmers with opportunities to crop their land all year around with high–yielding varieties. This intensive cropping requires an easy and ready availability of balanced fertilizers and plant protection chemicals and an appropriate price policy for inputs.

Food production

In the early 1970s, a global food crisis, oil price hikes, unfavourable weather conditions, droughts (especially in Western India) and severe floods (during 1974 in the North East) all combined to threaten the two pillars of India’s food strategy – a political commitment to self–reliance in food and a determination to prevent famine.

Ultimately, however, these beliefs were reinforced by these challenges.

The ‘green revolution’ package of high–yielding crop varieties, irrigation and complementary inputs, which enabled farmers to increase per acre yields, has helped agriculture keep pace with population growth, and led to national self–sufficiency (see below).

At the national level to the present though, India has made rapid strides in agricultural production, with food production increasing from 108.4 million tonnes in 1970–71 to a record production of 176.5 million tonnes in 1990–91 (GOI 1991), though this has been offset by an increase in population from 551 million to 844 million during this period. The per capita production of wheat in particular, and to a lesser extent rice, increased most significantly, as the use of inputs, and the area irrigated expanded. The food production per capita index, with 1971–80 as base (= 100), indicates an increase early in the 1980s followed by a levelling off in the mid–1980s, a drop in the drought years 1986–87, then a marked increase to 1989, before dropping again in 1990 (see Figure 10).

In the early 1990s, however, there are signs that such a strategy is running into diminishing returns, as a result of decreasing fertiliser productivities and long–term extraction of soil minerals. The rate of growth of foodgrain production is said to be decelerating (Sarma and Gandhi 1990), raising the question of sustainability of growth and possible exhaustion of the green revolution potential. Furthermore, although evidence has been presented to show that the technologies involved (at least since the mid–1980s) are largely scale–neutral (Hazell and Ramaswamy 1991), despite an early bias towards richer farmers, they are still only effective if a constant supply of water and fertilizer can be assured. In the (usually poorer) villages dependent on rainfed coarse grains – such as maize, sorghum and other millets – there has been no ‘revolution’ and here lies the challenge for the future. Initial biases towards wheat and rice and towards certain states, e.g. the Punjab and Haryana, need to be balanced, and ways sought to promote agricultural development in poorer rainfed areas.

The regional development of food production has been uneven. To some extent this simply reflects differences in the crop composition and seasonality of agriculture. There have also been regional variations in performance for individual crops which have accentuated existing regional disparities. Initial gains accrued particularly to the north–western states of Punjab, Haryana and the western half of Uttar Pradesh, which were environmentally more favourable and better equipped to give high returns to the new wheat technology package. Irrigated areas of Tamil Nadu were also able to exploit the new rice technology. Much poorer performance has been experienced in the states of eastern India with predominantly rain–fed agriculture and in the dryland agriculture of the states of Andhra Pradesh, Kamataka, Maharashtra and Madhya Pradesh – states characterized by a history, of instability in agricultural production and by a high incidence of poverty. Other aspects of agrarian structure such as gross inequities of land distribution with high degrees of landlessness, more or less disguised sharecropping and other forms of tenancy and exploitation through the marketing system as well as poorly developed irrigation, drainage and flood protection and a low uptake of fertilizer may explain the particularly dismal record of rice yields in the Eastern region.

Dryland agriculture is characterized by high female participation rates, very low and highly variable yields, a limited generation and heavy concentration of control over investible surplus, generalized lack of creditworthiness, small and sporadic creation of marketed surpluses and the distress commercialization (under conditions of debt and relatively low prices) of the agriculture of small and marginal farmers. Little progress has been made in developing strains of seed with high moisture stress resistance which would be suitable for use in dryland areas. Indeed, until recently there has been a bias in research funding away from these crops.

Drought and food distribution

The 1986–87 drought was the worst since before Independence, driving the agricultural strategy off–course, and necessitating the importing of cereals on a significant scale in 1988–89 (even though the drought broke in mid–1988). The precise definition of drought is difficult to provide. As Healthcote (1973) put it, “There are probably as many definitions of drought as there are uses of water”. In 1987, India experienced what was labelled as the country’s worst drought both in terms of intensity and geographical spread – 252 districts out of 412 in the country received deficient rainfall. During 1986–87, food production dropped to 143 million tonnes and then in 1987–88 to 138.4 million tonnes – see trend in Figure 10 (GOI 1991).

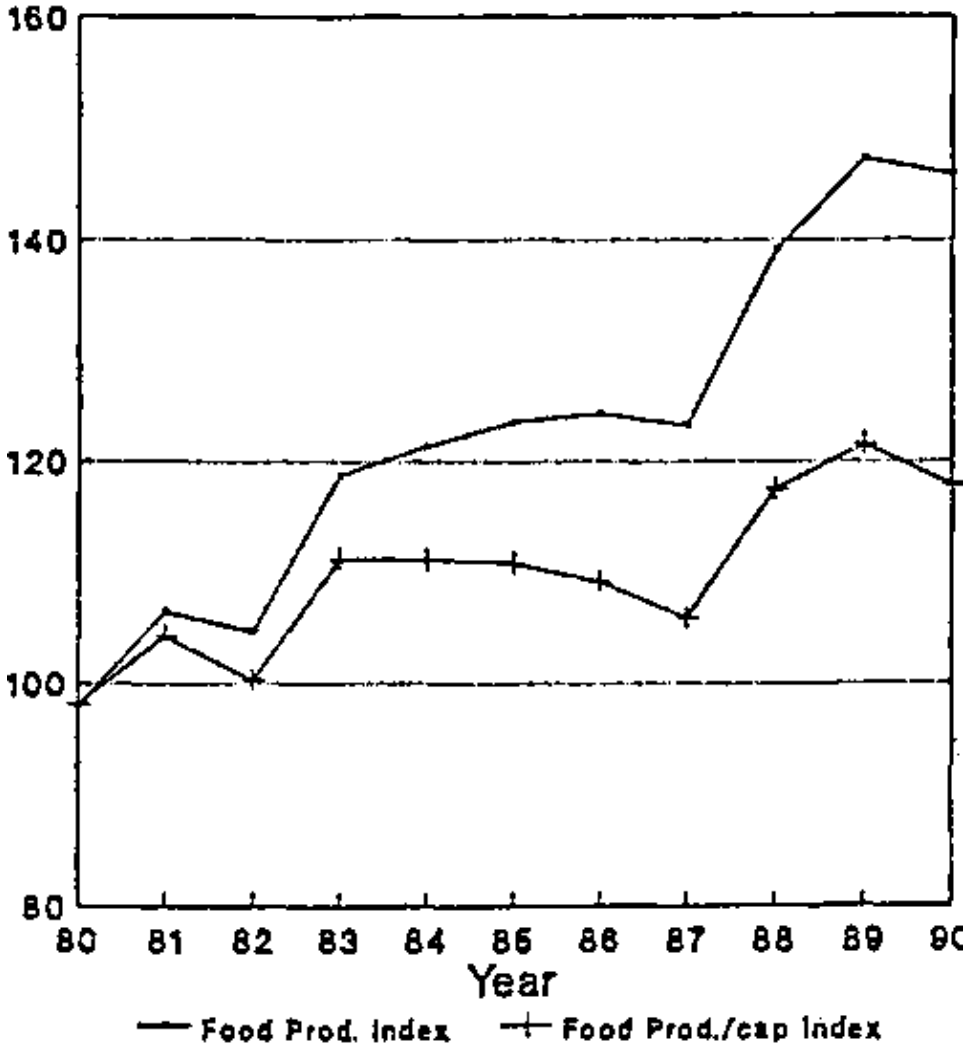

Figure 10. Food Production Index

Source: FAO AGROSTAT

The adverse impact of the drought on the country's economy in terms of the drop in agricultural production, industrial output, reduced purchasing power and the concomitant rise in unemployment, particularly of the rural labour force, was considerable. The results of a diet and nutrition survey during the 1987 drought however showed that widespread hunger and its consequences (experienced earlier in the 1960s and 1970s) were averted in 1987.

This was achieved through the wide geographical distribution of grain buffer stocks within the Public Distribution System (PDS).. These buffer stocks had become the symbol of self–reliance during the seventies and eighties, as a food security net for the population. The Public Distribution System (PDS) involves the distribution of subsidised foodgrains via a network of fair–price shops to the eligible poor with ration cards. Figure 11 shows how public distribution rose steadily from 1975, until buffer stocks were run down during the drought of 1987–88 (to the point where imports were necessary again in 1988). While buffers stocks may be costly to maintain, the 1987–88 drought demonstrated that such a food security strategy is cheaper than importing food on a large scale. States differ as regards the coverage, efficiency and effectiveness of the PDS, with states with a better infrastructure (e.g. Punjab and Haryana) – and urban areas *per se.*– often being better served, despite their lower relative need vis a vis poorer States such as Bihar, Orissa and Uttar Pradesh. A detailed analysis of the Public Distribution System is provided in Part II.

India has not experienced famine on any significant scale since Independence, a period including the worst drought this century (1986–88) for wide areas of western and central India. This is historically and comparatively an impressive achievement. Post–Independence policy was formed in the aftermath of the Great Bengal Famine. The dramatic measures to prevent famine in Bihar in 1966/67, to contain the food crisis in 1973/74, as well as to feed 10–12 million Bangladeshi refugees in 1971 indicate the overwhelming priority of famine prevention. After the so–called "Bihar Famine" of 1966/67, this has also been accomplished without significant direct external assistance. The prevention of famine in India now has a political importance that in

the short run will also outweigh any other consideration. There is therefore a battery of famine warning and prevention measures, representing a continuation and strengthening of earlier Famine Code practice (Clay *et al.* 1988).

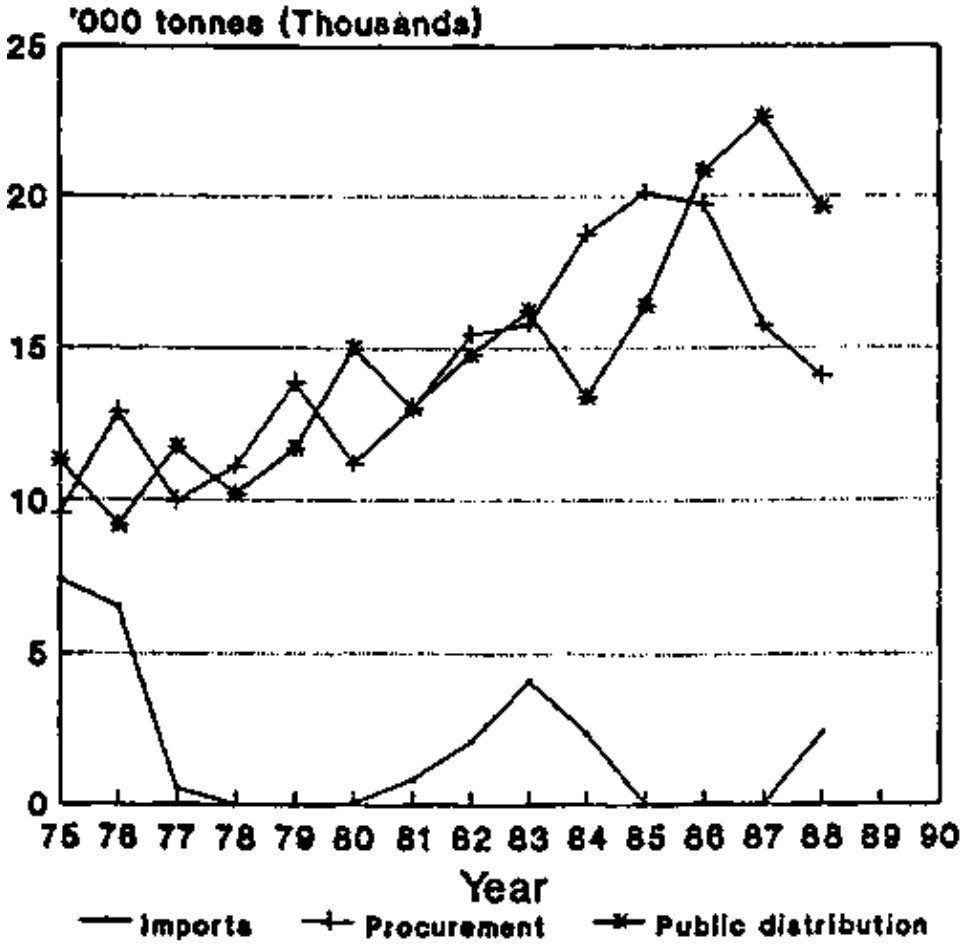

Figure 11. Foodgrain Use – Imports, Procurement, Distribution

Source: GOI 1991

An important qualification to this success, however, is establishing and maintaining a rudimentary food security net for both rural and urban poor throughout India, has also been accomplished without significant inroads into the massive continuing problem of structural poverty.

Per capita food availability

The per capita availability of food is a function of population and food production with adjustments made for exports, imports, wastage, livestock feed, seeds and stocks at the beginning of the year.

Cereals. The per capita net daily availability of cereals has not varied significantly in the last 20 years, being 417g in 1970–71 and 438 g in 1989–90 (GOI 1991) (see Figure 12). From the early 1950s to the early 1980s, per capita foodgrain availability fluctuated within a narrow band of 150–170 kgs per year, with a statistically insignificant trend. Thus, foodgrain production growth seems to have been absorbed by population growth, reduction in imports and increase in stocks (Sarma and Gandhi 1990).

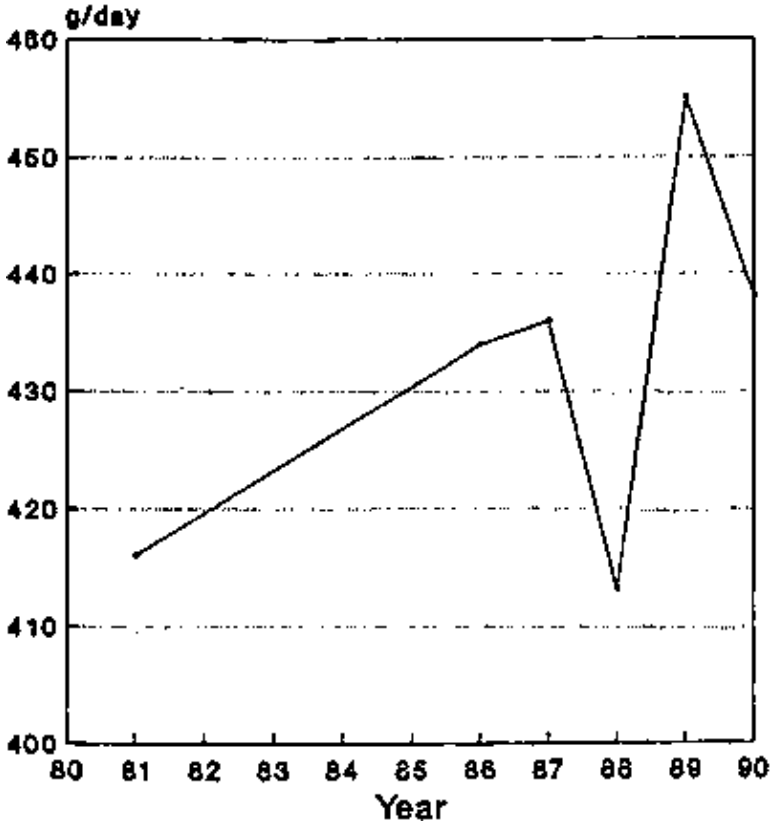

Figure 12. Net Cereal Availability – Per capita

Source 1991 GOI

Pulses. Pulses account for less than 8% of total food grain production in the country. The pulse production has not kept pace with population growth. Per capita availability declined from 51.2g in 1970–71 to 33.1g in 1987–88 before rising to 36.5g in 1989–90 (GOI 1991). This was not only due to a reduction in land under pulse cultivation but also to a decline in yield per hectare – there has been no breakthrough in technology as with wheat and rice.

Based on the 1988 population, body weights and physical activity pattern, the daily per caput energy requirement has been estimated to be 2200 kcals. (Reddy 1990). After considering post–harvest and distributional losses, the per caput requirement of foodgrain would come to 605 g/day with the total food grain requirement at production level being 178 million tonnes. The food grain production in 1990–91 is 176.5 million tonnes, close to the estimated requirement indicating virtual *national–level* self sufficiency in this respect at present.

Household Food Security

Agriculture development and food production are central to national food security. In addition, there are several other factors that determine the food security at household level. These include food prices, food availability, employment and purchasing power, government subsidies and the food rationing system.

Poverty

The poorest groups in India tend to be asset–less or nearly asset–less. Landlessness is increasing, both absolutely and relatively (from 9.6 per cent of rural population in 1971 to 11.3 per cent in 1982: GOI 1988). The poor derive income from wage work in which they may be simultaneously underemployed, underpaid and forced into unwaged work. The path of diversification of the rural economy varies from region to region and is often insufficient to absorb surplus labour from agriculture. In addition, there is still a particular institutionalized poverty amongst scheduled castes and tribes, and in regions where such people are concentrated the rates of poverty reduction are also very low. Within poor households, and more extensively throughout society in northern India, women and children are particularly disadvantaged and female–headed households are

amongst the very poorest (see *Maternal and Child Care*).

Actual measurement of poverty in the Indian context has come under debate in recent years. There are two conventional approaches: one based on average annual household income (in relation to an income poverty line defining a predominantly caloric threshold) and the other on calorie intake. Although income is widely used to measure economic welfare, it has serious drawbacks, a major one being that it may have substantial fluctuations which are averaged out in the long run. Consumption expenditure may be a better indicator of the actual economic position of a household (Kakwani and Subbarao 1990). The National Sample Surveys provide reasonably comparable time series data on the levels and distribution of household consumption expenditure (see 'Food prices and expenditure' section).

The Indian Planning Commission estimates the population below a national poverty line, defined in 1981 in the Sixth Five Year Plan as being the mid–point of the monthly expenditure class having a daily per capita calorie intake of 2,400 kcals. in rural areas and 2100 kcals in urban areas. The incidence of poverty (so defined) declined steadily from 51.5% in 1972–73 to 29.2% in 1987–88 – a fall of over 22% (see Table 10). Estimates by economists, however, suggest a much more modest decline of a little above 10% from 56.3 to 45.9%. The Planning Commission reports a decline in total numbers of the poor from 291.5 million to 232.4 million while other estimates suggest a substantial increase from 308 million to 361.2 million[2]. While both estimates suggest a decline in the *prevalence* of poverty, the quantum of the decline implied by the Planning Commission is far in excess of those from alternate and possibly more realistic estimates.

[2] The reasons for the disparity between the two estimates lies in the different definition of the poverty line and "adjustments/corrections" applied to the NSS data. The Planning Commission draws the line at Rs 49.08 and Rs 56.64 for rural and urban areas respectively at 1973–74 prices. Further, NSS food consumption data are scaled upwards by the Planning Commission to adjust for apparent underestimations, as estimated by comparison of NSS data with those from the Central Statistical Organization. This exercise results in "pulling up" a large number of persons who would otherwise be below the poverty line – a procedure disputed by many economists. Alternate estimations of poverty use state–specific cost of living indices for the middle range of the population "falling within the range of monthly per capita total expenditure which encloses the state–specific poverty norm in the base year" (Suryanarayana, 1991). The state–specific criteria are used to yield state–specific poverty lines and head count ratios from state–specific NSS distributions.

Table 10: Percentage of population below national poverty line

Area	***1977–78***	***1983–84***	***1987–88***
Rural	51.2	40.4	32.7
Urban	38.2	28.1	19.5
Total	48.3	37.4	29.2

Source: Planning Commission

These considerations are important in assessing the relative success of poverty alleviation programmes in the last two decades. Furthermore, as argued by *Suryanarana* (1991), if crossing the poverty line is used as the sole estimate of the success of poverty alleviation programmes, administrators may be inclined to focus only on the segment of population just below the poverty line. There is therefore a need to use distributionally–sensitive poverty indices in assessing the effectiveness of poverty alleviation programmes. Some attempts at using a similar approach are reflected in Subbarao's (1989) assessment of the changes in nutrient intakes among the poor and the "ultra poor"[3].

[3] Lipton (1983) takes 20% as being the irreducible proportion of income spent by the poorest in a wide range of countries on non–food essentials. Given the tendency of food requirement figures to over–estimate real food needs, especially in relation to people living in warm climates, Lipton suggests that it might be more realistic to work with 80% of the FAO/WHO weight–adjusted dietary energy requirements (FAO/WHO 1973). This leads to a 'double 80' rule, according to which people are judged to be 'ultra poor' if 80% of their income is insufficient to purchase 80% of these FAO/WHO energy requirements.

Another way of investigating change is to focus instead on the extent to which the rich and the poor in rural India have been able to increase their consumption over time. The following pattern emerges from such an exercise, reported in the national newspaper, *The Hindu* (Ranade December 18, 1991):

Table 11: Percentage increases in real consumption expenditure by income status

	Rich	***Poor***
1970–77	0.86	0.46
1977–83	0.69	1.85

(State–wise consumption data from the NSS were deflated by the respective consumer price indices for agricultural labour in conjunction with the price indices computed by Minhas et al. (1987) for the middle and total rural population. The requisite data for 1983–88 are only just becoming available).

Ranade notes that the quadrupling of the rate of growth in consumption of the rural poor was near–synchronous with the large increase in 'targeted' poverty alleviation programmes in the early 1980s. Any 'trickle down' effect of overall growth during this period was unlikely, given the deceleration in the rate of growth of the rural rich. This also concurs with evidence provided by Kakwani and Subbarao (1990) which suggests that the improvement between 1977 and 1983 was not associated with increased foodgrain production, but rather a decrease in within–state inequality along with the likely beneficial effects of several large–scale poverty–alleviation programmes. The improvement observed later, in the mid–1980s, on the other hand was likely to have been much more driven by economic growth and favourable relative food price changes (see Figure 14). Kakwani and Subbarao (1990) went on to show that this reduction in inequality was more pronounced for the ultra–poor than the poor. Ranade however questions whether the type of poverty alleviation programmes implemented in the early 1980s could be sustained given the poor state of the economy in the early 1990s. There are also inter–state variations in the effectiveness of these programmes (see Part II).

Kakwani and Subbarao (1990) also found that between 1972 and 1983 inequality at the all–India level, is driven largely by within–state, not between–state, inequality, although this appears slowly to be changing – between–state inequality is rising. In 1983, the states could be ranked thus, in order of declining poverty (using the head–count method): Bihar, West Bengal, Tamil Nadu, Orissa, Madhya Pradesh, Uttar Pradesh, Maharasthra, Assam, Kamataka, Kerala, Rajasthan, Andhra Pradesh, Gujarat, Haryana, Punjab. In fact, this ranking is almost identical to that of 'ultra poverty'. Looking at the map of India, poverty is apparently concentrated in the north east of the country (Bihar, West Bengal) and, apart from Tamil Nadu in the south, stretches out to cover the neighbouring states of Orissa, Madhya Pradesh and Uttar Pradesh.

Food prices and expenditure

The trends in food price indices are shown in Figures 13 and 14, based on data from the Economic Survey of India (GOI 1991). While absolute food prices have risen, their levels relative to the consumer price index have fluctuated connsiderably during the 1980s, with a slight overall declining trend (the ratio of food to consumer price indices is an indicator of a consumer's propensity to buy food as opposed to non–food articles). A downwards trend in relative food prices is likely to have a disproportionately beneficial effect on the poorest groups, with the highest price elasticities of foodgrain demand. Mean elasticities are estimated (Sarma and Gandhi 1990) to be 0.48 for rural, 0.23 for urban, and 0.42 for national, but elasticities differ sharply by quartile, being close to 1.0 for the bottom quartiles and about 0.1 for the top quartiles.

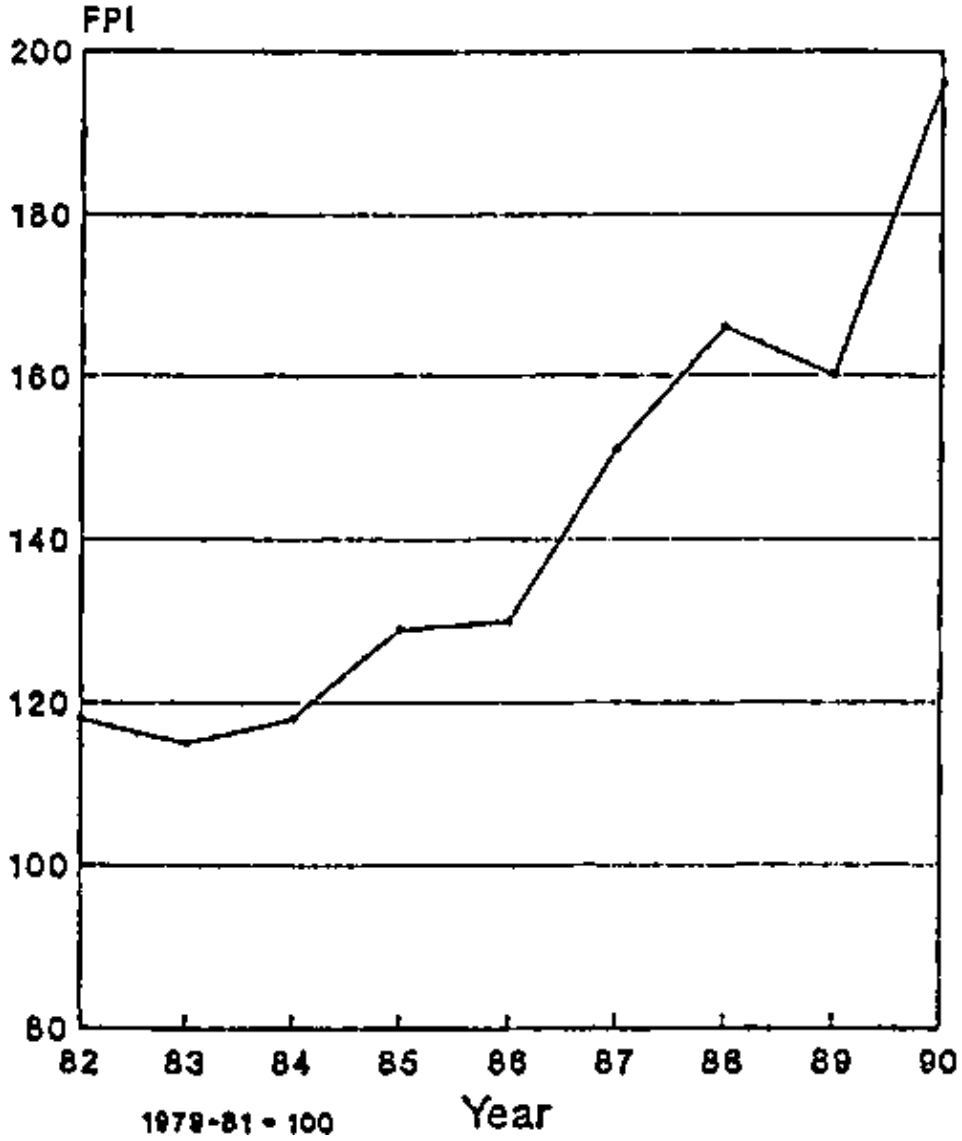

Figure 13. Food Price Indices

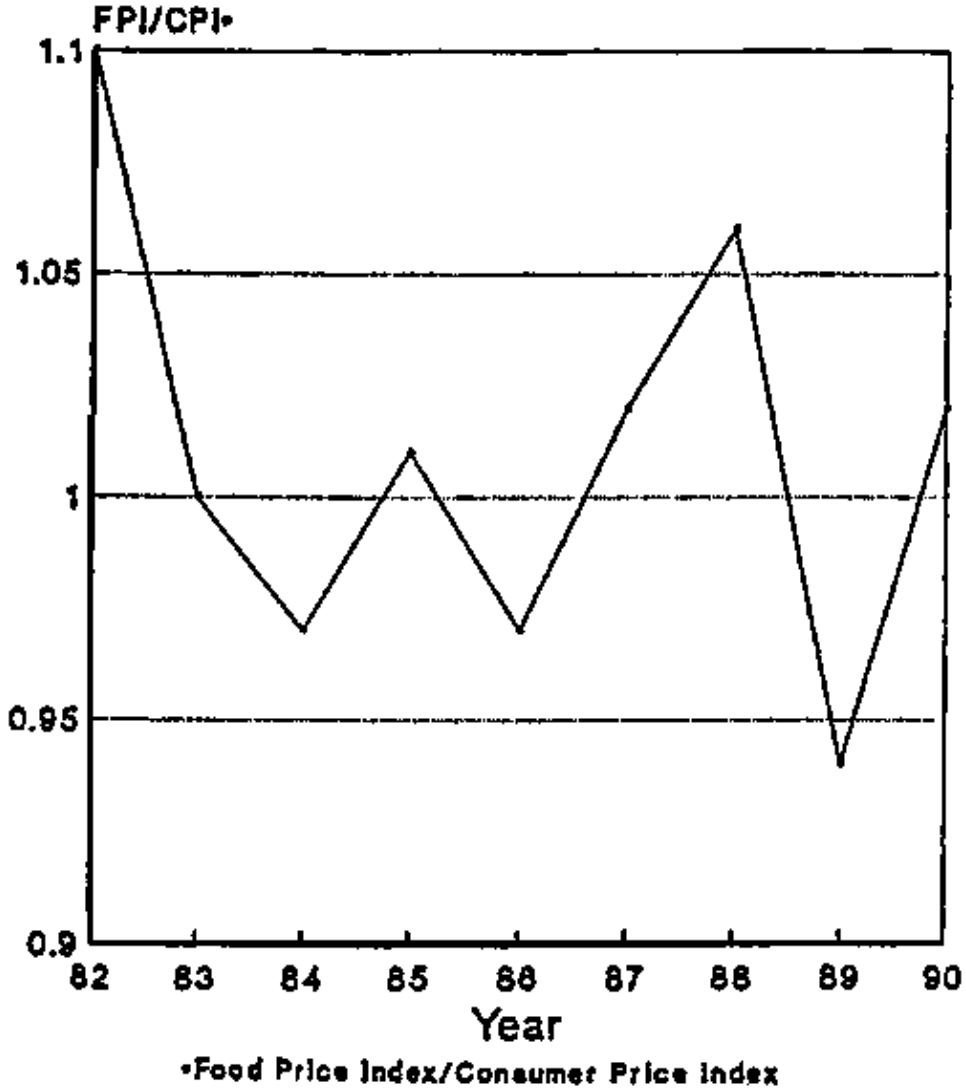

Figure 14. Relative Food Price – FPI/CPI*

Source: GOI 1991

Two thirds of the total expenditure of rural households is spent on food as compared to slightly more than half for urban households (Sarekshama 1989) (see Figure 15). Between 1972 and 1987, these proportions changed with relatively more money being spent on non–food items in both rural and urban areas; the main change occurring between 1972 and 1978.

National Sample Survey consumption data indicate a small improvement in the distribution of total expenditure between 1977/78 and 1983 in both the rural and urban areas, and between the rural and urban areas. For the poor population, the data indicate that foodgrain consumption of the rural bottom quartile rose somewhat between 1970/71 and 1983, but that of the urban bottom quartile was virtually stagnant. This is associated with a small increase in the real total; expenditure of the rural bottom quartile (combined with high elasticities) but near stagnation in that of the urban bottom quartile.

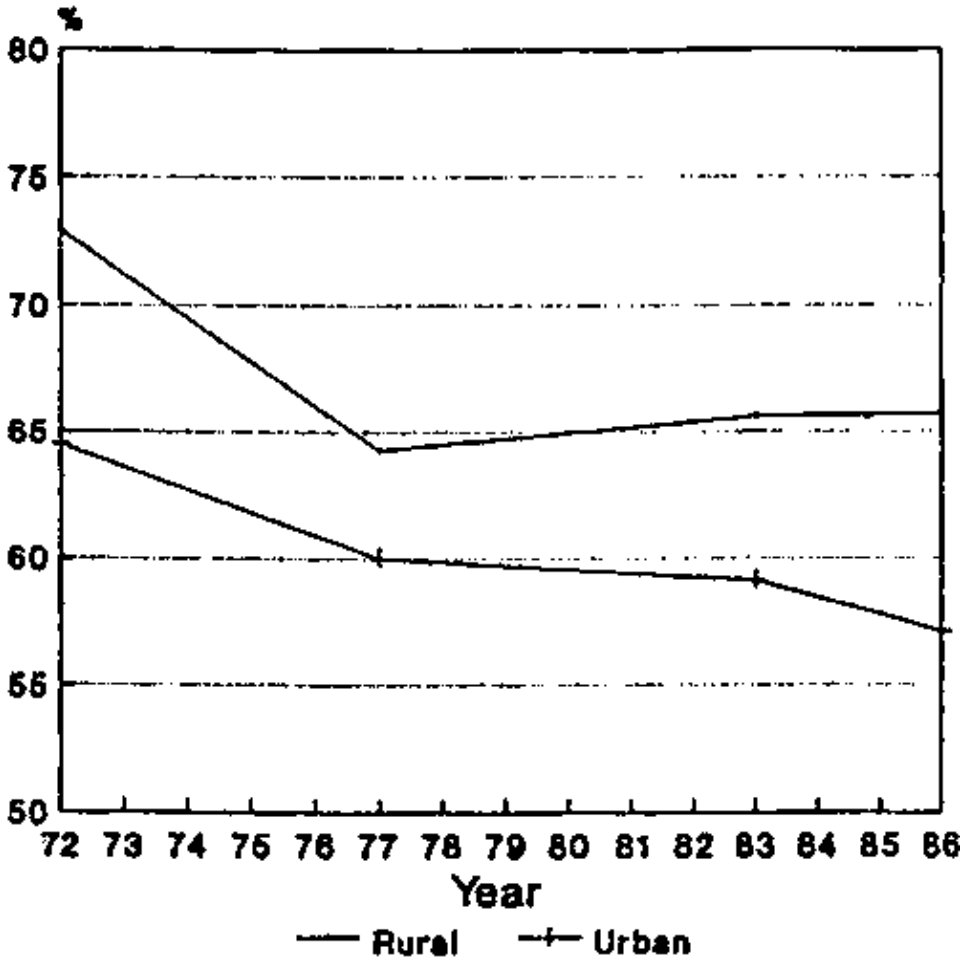

Figure 15. Food Expenditure – as % total expenditure

Source: Sarekshama (1991).

VI – HEALTH AND ENVIRONMENT

The ability to avoid exposure to disease or to treat it depends among other things on environmental conditions and health services, including such factors as access to safe water, housing conditions and sanitation. In this section, we consider trends in the allocation of resources for the social services of health, education and welfare, including a description of infrastructural development and access to water, sanitation systems and housing.

Resource Allocation and Infrastructure Development

Financial outlays under the different five–year plans indicate that investment in the social sector is inadequate. In addition, such investment that has been made has been concentrated on building up service infrastructure. Table 12 shows the per capita expenditure at current (not constant) prices on social services for successive five–year plans, along with the trends in the percentage share of total outlays by sector, while Figure 16 shows the trend in *real* expenditures, at constant 1987 US dollars (according to successive IMF Financial Statistics Yearbooks). Clearly, there has been little overall improvement in absolute or relative allocations for either health or education, with both remaining at low levels, as compared to other developing countries. As a percentage of total plan outlay, the shares for education and health are significantly lower in the seventh than in the first plan. Even within the education and health sectors, allocations for elementary education and primary health care have declined relative to higher education and curative care respectively.

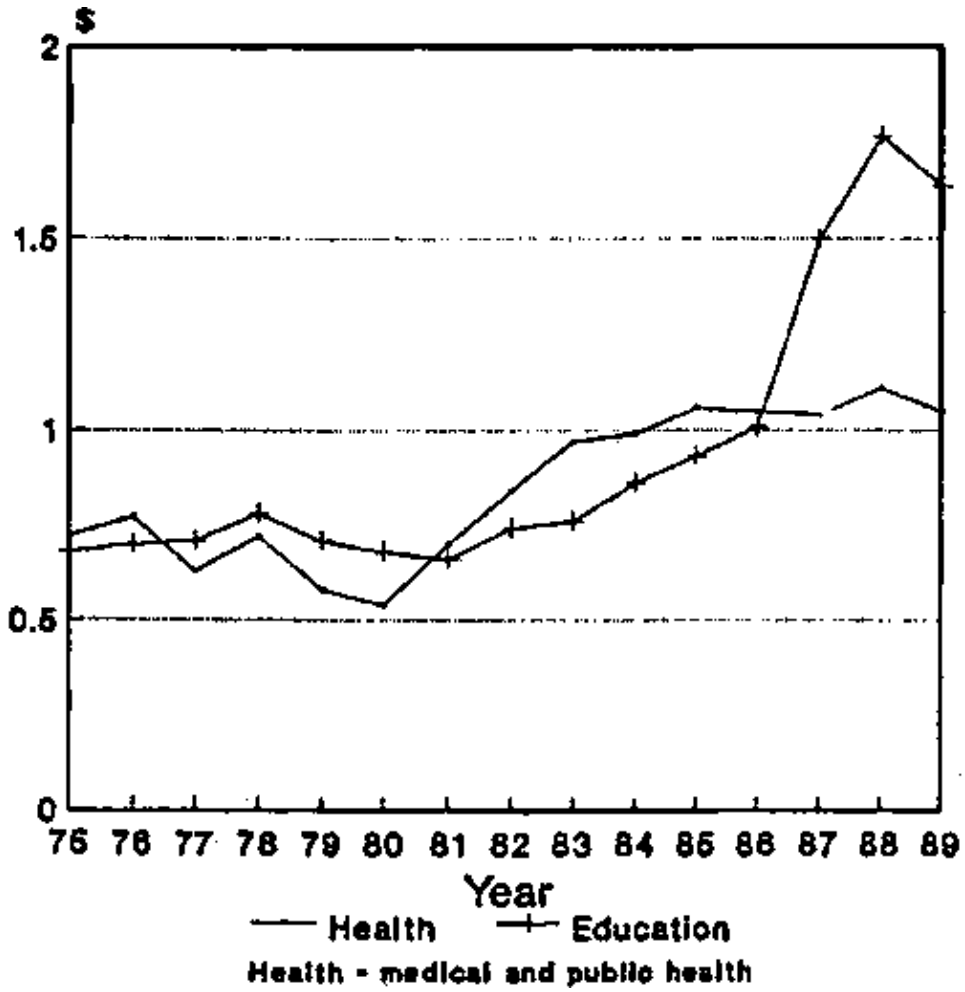

Figure 16. Per capita expenditure – Constant 1987 US $

Source: IMF Financial Statistics Yearbooks

It should be remembered that as well as central allocations for health, there are state revenues. Figure 17 shows the inter–state differences in per capita expenditure in 1986–87 –– illustrating the strong relationship between poverty and low state allocations to health.

As Table 12 shows, 1.9% of the total 1985–90 plan outlay was allocated to health care. In 1990, according to the World Development Report (World Bank 1992), 1.6% government expenditure was allocated to health. Of the countries supplying data for this year, only Zaire, Indonesia and Peru allocated proportionately less. When considered in terms of the proportion of overall GNP allocated to health, the picture is even more dismal, owing to the fact that total government expenditure is itself very low in relation to GNP (only 18.2% GNP in 1990). Thus, for 1990, less than 0.3% GNP was allocated to the health sector.

Furthermore, the structure of expenditure has been biased towards urban areas and away from primary health care. The order of priority has been family planning, hospitals and dispensaries, communicable disease control, rural health including mother and child health, and education and training. Of the plan funds for health, about 40% is spent on health facilities and medical education. There is a strong urban bias in the pattern of health expenditure and the rate of utilisation of the rural health budget is low.

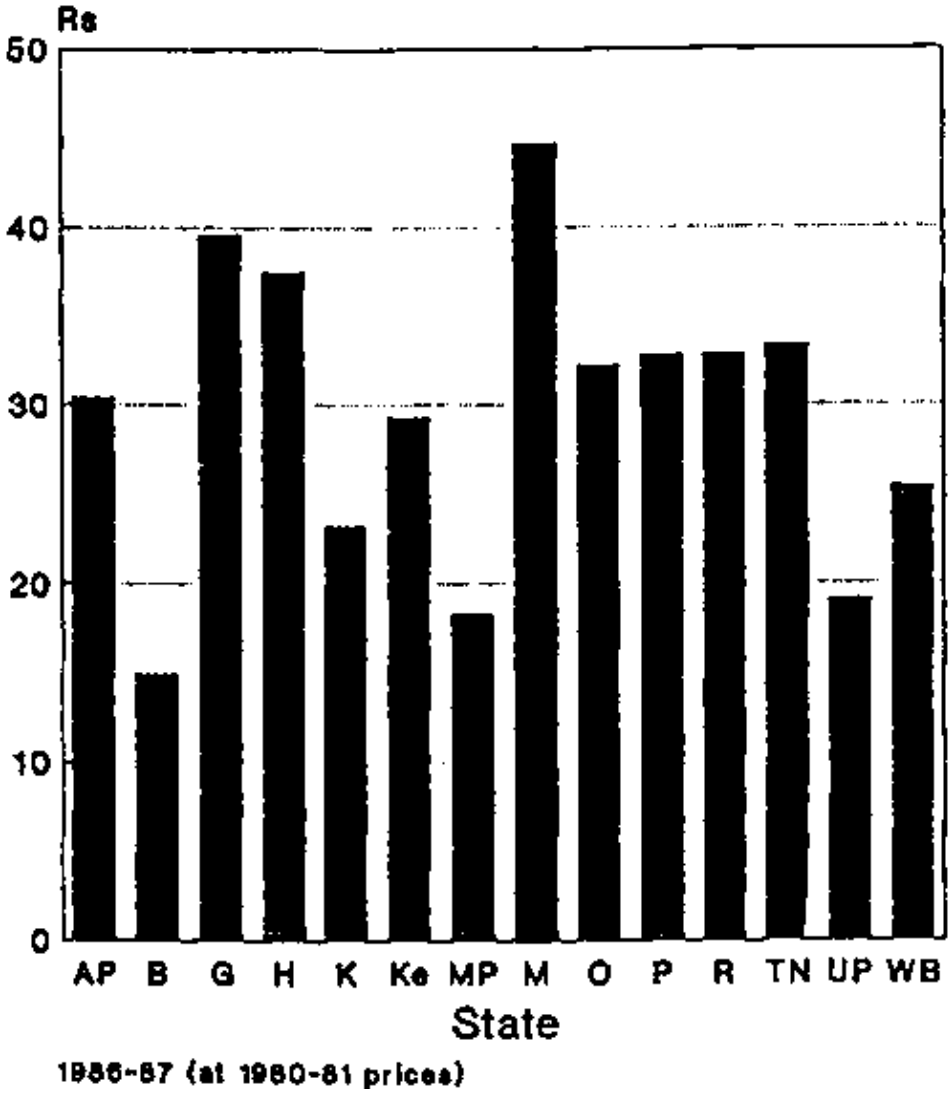

Figure 17. Health expenditure – Per capita, state–level

Source: Kakwani & Subbarao (1990b)

Health facilities have improved in terms of health manpower, number of primary health care centres and number of hospital beds available. Paramedical and health auxiliary personnel have increased in numbers, but there are still relatively far more doctors, as revealed by Ministry of Health and Family Welfare Yearbooks. In 1987, there were 42 doctors per 100,000 population as compared to 28 nurses, for example (Health Information of India Handbook 1988)

Currently in India there are over 3,000 hospitals with 95,000 beds in rural areas and 7,000 hospitals with over 500,000 beds in urban areas. In other words 70% of total hospital beds and–about 80% of the doctors are located in urban areas where only 25% of the population lives. In 1990, there were 20,531 primary health care centres (PHCs); one for every 41,000 rural population and 130,390 sub–centres, approximately one for every 6,500 population (Health Information of India 1990, published by the Ministry of Family Welfare, New Delhi). There is thus an evident imbalance in the health system, with too high a proportion of physicians practising in urban areas, inefficiently managed primary health care centres in rural areas undermining the confidence of people in using them and a general bias towards curative rather than preventive care.

Despite the number of PHCs and the fact that health manpower and services are increasing in absolute terms, it is still not keeping pace with population growth. There is a need to balance the meagre health resources, between rural and urban areas through a policy shift from urban to rural raising additional resources from public and private sectors, encouraging utilisation of existing services, and curbing their duplication.

Table 12: Per capita expenditure (Rs at current prices) on social services under successive Five–Year Plans (with % public sector outlay in brackets)

	1951–56	*1956–61*	*1961–66*	*1969–74*	*1974–79*	*1980–85*	*1985–90*
Public sector Plan outlay	52.1	112.7	185.1	185.1	152.6	1382.3	2303.8
Social	11.1	17.9	28.0	44.6	103.1	198.9	403.7
Services	(21.0)	(15.6)	(15.1)	(15.6)	(16.1)	(14.0)	(17.5)
Education	4.1 (7.5)	6.6 (5.5)	12.7 (6.9)	14.2 (5.0)	21.6 (3.3)	35.7 (2.6)	81.6 (3.5)
Health	2.6 (5.0)	5.2 (4.6)	4.8 (2.6)	6.1 (2.1)	12.3 (1.9)	25.8 (1.8)	43.4 (1.9)
Family Planning	–	0.05	0.5 (0.3)	5.0 (1.7)	7.9 (1.2)	14.3 (1.0)	41.6 (1–8)
Housing and Urban Services	0.9 (1.7)	1.9 (1.7)	2.7 (1.5)	4.4 (1.6)	18.6 (2.9)	35.2 (2.5)	54.1 (2.4)
Water Supply and Sanitation	–	–	2.3 (1.2)	8.5 (3.0)	17.6 (2.7)	55.6 (4.0)	83.4 (3.6)
Social Welfare and Related Fields	3.6 (6.7)	4.2 (3.7)	4.8 (2.5)	6.1 (2.1)	24.9 (3.9)	32.1 (2.3)	99.3 (5.0)

Note: Figures in brackets are percentages to total plan outlay

Source: Planning Commission

Immunization coverage

The Government of India launched a universal immunisation programme in 1985–88 which, according to the number of children immunized and the percentage of coverage to target (See Figure 18) appears to be running smoothly, although it often fails to provide the complete dosage (which is more important than simple coverage). The National Health Policy document sets the goal to cover 100% of pregnant women and infants with tetanus toxoid, and 85% of children for DPT, polio and BCG vaccines by 2000 AD.

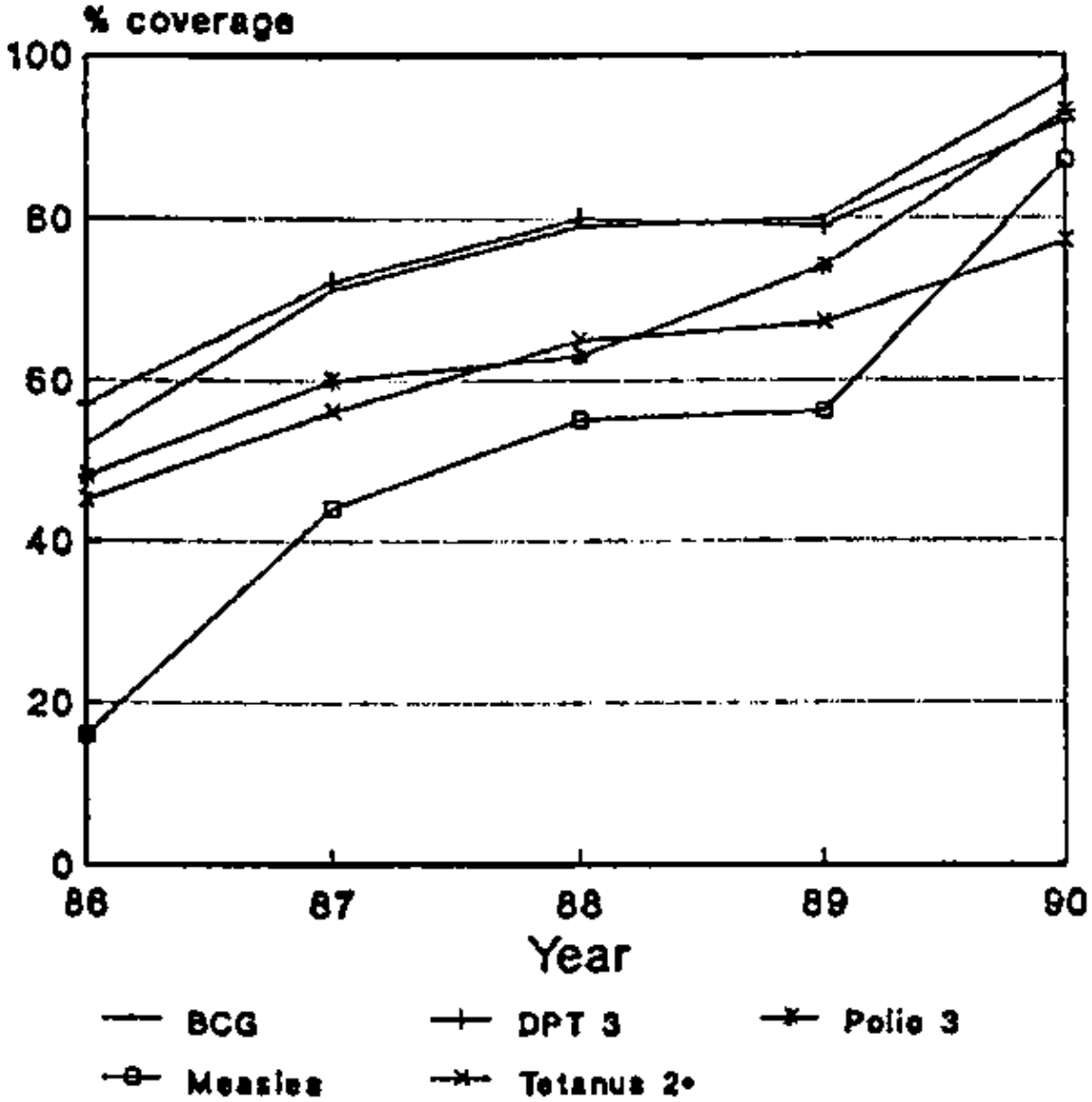

Figure 18. Immunisation Coverage – % by 12m, % preg. women (tet)

Source: EPI, WHO.

Shelter, sanitation and water supply

Even though the number of dwelling units is increasing, the rate does not keep pace with the rate of population increase. The housing gap has increased steadily from 23 million in 1981 to 31 million dwelling units in 1991 and it will become worse by 2001 (UNICEF 1990). This widening gap though has been a middle–class concern, with the vast acute need of slum and pavement dwellers hardly entering the calculation (UNICEF 1990, p139). In rural areas, the shortage of shelter is both less visible and harder to assess.

Sanitation is linked closely to both shelter and water supply. According to government estimates (UNICEF 1990 p141), in 1981 only 25.1% of the urban population and 0.5% of the rural population had access to basic sanitary facilities. This coverage increased by 1985 to 28.4% and 0.7% respectively. The chances of reaching the reduced goals of the International Drinking Water Supply and Sanitation Decade of 50% urban and 5% rural coverage appear very remote indeed.

A study on water sources was carried out by NSSO during 1986–1987. The results showed that only 16% of rural and 72% urban population use a tap as a major source of drinking water. Efforts are being made to provide ‘drinking water’ to problem villages (i.e. villages where there is no source of drinking water within a distance of 1.6 km or within a depth of 15 metres). Other problem villages are those with excessive salinity, iron, fluoride etc. in water. As of April 1989, there were nearly 21,000 problem villages, which required drinking water (GOI 1989). The UNDP Human Development Report (1990) reports that the population with

access to safe water in 1985–87 was 57%, compared to 31% in 1975.

Supply of drinking water is the primary responsibility of the State Government. The Accelerated Rural Water Supply Programme (ARWSP) is supported fully by the Central Government in order to provide safe drinking water to the population. By 2000 AD the Government sets its goal in the National Health Policy document to provide 100% population with a protected water supply.

VII – MATERNAL AND CHILD CARE

Maternal and child care, along with household food security, adequate health services and a healthy environment is a third necessary (but in itself insufficient) precondition for adequate nutrition. In fact, 'care' may be considered as a pivotal link between these two other conditions, representing the behavioural component of intra–household decision–making and resource use. It refers to the provision in the household and the community, of time, attention and support to meet the physical, mental and social needs of the growing child and other family members. In the child nutrition context, most importantly it involves the optimal use of household resources for child feeding, protection from infection, and care for the sick child. While the issue of 'caring capacity' refers to all the household members –– male and female –– who are potential caretakers of children, in practice in India, the main responsibility for child care lies with the mother (who often also has a major role as an income–earner). Her capacity to manage the many competing demands on her time will govern the degree to which she can maintain a clean household environment, feed her children, care for them when sick as well as providing and preparing food for other household members.

In turn, this capacity will be governed by the quantity, control and use of resources such as food, income, time and knowledge. The control of such resources at a societal level may be influenced by factors such as her socio–economic and educational status. We thus start with an examination of the feeding and caring practices in the household before examining the possible basic causes relating to the role of women in Indian society and their educational status and literacy levels relative to men.

This integral precondition for adequate nutrition may not be as well recognised by policy–makers, compared to food and health. Partly this may be as a result of its many linkages with the areas of food and health, and partly as little data is routinely collected to reveal the gender dimensions of nutrition problems. These are discussed in the concluding section.

Mother and Child Health Care

The type of care received at child birth is often critical for the health and survival of both infant and mother. A significant proportion of neo–natal deaths is attributed to poor birth practices. During 1987, only about 32% of births in rural areas and 74% in urban areas were in institutions or attended to by trained personnel (Registrar General of India 1979–86). Traditional birth attendants are unable to attend to complications and health professionals are contacted too late. Both these factors point to the need to identify mothers at risk during the prenatal period.

Recent reports show that tetanus toxoid immunisation coverage is 77% of pregnant women in India (EPI 1990). Started in 1960, and boosted in the second half of the 1980s by the immunisation mission, this intervention is picking up as part of ante–natal care (see Figure 18). The national average of tetanus toxoid coverage however masks variations between states ranging from 16% in Assam to 99% in Kerala.

Even though abortion has been legalised in India since 1972, mortality and morbidity due to illegal abortions and birth attention by incompetent persons in unhygienic conditions remain a major problem, mainly because of ignorance of the law and inaccessability of professional services in rural areas. Only around half a million pregnancy terminations were performed through the health services in the fiscal year 1987–88 which is around 9% of the induced abortions likely to have been performed during the same period. Since the inception of this formal facility in 1972, 5.8 million abortions have been performed under it; less than the total number of induced abortions likely to happen in one year (UNICEF 1990 p15). Induced abortions in fact reflect an unmet need of women for family planning, and highlight gaps between demand for family planning on one hand and availability, accessibility and actual use of services on the other.

India is the first country to launch an official family planning programme to control population. However, the programme has not had the desired impact. The trend in the percentage of couples protected by various methods of family planning are shown in Figure 19. The target fixed by the National Health Policy is to cover 60% couples by 2000 AD, while the present protection is 41% (all methods). Efforts must be made through different channels of mass media to propagate the acceptance of a small family norm.

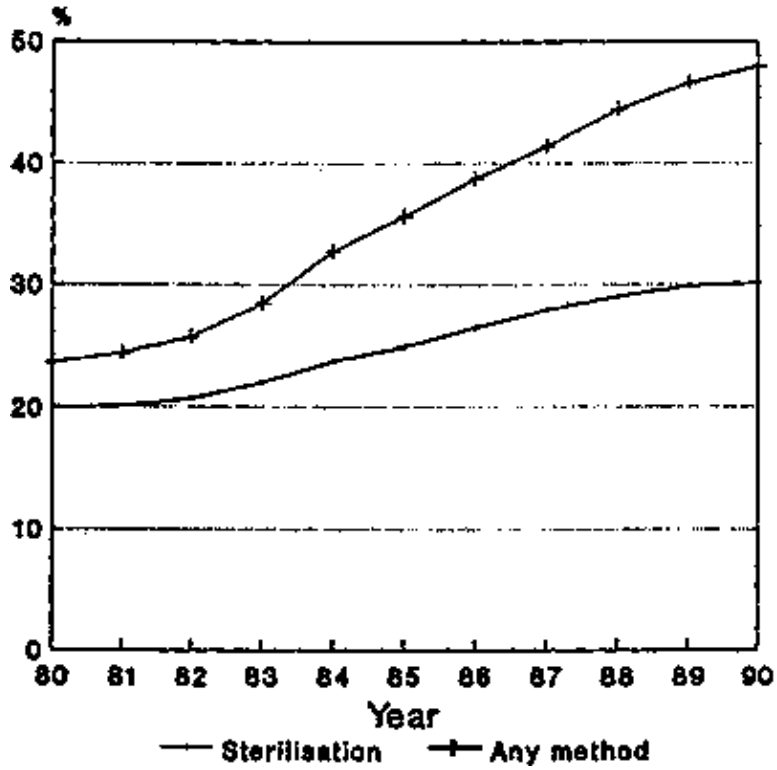

Figure 19. Family Planning – Couples using contraceptives

Source: GOI Ministry of Health and Family Welfare

Child Caring and Feeding Practices

Child feeding practices such as breastfeeding, weaning and feeding sick, anorexic children have a bearing on the nutritional status of the child. A comprehensive study on infant and child feeding practices carried out by the ICMR in six different regions of the country – Coimbatore, Gandhigram, Hyderabad, New Delhi, Pune and West Bengal (ICMR 1990) – indicated that a great majority of women started to breastfeed their new–borns on the third day after delivery, while liquid/semi solid supplements were rarely given to infants before six months (except in West Bengal).

A collaborative study on contemporary patterns of breast feeding conducted by WHO (1981) indicated that the prevalence of breastfeeding in the rural regions was related to socio–economic background. In general, it was more common in rural than urban areas, and within the urban population it was more prevalent among the poor than the economically advantaged. As many as 95% of infants belonging to poor rural and poor urban mothers were breastfed, even at 15 months of age, while corresponding percentages for high and middle income groups were 18% and 51%. In another study (GOI 1975–88), comparison of child feeding practices in ICDS (Integrated Child Development Services) and control areas had shown that nearly 85% mothers started breast feeding their newborn children within 6 hrs after delivery. The report indicated that though there was no significant difference in the breast feeding practices between ICDS and control areas, delayed weaning was more common in non–ICDS children (28% vs 59%). The ICDS is reviewed in Part II.

The four–state ICDS study undertaken by NIN (Sarma *et al.* 1990) has indicated that nearly 50% of the mothers did not alter the diets of their children when they were sick. Quality of intranatal care is another important indicator of health service availability and utilisation. The ICDS report shows that 76% of the deliveries in ICDS areas were conducted by trained personnel compared to 49% in non–ICDS areas. The immunisation coverage of children between 12–24 months also showed that the ICDS children in most of the states were better protected. In the states of Tamil Nadu and Maharashtra, however, the coverage was more

or less similar in ICDS and non−ICDS areas. Similar results were observed in the four−state ICDS study undertaken by NIN where immunisation coverage, antenatal care, massive dose vitamin A administration, folifer distribution etc., was two to three fold better in ICDS areas.

Food Distribution within the Household

Analysis of dietary data to assess intra−family distribution of food has shown that in 50% of the households surveyed, levels of energy adequacy did not differ between preschool children, adult men and women. Either all of them were consuming adequate amounts (31% of households) or inadequate amounts (19% of households). When intakes were corrected for requirements, it was observed in NNMB surveys that the average calorie intake levels of women were close to 94% of their RDI as against 85% in men. This is contrary to the general belief that women get least. However, in 59.4% of the households, the diets of preschool children were deficient in energy when judged on the most conservative cut−off of −2SD RDI.

The average food/nutrient intakes of preschool children were assessed by oral questionnaire method in the NNMB repeat surveys. The intake of cereals and to some extent fruits and sugar, showed an increase between 1975 and 1990, and no remarkable changes were seen in the consumption of other foods. The average daily per capita intake of calories among children 1−3 years old during 1988−90 was 908 kcal as against 834 kcal in the seventies, although the RDI is 1240 kcals (NNMB 1991); corresponding figures for 4−6 year olds were 1260 kcal and 1118 kcal, while the RDI was 1690 kcals. The increase over time in both cases has been mainly due to increased consumption of cereals rather than other foods. It shows that, although overall household food consumption has not changed much in the last 15 years, there has been some preferential allocation to children −− probably via an increased awareness of the nutritional needs of growing children by parents, along with the beneficial effects of direct nutrition interventions initiated during this time period. There was no notable difference in food consumption between boys and girls −− a finding in line with the lack of gender differentials in anthropometry and IMRs.

Education

Resource allocation

The total expenditure on education increased from 1.2% of the GNP in 1950−51 to about 4% in 1986−87, against an optimal target level of 6%. The real per capita expenditure also increased steadily, particularly in the late 1980s, from $ 0,68 in 1975−76 to $ 1.64 in 1989−90 (see Figure 16).

The share of education as a proportion of plan outlay in the public sector has shown a declining trend through the plan periods. Within the education sector, the share of elementary education has been falling from 56% in the first five−year plan to 29% in the seventh plan; higher education has benefited at the cost of primary education. There is a need to step up the resources for formal and non−formal education. Assuming that 70% of the 6−14 age group will be provided education through formal and 30% through non−formal channels, the annual per capita cost for universal elementary education has been estimated at Rs. 103 (formal) and Rs. 54 (informal) by the year 2000.

Infrastructure development

As of 1987−88, there were 543,677 primary, 141,014 middle and 71,305 secondary and higher secondary schools in India. The growth of educational facilities during the last one and half decades has been steady (GOI 1987).

Inter−state variations in school enrolment indicate that gender differentials are pronounced, though the percentage of scheduled castes/tribes out of the children enrolled at primary level is at par with, or higher than, the percentage of scheduled castes/tribes in the total population (UNICEF 1990). The rural−urban divide also shows up sharply in school enrolment and as a gender differential.

Available information on retention rate in primary classes indicate that it is quite low, particularly for girls. For example, in 1985–86, the retention rate for class V was 56.9% for boys and 51.0% for girls (CSO 1989). The drop–out rate worsens as girls move from lower to higher classes. Existing measures therefore need to be strengthened in order to have continuous education for girl children.

The new educational policy adopted by the Government in 1986 accords a very high priority to universalisation of education to ensure essential minimum education to all children up to the age of 14 years.

Female literacy outcomes

Changes in literacy rates during the 1980s are impressive for both males and females (Registrar General of India 1991). According to the 1991 census, about 52% of India's population is literate. At the time of independence in 1947, the female literacy rate was a mere 6%. Over the years however, there has been a steady improvement in the rate, although the absolute number of female illiterates has increased from 215 million in 1971 to 242 million in 1981. This backlog is estimated to have further swollen to 253 million in 1988, notwithstanding the rise in the female literacy level reported by the 1987–88 National Sample Survey. Of the 340.5 million illiterates above 5 years in India in 1981, as many as 200.3 million were women. Of them 170.7 million live in rural areas. In other words, more than half of the total illiterates in India in 1981 were rural females, and this proportion remained throughout the 1980s. The female rural literacy rate in the 10–14 year age group was 36.4%, but it declined progressively with increasing age and is only 8.6% in the above–35 age group (UNICEF 1990 p88).

Overall, female literacy rates improved threefold from 1961 to 1991 (from 13.3 to 39.4%) while for males the level has gone up from 34.4% to 63.8% during the same period. Clearly however the female rate is still much lower than that of males (Registrar General of India 1991) – in fact the female rate in the early 1990s can be seen to approximate the male literacy rate of a quarter a century ago.

The regional variation with regard to female literacy is striking. In the 1981 census, the highest female literacy rate (5 years and above) of 78.9% is registered by Kerala (UNICEF 1990 p102). By contrast, among the 14 most populous states, four states viz., Rajasthan (28.4%), Madhya Pradesh (32.3%)– Uttar Pradesh (31.4%) and Bihar (30.2%) ranked the lowest. These states accounted for half the illiterate rural women in India (as well, in fact, as the majority of India's poor).

There have been efforts to correlate female literacy with age at marriage, fertility rates and child mortality. In rural areas, a higher proportion of married women are illiterates as compared to urban areas. Further, among illiterates, around two–thirds of women got married before reaching the age of 18 years, suggesting a positive correlation between age at marriage and level of education. Available data also suggest an inverse correlation between a woman's level of education and her fertility.

Child mortality rates are about five times higher among illiterate mothers compared to graduates (Registrar General of India 1989). Better child survival among the educated group may be due to several factors such as better hygiene, improved nutrition and feeding practices, and timely medical intervention. A study conducted by NIN (Brahman *et al.* 1988) showed that, controlling for income, the energy content of the diet of children whose mothers were literate tended to be better than those whose mothers were illiterate. There are other case studies showing that maternal education has a significant influence on the nutritional status of the children (Walker and Ryan 1990).

Women's literacy and their use of health facilities go hand in hand. Krishnan (1985) examined overall death rates in terms of literacy, doctor, hospital and bed population ratio, per capita income and % per capita expenditure on medical and health services. He observed that literacy was the most important factor while health services also had some explanatory power.

Socio–economic Status

The capacity of a mother to care for her children depends on her social status and economic activities. In many poor societies patriarchy is likely to be the main obstacle in securing a fairer distribution of work and decision–making power between adult household members.

Increases in the ratio of female to total income is expected to improve the economic status of women within the household and their control over resources. Their ability to realise their own preferences within the family (of which health and well–being of children is likely to be a priority) may consequently be strengthened. However, working outside the house may leave her little time for child care. It is a complex situation and women's problems are difficult to capture in national surveys. There have been a few case–studies to assess the impact of women's work and income on child nutrition. The analysis of women's work and child survival undertaken by Rosenzweig and Schultz (1982), whose two–stage regression analysis of an all–India sample of rural households demonstrated that female employment had a significant influence on the survival of the girl child. A case study undertaken in Kerala (Gulati 1978) indicated that the nutritional adequacy of households dependent on agricultural labour was more related to women's employment than men's. A study undertaken by the Maharashtra Employment Guarantee Scheme (Walker and Ryan 1990) indicated that in households where women exercise control over their wages, more money was spent on food and other basic needs while men tend to spend more on liquor, cigarettes etc. These studies suggest that women's gainful employment and decision–making power in the family influence the child health and survival (see 'Gender Issues in Child Care' section below).

Labour–force statistics under–report female contributions at a national level. In the Indian census of 1981 only 14 per cent of the total female population were classified as "workers" although an estimated 54 per cent of rural women and 26 per cent of urban women are engaged in work activities. The basic difficulty in reporting lies in the extremely hazy demarcations between economically productive employment and domestic work within the subsistence sector, especially as it relates to agricultural activities (though the latter should also be considered as economically productive in that it maintains the labour force).

Gender Issues in Child Care

Data on gender differences in child care and access to food and health care are contradictory. While recent NNMB data fail to show evidence of gender discrimination in food consumption (and by implication, in food access and allocation), anthropological and other evidence to the contrary has been reported from numerous studies. Miller (1981) has collated evidence from thirty one ethnographic studies from several regions in India on allocation of food, medical care, and love and affection. Of the 13 studies that report on food allocation among young children, only two studies indicate no gender differentiation in feeding practices, while 11 studies indicate caretaker bias against female children.

This bias is most often exhibited during early infancy in breastfeeding, weaning and supplementation practices, and in later years in apportionment of quality foods such as milk, butter, snacks and sweets. Most studies conclude that gender biases are small (which may be one of the reasons why these are unlikely to be picked up by generic surveys), but as one study states "in an emergency...[a daughter] is more readily expendable than a son". Twelve other studies that document gender–related food practices during adolescence present evidence for allocation of special foods to girls for periods ranging from a few days to a few months at/around the time of menstruation. Of the ten studies that report on allocation of medical care, all but one infer better medical care for boys.

Only two of the studies reviewed address the issue of sex differences in nutritional status, and both present evidence for consistently higher prevalences of underweight girls than boys. Many of the studies also suggest more pronounced gender differences in northern India, and among the less privileged classes. The report presents further evidence that sex ratios at birth are similar in all regions of the country, while juvenile sex ratios (females/males) are significantly low in North India – the region where evidence for gender discrimination is most strong (sec Table 13). While some evidence of female infanticide may explain this differential, the implication is that overt or covert marginalization in child care in North India translates into greater female mortality in the early years and a consequent rise in the sex ratio.

Table 13: Sex ratios in Indian regions (females per 1000 males)

Region	***Sex ratio at birth #***	***Juvenile sex ratio ****
North Zone	962	847–980
East Zone	943	952–1031

South Zone	943	980–103
West Zone	935	952–1000
Central Zone	926	1000–1031
North West Zone	935	901–952

Sources: # Miller (*1981*) *Appendix A, * Extrapolated from Miller* (*1981*)*, Figure 4* (*expressed as numbers of females per 1000 males*).

Five explanations are offered by Kundu and Sahu (1991) for the worsening sex ratio (from 933 females per 1000 males in 1981 to 929 in the 1991 census): i) a progressive undercount of women compared to men in different censuses, ii) an increased discrimination of females (including infanticide) in providing the minimum nutrition, access to health and other amenities, iii) increase in the proportion of male selective migrants from other countries, iv) reduction in foetal wastage resulting in a decline in female–male ratio at birth, and v) female selective termination of pregnancy leading to, once again, a decrease in the sex ratio at birth.

A recent World Bank country study (World Bark 1991) has re–analyzed district–level data from Miller's study to show that between 1961 and 1971, there was a substantial increase in the percentage of rural districts that exhibit higher female mortality. Again, this drift is many times greater in the north than in the south. Country level data also suggest that the sex ratio in India has increased between 1961, 1981 and 1991 (UNICEF, 1990).

Relatively recent evidence of female infanticide has been provided by a study carried out in North Arcot district of northern Tamil Nadu (George *et al.* 1992). Between April 1st 1987 and September 3.0 1989, of 759 live births (from a study population of 13,000), 56 infants died – 23 males and 33 females. Of these 19 were confirmed as infanticides, and *all* were girls. Thus more than half of all female infant deaths in the 12 study villages during this two and a half year period were infanticides. An infant mortality rate for the whole study population was calculated at 69 per 1,000 live births. If infanticides are subtracted out, this leaves an IMR of 46 per 1,000 live births. Put another way, in the 6 villages (of the 12) were female infanticide was practised, this was the outcome of 9.7 per cent of all female births!

These are frightening statistics, even more so when research has shown that the problem is much worse in the north of the country. The question of why it is that all the Indian states with IMRs higher than the national average (of 94) are concentrated in the north of the country demands investigation from this perspective? While the relative incidence of poverty in the north vis–a–vis the south may explain some of this, the findings above suggest that research into the degree of female infanticide in other parts of India, particularly the north, is urgent.

What underlies such an extreme manifestation of discrimination? The debate on excess female mortality in South Asia has been summarised by Harriss (1987). Differentials in child mortality and nutritional status can be considered as being related to female economic and social status which may be influenced by both material and cultural factors (Clark 1987).

Material explanations relate to the economic undervaluation of women (Bardhan 1987). This, in turn, depends on female labour demand, participation and earnings, as well as the gender distribution of inheritance rights (that governs control of property) and the exchange value of the female at marriage (reflected in dowry costs). Household income differentials may have paradoxical effects. In poorer households, women (who are less dowered) may participate more in the wage labour markets and suffer less from the adverse effects of patrilinearity. However, resources being more scarce, the results of less discrimination may nonetheless be more fatal. The World Bank study mentioned above argues further that regional differences in female access to food and health resources are determined by the economic value of women's labour. Data from Rosenzweig and Schultz (1982) complement these conclusions with evidence for a synergistic relationship between female survival and economic productivity of adult females.

Cultural factors on the other hand determine not only the gender division of waged tasks within which market mechanisms may operate, but also systems of property ownership (Das Gupta 1987). In a tribal south Indian population, for example, increased income from female wage work was not associated with an increased female control over household food allocation decisions (Gillespie 1989). The impact of the concurrent decrease in capacity for child care was disproportionately borne by girls under the age of one, a bias that was reflected in excess female child undernutrition. Material factors in this case appear to have been less

important than cultural factors in influencing gender–differentials in child care and nutrition. The process of Hinduisation which is diffusing throughout tribal societies in South India, with the practice of dowry becoming increasingly widespread and the costs of the dowered increasing, may here be reflected in the relative neglect of the nutritional and health needs of girls vis–a–vis boys.

The role of women in nutrition–relevant actions in the states of Andhra Pradesh and Tamil Nadu in South India will be investigated in Part II of this report.

VIII – CONCLUSIONS

Overall, the trend in nutritional outcomes in India during the last fifteen years or so has been positive but modest, manifesting itself mainly in a reduction of the proportion of preschool children who are severely malnourished (through a rightwards shift in the anthropometric distribution). At the same time, however, the household food security situation has hardly changed. This, despite reported reductions in people living below the poverty line, and an increase in the per capita food consumption of the poorest social groups (landless agricultural labourers).

On the agricultural side, there are signs of future problems and constraints as the population growth rate remains high, while the new technologies introduced in the 1970s may now be less effective in catalysing growth in food production. Concern for people's livelihoods should now be a priority, reflected in agricultural strategies which take account of the fact that an increasing proportion of households are primarily dependent on the demand side of the food market.

In the past 20 years the food production strategy has had built–in biases. While it has been heavily dependent on wheat, the growth in output has been too concentrated in the north western states and in the regions of irrigated rice. Its impact has been relatively disappointing in the densely peopled, poorer eastern states that now contain much of the unutilized potential for irrigation and for higher productivity rainfed rice. The dryland areas of the centre and south were also not sufficiently involved, and despite anticipated linkage effects, the strategy has not yet had a substantial impact on the structural problem of rural poverty. It now appears that the intensification of production has been associated with environmental degradation and pressures on renewable rural energy resources have become even more severe. The focus of planning has hitherto see–sawed between a desire to maximize growth in food production on the one hand and a concern, not so powerfully articulated, for regional equity on the other. Regional equity is now of paramount importance. Easily available means of growth in foodgrains production have now been exhausted and there are probably diminishing marginal returns to the most productive land. This is happening in the face of increasingly serious population pressure on land resources, which highlights the urgency of adopting a more evenly spread, environmentally–sustainable agricultural development strategy; one that considers livelihoods as a more important goal than production *per se.*

Before such a strategy achieves results, the national food security safety net of the Public Distribution System needs improving. During the 1980s, it was patchy in terms of both coverage and effectiveness (Part II of this report will look in further detail at this intervention).

Despite the levels of governmental expenditure (in both absolute and relative terms) to health, education and social welfare remaining low during the 1980s, there has been a steady improvement in the quality, outreach and utilisation of primary health care facilities. Furthermore, India's decades of experimentation with nutrition and health interventions since the Applied Nutrition Programmes of the 1950s seems to be beginning to bear fruit, with programmes such as the improved Integrated Child Development Services (ICDS) and the Tamil Nadu Integrated Nutrition Project (TINP). It may be plausible to link these two positive factors with the nutritional improvements seen during this time, although other broader poverty alleviation programmes may also have played a significant role. Part II of this report examines all these interventions in investigating in full the question "why has nutrition improved?" in two South Indian states – Andhra Pradesh and Tamil Nadu.

Regionally, as well as the differences discussed with regard to agriculture, there are also highly significant state–by–state variations in many other nutrition–related variables discussed here, with many factors associated with nutritional problem areas clustering particularly in the states of Rajasthan, Uttar Pradesh, Madhya Pradesh, Bihar and Orissa. Anti–female bias in food provisioning, health care utilization and general care may be particularly severe also in these northern states, and reflected in the regional differences in juvenile sex ratios. By contrast, the one state that ranks highest with respect to many nutrition–related indices is Kerala – where sustained political commitment to human (particularly women's) development through

preferential state government support to health, education and welfare sectors, has paid rich dividends.

ANNEX I: FOOD CONSUMPTION DATA: THE NATIONAL NUTRITION MONITORING BUREAU AND NATIONAL SAMPLE SURVEY ORGANISATION

The National Nutrition Monitoring Bureau (NNMB) since its inception in 1972 has been collecting data on diet and the nutritional status of representative population groups in different states of the country. These include the states of Andhra Pradesh, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu, Uttar Pradesh and West Bengal. In each state, every year, 500 rural households are covered by diet and nutrition surveys. In 80% of these households food consumption levels are assessed by the one–day weighment method, wherein the investigator weighs all the raw foods to be cooked by the family for the day. The total amounts of nutrients such as energy, protein, vitamins and minerals are derived by referring to the Food Composition Tables of Indian Foodstuffs. Data on nutrient intakes are expressed on a per consumption unit (CU) basis by converting the number of individuals partaking meals into consumption units using the calorie coefficients recommended by the Indian Council of Medical Research (ICMR) for the Indian population. In the remaining 20% of the households, the 24 hour recall method of diet survey (oral questionnaire method) is carried out. The volume of cooked food consumed by each member in the household is assessed using standardized cups and then converted into raw amounts by using appropriate conversion factors derived for each food item. The nutrients derived from these foods are calculated using the food composition tables.

Apart from NNMB, the National Sample Survey Organisation (NSSO) is the only other agency collecting large–scale data on food consumption, based on consumer expenditure. They have been conducting consumer expenditure surveys annually up to 1973–74 and thereafter quinquennially, dividing expenditure into food and non–food. Calorie and protein intakes are expressed per consumption unit per day, based on the consumption of all food items collected during the reference period. The reference period for data collection on all items of consumer expenditure is the previous 30 days. A stratified two–stage sampling design is employed with census villages in rural and blocks in urban areas as the first stage units. Households are the second stage units. Sample villages are selected with probability proportionate to population, with households being selected by a circular systematic sampling method. The entire one year survey period is divided into four sub–rounds each of three months duration. The estimates based on pooled data taking by sub–rounds are free from the effect of seasonality.

The intake level of the rural population, as assessed by NSSO is quite high when compared to NNMB data, indicating differences in the main objective, sampling design and method of data collection between NNMB and NSSO. These are shown in the table below.

Table A1: Comparability of NSSO and NNMB Survey Designs

Criterion	***NSSO***	***NNMB***	
Objective	Collection of information of household consumer expenditure	To assess nutritional status of individuals	To assess nutritional status of households
Method of collection	Recall	Recall	Weighment
Sample design	Stratified two–stage	Stratified three–stage	Stratified three–stage
Sample size	Large, varying size	Very small (one fourth of weighment) fixed size for each state	Small (one thirty third of NSSO) fixed size for each state
Reference period	One month preceding the day visit	One day preceding the day of visit	Day of visit
Unit of data collection	Household	Individual	Household

Source: Kulkarni and Kumar (1984)

NNMB is in a better position to capture nutritional status at the household/individual level owing to its survey team, consisting of a medical doctor, dietician etc. and its objective being highly focused. However, the sample size is very small compared to NSSO and the estimates are less precise. NNMB has now started using the sampling frame of NSSO, thus covering a larger stratum (16 Districts) in each state, and giving a better representation of the population.

ABBREVIATIONS OF STATES

Rajasthan (Ra)
Jammu and Kashmir (JK)
Himachal Pradesh (HP)
Punjab (Pu)
Haryana (Ha)
Delhi (De)
Uttar Pradesh (UP)
Bihar (Bi)
West Bengal (WB)
Orissa (Or)
Andhra Pradesh (AP)
Tamil Nadu (TN)
Karnataka (Ka)
Kerala (Ke)
Sikkim (Si)
Meghalaya (Me)
Assam (As)
Nagaland (Na)
Manipur (Man)
Mizoram (Mi)
Tripura (Tr)
Goa (Go)
Gujarat (Gu)
Madhya Pradesh (MP)

REFERENCES

Agarwal, K.N. *et al.* (1991) *Growth Performance of Affluent – Indian Children (Under Fives)* Nutrition Foundation of India (NFI), Scientific Report.

AJCN (1982) Report of Working Group on Fortification of Salt (1982) *Am. J. Clin. Nut.,* 34, 1442.

Bardhan, K. (1987): Women's Work, Welfare and Status. *Economic and Political Weekly,* 20 (50), 2207–2220; 20 (51–2), 2261–69.

Brahmam, G.N.V. *et al.* (1988) Intra Family Distribution of Dietary Energy – an Indian Experience. *Ecology of Food and Nutrition.* Vol. 22.

Central Statistical Organization (CSO) (1989) *National Accounts Statistics.*

Clark, A.W. (1987) The Social Demography of Excess Female Mortality in India: New Directions. Paper prepared for the BAMENEH/American SSRC Workshop on Excess Female Mortality, Dhaka, January 1987.

Clay, E., Harriss, B., Benson, C. and Gillespie, S. (1988) *Food Strategy in India,* Report for the U.K. Overseas Development Administration.

Das Gupta, M. (1987) The Second Daughter: Sex Differentials in Child Mortality, Nutrition and Health Care in Punjab, North India. Paper prepared for the BAMANEH/American SSRC Workshop on Excess Female Mortality, Dhaka, 1987.

Ferro–Luzzi, A., James, W.P.T. and Waterlow, J.C. (1988) Definition of Chronic Energy Deficiency in Adults. Report of a Working Party of IDECG. *Eur. J. Clin. Nutr.* 969–981.

George, S., Abel, R. and Miller, B.D. (1992) Female Infanticide in Rural South India, *Economic and Political Weekly,* May 30 1992

Ghosh, A. (1991) Eighth Plan: Challenges and Opportunities – XII,. *Economic and Political Weekly* April 30, p 107.

Ghosh, S. *et al. Longitudinal Study of the Survival and Outcome of a Birth Cohort,* Report of the Research Project 01–6582, NCHS, Maryland, USA.

Gillespie, S.R. (1989) *Social and Economic Aspects of Malnutrition and Health Among South Indian Tribals.* PhD thesis, London School of Hygiene and Tropical Medicine, University of London. To be published as "Struggle for Health" by Concept, New Delhi.

Gillespie, S.R., Kevany, J. and Mason, J.B. (1991) *Controlling Iron Deficiency,* ACC/SCN State–of–the–Art Series, Nutrition Policy Discussion Paper No. 9, Geneva.

Gillespie, S.R. and Mason, J.B. (1991) *Nutrition–Relevant Actions,* ACC/SCN State–of–the–Art Series, Nutrition Policy Discussion Paper No. 10, Geneva.

Government of India (GOI) (1987) National Sample Survey Organization (NSSO), 42nd Round, July 1986 – June 1987, No. 364, Department of Statistics, p6.

Government Of India (GOI) (1991) *Economic Survey 1990–91,* Ministry of Finance.

Government of India (GOI) (1989) *Health Information of India,* Ministry of Health and Family Welfare.

Government of India (GOI) (1988) *Seventh Five–Year Plan: Mid–Term Appraisal*

Government of India (GOI) (1983) *National Health Policy,* Ministry of Health and Family Welfare, New Delhi.

Government of India (GOI) (1975–88) *ICDS Evaluation and Research,* Central Technical Committee.

Government of India (GOI) Ministry of Health and Family Planning, Year Books.

Gulati, L. (1978) Profile of Female Agricultural Labourers *Economic and Political Weekly,* 13: p 12.

Hanumantha Rao, D. and J. Gowrinath Sastry (1979) Growth Pattern of Well–to–do Indian Adolescents and Young Adults. *Ind. J. Med. Res. 66,* pp 950–956.

Hanumantha Rao, D., K. Satyanarayana and J. Gowrinath Sastry (1976), Growth Pattern of Well–to–do Hyderabad Preschool Children. *Ind. J. Med. Res. 64,* pp 629–638.

Harriss, B. (1987) Differential Female Mortality and Health Care in South Asia. Report of a Conference held in Dacca, Bangladesh in January 1987 and organised jointly by the South Asian Committee of the American Social Science Research Council and the Bangladesh Association for Maternal and Neonatal Health.

Harriss, B. (1988) Poverty in India: Micro–Level Evidence, Report from a workshop on Poverty in India held at International Development Centre, Queen Elizabeth House, Oxford, mimeo.

Harriss, B. (1990) The Intrafamily Distribution of Hunger, In: Dreze and Sen (eds) *The Political Economy of Hunger Vol. I: Entitlement and Well–being,* p. 351–424.

Hazell, P.B.R. and Ramaswamy, C. (1991) *The Green Revolution Reconsidered: The Impact of High–Yielding Rice Varieties in South India,* Johns Hopkins University Press, Baltimore, USA.

Heathcote, R.L. (1973) *Drought Perception in the Environmental Economic and Social Significance of Drought* (Lovett, J.V. ed) Sydney, Australia: Angus and Robertson, pp 17–40.

International Monetary Fund (IMF) Financial Statistics Yearbooks, selected years.

Indian Council of Medical Research (ICMR) (1991) *Studies on Preschool Children* Report of the Working Group of ICMR, New Delhi, Technical Report Series No. 26.

Indian Council of Medical Research (ICMR) (1990) *A National Collaborative Study of Identification of High Risk Families, Mothers and Outcome of their Off springs, with particular reference to the problem of maternal nutrition, low birth weight, perinatal and infant morbidity and mortality and rural and urban slum communities,* An ICMR Task Force Study.

Indian Council of Medical Research (ICMR) (1981) *Epidemiological Survey of Endemic Goitre and Endemic Cretinism,* An ICMR Task Force Study.

Indian Council of Medical Research (ICMR) (1977) *Studies on Preschool Children.* Report of the Working Group of ICMR, New Delhi, Technical Report Series No.26.

Indian Council of Medical Research (ICMR) (1986) Studies on Weaning and Supplementary Foods: Report of the Working Party of the ICMR.

Kakwani, N. and Subbarao, K. (1990) Rural Poverty in India, 1973–86. World Bank Working Paper Series 526.

Kakwani, N. and Subbarao, K. (1990b) Rural Poverty and its Alleviation in India, *Economic and Political Weekly,* 31 March 1990.

Khatri, G.R. (1990) National Goitre Control Programme *Proceedings of the Workshop on Iodised Salt* National Institute of Nutrition, Hyderabad November 1–2.

Krishnan, P. (1975) Mortality Decline in India 1951–61 – Development vs Public Health Programme, *Social science & Medicine,* 90.

Kulkarni G.A. and Kumar A. (1984) Estimates of the Undernourished Population, From Alternate sources *SARVEKSHANA,* April 1984, p3.

Kumar, S. (1978) *Role of Household Economy in Child Nutrition at Low Incomes* Occasional Paper No.95; Dept of Agricultural Economics; Cornell University NY.

Kundu, A. and Sahu, M.K. (1991) Variation in Sex Ratio: Development Implications, *Economic and Political Weekly, October 12,* p2341–2.

Menon, K. and Vijayaraghavan, K. (1980), Sequelae of Severe Xerophthalmia – A Follow–up Study *Am. J. Clin. Nut., Vol 33,* pp 218–220.

Miller, B. (1981) *The Endangered Sex: Neglect of Female Children in Rural North India* Cornell Univ. Press. Ithaca, NY.

Miller, B. (1981) *Neglect of Female Children in Rural North India* Cornell University Press NY.

Minhas, B.S., Jain, I.R., Kansal, S.M. and Saluja, M.R. (1987) On the Choice of Appropriate Consumer Price Indices and Data Sets for estimating the Incidence of Poverty in India, *Indian Economic Review,* Vol 12, pp 19–49.

Ministry of Health and Family Welfare (1989) *Report of the Meeting on Prevention and Control of Nutritional Anaemia,* Ministry of Health and Family Welfare, Government of India and UNICEF, New – Delhi, November 1989.

National Nutrition Monitoring Bureau (NNMB), *Annual Reports 1975–91.*

National Nutrition Monitoring Bureau (NNMB) (1991), *Report of Repeat Surveys.*

Naidu, A.N. *et al* (1991) Maternal Body Mass Index and Birth Weight *Nutrition News:* Vol. 12, No 2.

Naidu, A.N. *et al.* (1983) *Nutritional Status of Indian Adults* (assessed by Body Mass Index), National Institute of Nutrition.

National Institute of Nutrition (1985–86) Maternal Size and Birth Weight of Infants *Annual Report,* p 100.

National Institute of Nutrition (1983) Income and Birth–weight *Annual Report* p 125.

Naidu, A.N. *et al* (1991) Maternal Body Mass Index and Birth Weight, *Nutrition News,* Vol. 12, No. 2.

National Institute of Nutrition (1983) Growth of Breast–fed Infants in a Slum Population *Annual Report* pp 153–157.

Pryer, J. (1989) When Breadwinners Fall III: Preliminary Findings from a Case Study in Bangladesh, *IDS Bulletin* 20 (2), 49–58.

Radhakrishna, R. (1992) Trends in Nutrition: Emerging Challenges, and Nutrition: Need for Effective Intervention, Two articles for *The Economic Times of India,* February 10–11 1992

Ramachandran, P. (1989) Nutrition in Pregnancy, *In: Women and Nutrition,* Gopalan, C. and Kaur, S (eds.) Nutrition Foundation of India, Special Publication Series No. 5, p 155.

Ranade, S. (1991) Good Times and Bad Times; Indian Politics and the Poor, Article III, *The Hindu,* December 18 1991.

Rao, D.H., and J.G. Sastry, (1979) Growth Pattern of Well–to–do Indian Adolescents and Young Adults *Ind. J. Med. Res. 66,* pp 950–956.

Reddy, V. (1990) *Energy and Protein Requirements* Paper presented at the regional expert consultation of the Asian network for Food and Nutrition Planning, Bangkok, 24–27th July, p 14.

Registrar General of India (1982/1986) *Survey on Causes of Deaths (Rural).* Serial No. 3 No. 19.

Registrar General of India (1991) *Census Provisional Population Totals.*

Registrar General of India (1991) *Census.*

Registrar General of India (1989) *Census – 1981 Occasional Paper* No. 2.

Registrar General of India (1987) *Survey of Causes of Death (Rural).*

Registrar General of India (1984) *Survey on Birth Order Differentials.*

Registrar General of India (1981) *Census.*

Registrar General of India (1979–86) *Sample Registration System.*

Rosenzweig, M. R. and P.T. Schultz (1982) Market Opportunities, Genetic Endowments and Intrafamily Resource Distribution: Child Survival in Rural India. *American Economic Review 72* (4): 803–815.

Sarma, J.S. and Gandhi, V.P. (1990) Production and Consumption of Foodgrains in India: Implications of Accelerated Economic Growth and Poverty Alleviation, *IFPRI Research Report No. 81,* July 1990.

Sarma, K.V.R., *et al.* (1990) *ICDS – An Epidemiological and Qualitative Study,* NIN Scientific Report.

Satyanarayana, K. *et al.* (1986) Effect of Early Childhood Undernutrition and Child Labour on Growth and Adult Nutritional Status of Rural Indian Boys around Hyderabad. *Human Nutrition: Clinical Nutrition,* 40 C, pp 131–139.

Satyanarayana, K. (1989) Nutritional Status and Productivity, International Dietary Energy Consultancy Group, *Annual Report.*

Satyanarayana, K. *et al.* (1991) *Body Mass Index and Mortality Pattern – A 10 year Retrospective Study* (*communicated*).

Sarekshama (April–June 1989) *A Note on Consumer Expenditure Survey 42nd Round (July 86–June 87)* Vol. XII, No. 4.

Shekar, M., Prahlad Rao, N. Gillespie, S.R. and Reddy, V. (1992) *Nutrition–Relevant Actions in Two South Indian States, Part II of Nutrition In India,* ACC/SCN, Geneva.

Srikantia, S.G. (1989) Pattern of Growth and Development of Indian Girls and Body Size of Adult India Women, In: Gopalan, C. and Kaur, S. (eds.) *Women and Nutrition in India,* NFI, Special Publications Series 5.

Subbarao, K. (1989) Improving Nutrition in India: Policies and Programmes and their Impact, World Bank Discussion Paper No. 49

Suryanarayana, M.H. (1991) Measuring Poverty: An Alternative Approach, The Economic Times, October 24 1991.

UNDP (1990) *Human Development Report,* Oxford University Press for UNDP.

UNICEF (1990) *Children and Women in India: A Situation Analysis.* UNICEF, New Delhi, India.

Vijayaraghavan, K. and Prahlad Rao, N. (1982) An Evaluation of National Prophylaxis Programme against blindness due to Vitamin A deficiency *Nut. Rep. Int.* 25, pp 431–441.

Walker T.S. and Ryan J.G. (1990) *Village and Household Economics in India's Semi–arid Tropics* Baltimore: The Johns Hopkins.

WHO (1981) Report on the WHO Collaborative Study on Breast Feeding, p. 36, 37.

World Bank (1991) *Gender and Poverty in India* The World Bank, Washington DC.

PART II – NUTRITION–RELEVANT ACTIONS IN ANDHRA PRADESH AND TAMIL NADU

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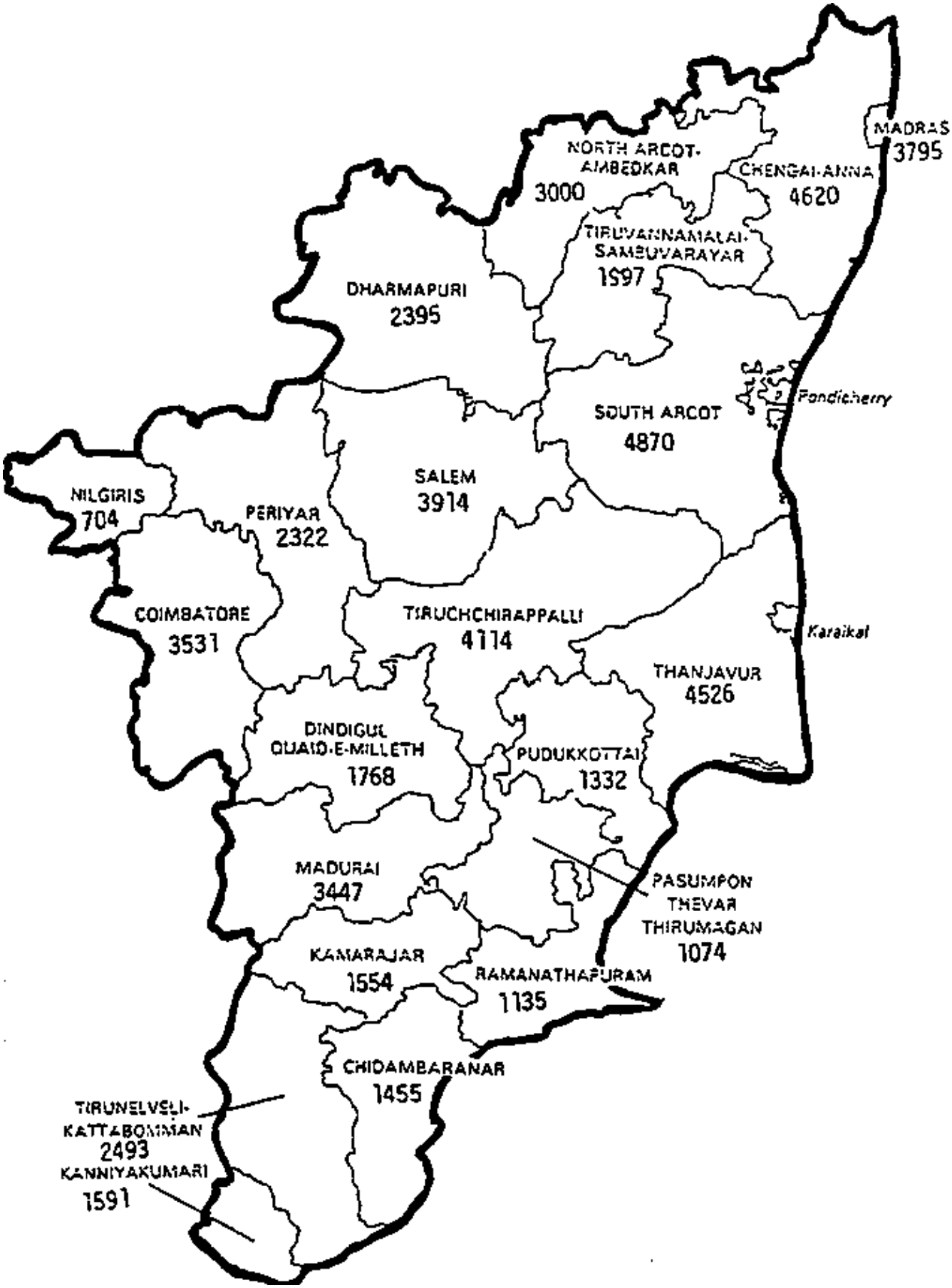
December 1992

MAP 1: States of India

MAP 2: Andhra Pradesh (population in thousands, 1991)



MAP 3: Tamil Nadu (population in thousands, 1991)

This is one of the six country studies within the 'ACC/SCN Country Review of Nutrition–relevant Actions' series carried out in selected developing countries. Part I of this paper 'Nutrition Assessment and Analysis in India' tracks the changes in the nutritional profile in India over the last two decades. Part II here reviews

nutrition–relevant actions in order to investigate potential reasons for the observed nutritional improvement. Given the size of the Indian continent and the diversity in nutritional profiles across the twenty five states in the country, this review is limited to two states – Andhra Pradesh and Tamil Nadu. Such a state–level focus is particularly relevant in view of the two–tier system of governance in the country (i.e the Centre and the State) creating a near–unique political and economic environment in each state.

Discussion of nutritional influences is encompassed here within the general framework that incorporates three pre–conditions for adequate nutrition – household food security, adequate health services and environment and adequate maternal and child care (see UNICEF 1991, Gillespie and Mason 1991). Within this, interventions in the field of nutrition, health, education, family welfare, agriculture, income–generation and employment are all encompassed within the scope of "nutrition–relevant actions". This review focuses on three types of actions – nutrition interventions, food interventions and poverty alleviation programmes – and broadly traces their effects on nutritional outcomes through their influences on these three preconditions. Nutrition interventions, as defined here, include (among other inputs) supplementary feeding, nutrient–supplementation and information–education–communication (IEC) components. We discuss the Integrated Child Development Services (ICDS), the Tamil Nadu Integrated Nutrition Programme (TINP), the Midday Meals Programme (MDM), the Vitamin A Prophylaxis Programme and the Anaemia Prophylaxis Programme in this section. One main food intervention is described – the Public Distribution System (PDS), which has a hidden or implicit nutritional objective in its aim to improve household food security. Poverty alleviation programmes focus on employment, income generation and/or income redistribution. We discuss an asset endowment programme – the Integrated Rural Development Programme (IRDP) and a wage–based one – the National Rural Employment Programme (NREP) in the latter section of this report.

Since many of the nutrition–relevant actions are conceived and designed nationally, wherever possible each intervention is discussed at a general design level, and subsequently complemented with more specific state–level information on coverage, implementation and quality control/evaluation.

Andhra Pradesh and Tamil Nadu

Both Andhra Pradesh and Tamil Nadu are located in coastal south India (see Map 1) and comprise small mountainous regions, large coastal plains and dry interior regions. Their major river systems such as those of the Krishna and Godavari in Andhra Pradesh and Kaveri in Tamil Nadu originate in the Western ghats and flow eastward, taking with them, a number of tributaries and irrigating vast tracts of land. They form large deltas before emptying into the Bay of Bengal. Some of the rivers are perennial and a majority are rainfed. Besides these geographical similarities, the two states share a similar administrative culture, both having originated from the Madras presidency under British rule.

Agriculture is the mainstay of the economy in both states. Andhra with its wide diversified farm base, is a foodgrain surplus state – often called the granary of south – but less advanced industrially than Tamil Nadu. Tamil Nadu also has an advantage over Andhra Pradesh in terms of selected demographic and socio–economic criteria such as Infant Mortality Rate (IMR), Total Fertility Rate (TFR), literacy, age at marriage, per capita income, percent of births attended by trained personnel, employment in organized sectors, and dependency ratio, according to the 1988–89 Yearbook of the Ministry of Health and Family Welfare of the Government of India. Rankings on the basis of a composite physical quality of life index also reinforce these differences (Karakal and Irudeyarajan 1991).

Andhra Pradesh

Andhra Pradesh (AP), with an area of 275,000 sq km is the fifth largest state in India (see Map 2). It has a population of 66.3 million (1991 census), with a large majority (73.2%) living in rural areas in 29,400 villages and the balance 26.8% living in about 250 urban towns and cities. Nearly 20.8% of the population are Scheduled Castes (14.9%) and Scheduled Tribes (5.9%). According to the 1991 census, overall literacy in the state is 37.4% as compared with an average of 52.1% in the country. Female literacy, as in many other states in the country is lower (28.0%) than male literacy (46.6%). These figures are again much lower than the all–India figures of 39.4% and 63.9% respectively (Census of India 1991).

The state is divided in to twenty three districts spread over three distinct geographical regions known as Coastal Andhra, Rayalaseema and Telangana regions. The nine districts of Srikakulam (Sr), Vizianagaram

(Vz), Vishakapatnam (Vs), East Godavari (EG), West Godavari (WG), Krishna (Kr), Guntur (Gu), Prakasam (Pr) and Nellore (Ne) constitute the coastal region. Ten districts of Hyderabad (Hy), Rangareddy (Ra), Nalgonda (Na), Khammam (Kh), Mahboobnagar (Ma), Warangal (Wa), Karimnagar (Ka), Nizamabad (Ni), Medak (Me) and Adilabad (Ad) form the Telangana region and the four districts of Kurnool (Ku), Cuddapah (Cu), Anantapur (An) and Chittoor (Ch) make up Rayalaseema region (abbreviations used in figures and tables).

The concentration of the Scheduled Caste population is highest (20.7%) in Nellore district and lowest (7%) in Vishakapatnam. The tribal population is most concentrated (24.5%) in Khammam district and least so in Hyderabad (0.64%).

The state receives rains from the summer as well as the winter monsoons. The summer monsoon (June–Sept) is the South–West monsoon which contributes nearly two thirds of rains (600 mm) in the state, while the winter monsoon (Oct–Dec), supplies the remaining one–third. On average, the coastal region receives the highest rainfall (1000 mm) followed by Telengana (890 mm) and Rayalaseema (670 mm). Periodic droughts in Telengana and Rayalaseema regions and floods in Coastal Andhra however, hamper food production in the state.

Agriculture is the major strength of the Andhra economy. It is estimated that 36.2% of the state's net domestic product is derived from agriculture, while it provides livelihoods for 70% of its population. Major crops grown in the state are: rice*, jowar, bajra, ragi* (millets), maize, sugar cane, chillies, groundnut, castor, cotton, and tobacco. Rice is the principal food crop followed by *jowar* and other coarse millets. Among the cash crops, sugar cane, cotton and tobacco are important. The major oil seed produced in the state is ground nut. A variety of pulses are also produced.

The state recorded an improvement in food production in the late 1970s and early 1980s (see Figure 1) through the adoption of improved food production and management techniques despite an almost constant area under food grains. From 1983–87 however, there was a significant declining trend in per capita food production. About 68% of arable lands in the state are reported to be under dry farming and cultivated by poor farmers. Special efforts are being made to increase production of food grains, oil seeds and commercial crops through active programmes in watershed development, soil and moisture conservation, crop insurance, cattle breeding, horticulture and floriculture.

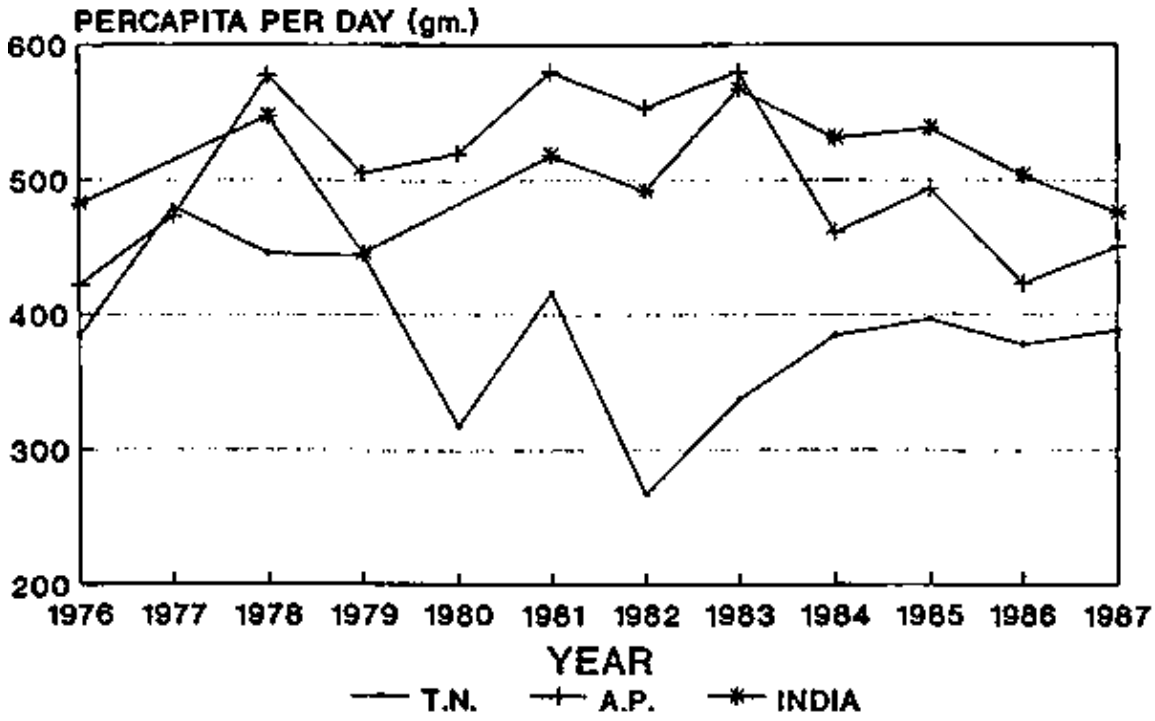


Figure 1 – FOODGRAIN PRODUCTION

Source:

Tamil Nadu

Tamil Nadu (TN), one of the southern−most states of India covers about 130,000 square kilometres and has a population of 55.6 million (1991 census) distributed over 21 districts. South Arcot district, which accounts for 8.75% and the Nilgiri which accounts for 1.27% of state's population constitute the most and least populous districts of the state respectively. In 1981, Tamil Nadu had only 16 districts, compared with 21 now. In 1985, the district of Ramanathapuram was trifurcated in to Pasumpon Thevar Thirumagam, Kamrajar and Ramanathapuram. Madurai district was divided (in 1985) in to Madurai and Dindigul−Quaid−e−Milleth districts, while in 1986 Tirunelveli was divided in to Thirunelveli−Kattabomman and Chidambaram districts. In 1989, North Arcot was divided in to North Arcot Ambedkar and Tiruvannamalai−Sambuvarayar. Chengalpattu district was renamed Chengai−Anna in 1981.

A majority (two−thirds) of the population is rural and lives in about 15,830 villages, while the remaining one−third lives in 25 cities/urban agglomerations. This makes Tamil Nadu a highly urbanised state, next only to Maharashtra which has more than 35% urbanisation, as compared to 23.7% for all−India. The urban Tamil population is concentrated in metropolitan cities like Madras and along the industrial belts of Madras, Salem and Coimbatore and in the agriculturally advanced regions of the Kaveri delta.

During 1981−1991 the population in the state grew at a rate of 14.9% as compared to an increase of 23.5% in the country as a whole. In absolute numbers, nearly 7.2 million people have been added to the state's population during the last 10 years. According to the Sample Registration System (SRS) there has been a decline in birth rate and death rate in Tamil Nadu in the last decade. The birth rate declined from 28 per 1000 in 1981 to 23 in 1989 while the death rate declined from 11.8 to 8.6 per 1000 during the same period (Registrar General 1991)

During the last ten years, the overall literacy level has increased from 54.3% to 63.7% (Census of India 1991), male 74.8% and female 52.3%. Of the total scheduled caste (SC) population in Tamil Nadu, nearly 80% (7.1 million) live in rural areas. Chengalpattu district has the highest proportion of SCs (26.2%) and Kanya Kumari, the lowest (4.2%). Nearly 80% SCs are agricultural labourers, and literacy levels continue to be low compared to the general population.

The average family size in the state is 4.7. Contrary to the all−India pattern, where rural families are larger than urban families, in Tamil Nadu family size in urban areas is slightly larger (4.9) than that (4.6) in rural areas. The dependency ratio (ratio of population in the 0−14 and the 60 years and above age group to total population) is 70 in Tamil Nadu as against 85 for all−India (Tamil Nadu Corporation for the Development of Women Ltd. 1986).

The topography of the state comprises coastal plains in the east and hilly−forests and upland regions in the northern and western parts of the state. Tamil Nadu has a coastline of about 1000 km which forms about 18% of the country's coastline. Agro−climatically the state is demarcated into three distinct regions. Region I consists of highly fertile areas of the Kaveri delta and includes three districts viz. Thanjavur, South Arcot and Tiruchirapalli − predominantly rice growing areas. Region II is less fertile and consists of four districts − North Arcot, Thiruvannamalai, Salem and Coimbatore − known for their commercial crops of sugar, cotton and groundnut. Wells and tanks are the main sources of irrigation. Region III is a dry area spread over 14 districts with poor irrigation facilities, where coarse millets like *jowar, ragi, bajra* and maize are grown.

Tamil Nadu receives an average annual rainfall of about 940 mm, of which 48% is through the North−east (October−December) monsoon, and 32% through the South−West monsoon (June−September). Since the state is entirely dependent on rains for recharging its water resources, monsoon failures lead to acute water scarcity and severe drought.

Food production over the past two decades in Tamil Nadu has failed to keep pace with the growth in population (see Figure 1). As a result, per capita net production and availability at the state level has remained below 400 g., a trend contrary to what has been observed at the all India level. Availability of other foods like pulses, milk, flesh foods etc. show a mixed pattern. While per capita availability of milk has increased since the 1980s, pulse availability showed a decline − a trend consistent with the national picture.

Nutrition and Mortality Outcomes

Regarding mortality, Figure 2 shows trends in rural infant mortality rates for the two states as compared with the all–India figures. Both states had lower IMRs than the country average in the late 1970s and 1980s. The IMR in Andhra improved at a faster rate than the country average between 1977 and 1983, before actually worsening slightly in the latter part of the 1980s.

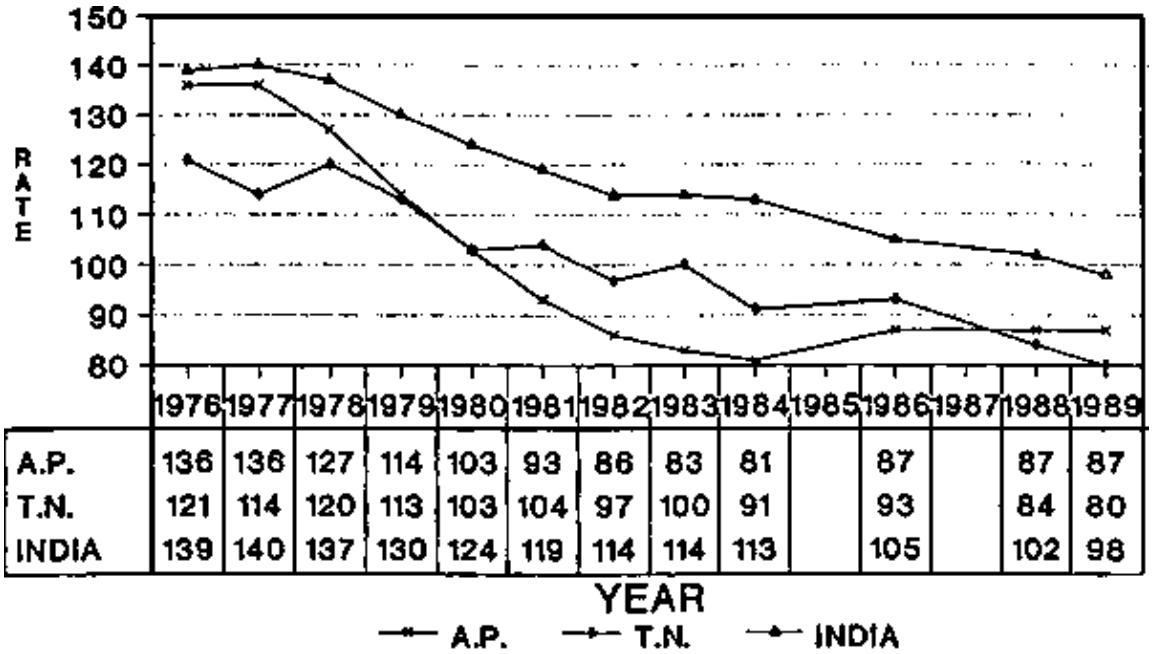


Figure 2. RURAL INFANT MORTALITY RATES – Per 1,000 live births

SOURCE: SRS

Nutrition trends are provided by data from the NNMB which show a decline in combined moderate and severe nutrition grades (Gomez classification, less than 75% of NCHS weight–forage standards) in the states of Andhra Pradesh and Tamil Nadu over the last fifteen years (Figure 3a). The order of the decline is similar to that observed in the country as a whole – lower than that observed in Kerala or Maharashtra, but higher than in Orissa, Madhya Pradesh or Karnataka. The increase in the numbers of preschool children classified as 'normal' (above 90% standard) has, however, been relatively modest (NIN 1991) in both Andhra Pradesh and Tamil Nadu.

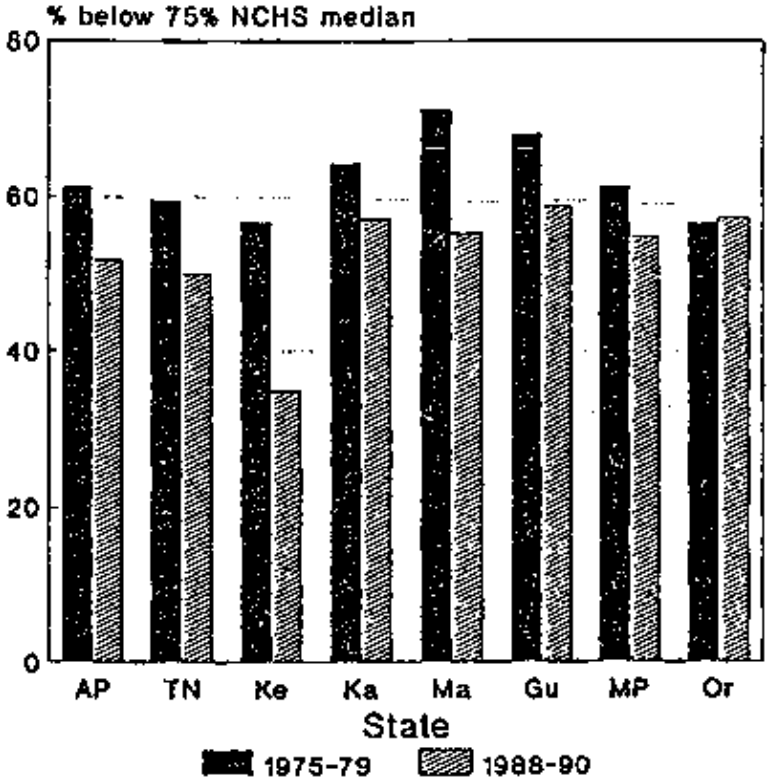


Figure 3A. Underweight Prevalences – 1–5 year olds, by state

Andhra Pradesh

The NNMB repeat surveys for rural areas showed that the prevalence of *severely* underweight 1–5 year olds (i.e. below 60% NCHS median weight–for–age) dropped from 15.4% in 1975–79 to 7.5% in 1988–90 – i.e. at a faster rate than the all–India improvement of 15.0% to 8.7% in the same period. As with the all–India trend, there was little change in the prevalence of moderately underweight (remaining around 45%). Figure 3b shows that the major part of the improvement occurred in the late 1970s/early 1980s.

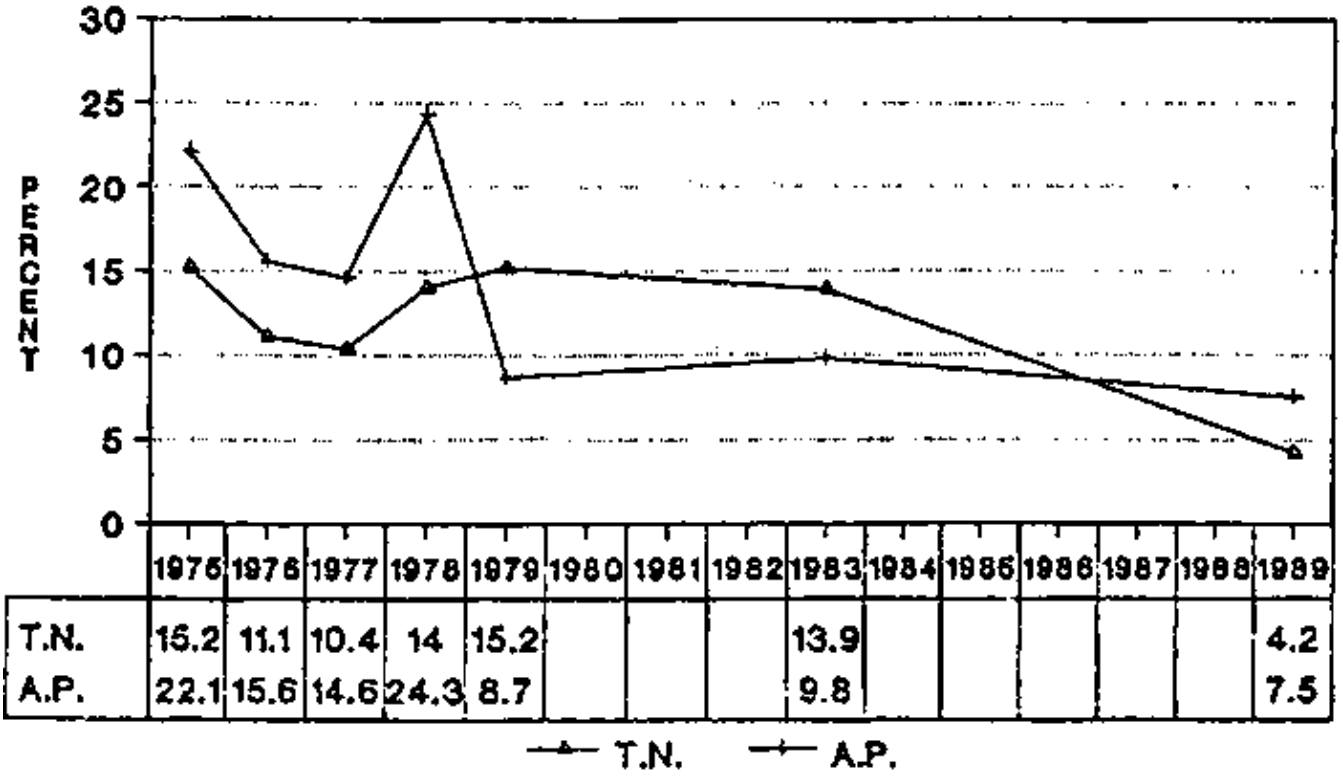


Figure 3B – PREVALENCE OF SEVERELY UNDERWEIGHT – PERCENT 1–5 YEAR OLDS

SOURCE: NNMB (NCHS standards)

The repeat surveys also suggested that during 1975–79 more preschool (1–5 year old) boys (65.9%) than girls (56.8%) were below 75% NCHS median weight–for–age – an observation similar to the above using local standards. However, this difference had disappeared by 1988–90, when equal proportions of boys and girls (about 52% each) were in this category.

Comparing urban and rural areas, a 1984 NNMB study has shown that children living in slums exhibit the highest prevalence (46.1%) of underweight (using local Hyderabad standards), close to the rural figure of 44.5%. In each of the three other urban socio–economic classes, prevalences were lower and the proportion of severely underweight children was also minimal.

The rural infant mortality rate decreased from 136 in 1976 to 87 in 1988, as compared to the all–India IMR decrease from 139 to 102 (see Figure 2). The urban IMR in 1988 was 63. A comparison of the ratio of deaths among children 0–4 years to total deaths shows that Andhra Pradesh, at 32.4% (in 1987) is better–off than most states (the all–India average was 42.0%) with respect to the survival prospects of young children relative to the rest of the population (UNICEF p 16, 17, 19, 132).

Tamil Nadu

The NNMB repeat surveys for rural areas showed that the prevalence of *severely* underweight 1–5 year olds (i.e. below 60% NCHS median weight–for–age) dropped from 12.6% in 1975–79 to 4.2% in 1988–90 – i.e. at a faster rate than the all–India improvement of 15.0% to 8.7% in the same period. As with the all–India trend, there was little change in the prevalence of moderately underweight (remaining around 45%). The prevalence below 75% median weight–for–age overall dropped from 59.6% to 50.0%. Figure 3b shows that the major part of the improvement occurred in the mid to late 1980s, with no real change between 1977–83. There was little gender difference in the proportions of children, in either 1975–79 or 1988–90, that were below 75% NCHS median weight–for–age.

According to rural and urban NNMB surveys between 1975–80 (data pooled for these years), the prevalences of underweight children (severe and moderate degrees, Gomez classification) in the urban ‘middle–income’ group (28.9%) and the ‘industrial labour’ group (34.8%) were much less than those in the ‘low–income group’ (45.2%) and the slums (38.6%). The rural picture tended to be worse than the urban slums but better than the urban low–income group, which had the highest prevalence of underweight children. The pattern thus seen in the city of Madras (Tamil Nadu) was slightly different from that observed in the city of Hyderabad (Andhra Pradesh) and also all the other main cities of states covered by NNMB, where highest prevalences were seen in slums.

A district–wise analysis in Tamil Nadu, shows a relatively greater reduction in the numbers of children below 75% of NCHS standards in districts between 1979 and 1990 where the Tamil Nadu Integrated Nutrition Project (TINP–I) has been operating since 1980 (NIN 1991b), as shown in Table 6.

The rural infant mortality rate decreased from 121 in 1976 to 84 in 1988, as compared to the all–India IMR decrease from 139 to 102 (see Figure 2). A comparison of the ratio of deaths among children 0–4 years to total deaths shows that Tamil Nadu at 25.2% (in 1987) is second only to Kerala (13.3%) (with the all–India average was 42.0%) with respect to the survival prospects of young children relative to the rest of the population.

Poverty and Nutrition

Andhra Pradesh underwent a fair reduction in head–count ratios for rural poverty between 1977–78 and 1986–87 from 45.5% to 33.8%, with the major part of the decline occurring between 1977/78 and 1983, and a smaller decline between 1983 and 1986/87, as shown in Figure 4 (Kakwani and Subbarao, 1990, p30). Concurrently, the percent of preschool children below 75% of NCHS standards declined from 61.5% in 1975/79 to 51.8% in 1988/90.

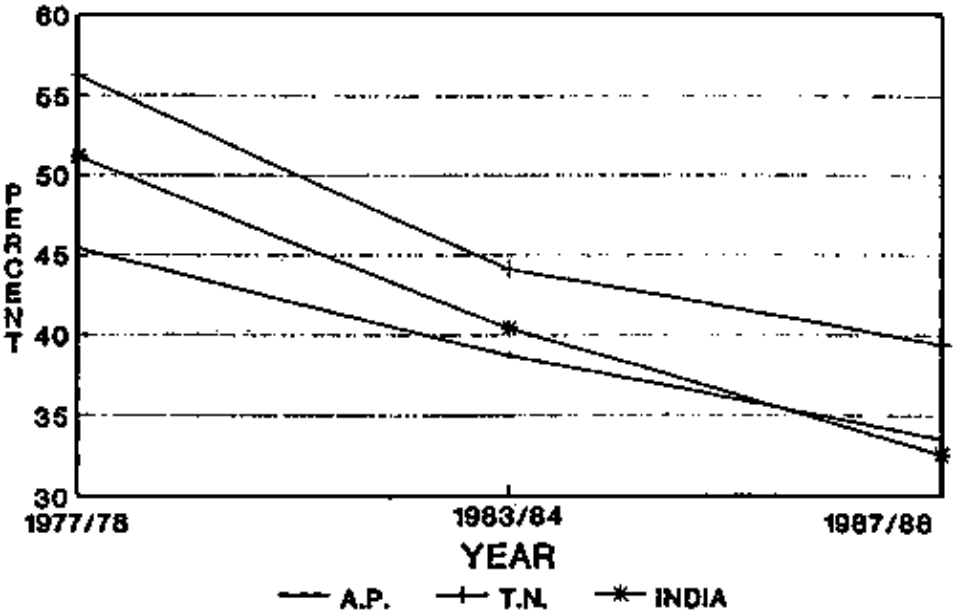


Figure 4. RURAL POPULATION BELOW POVERTY LINE

SOURCE: PLANNING COMMISSION

In Tamil Nadu, estimates of rural poverty ratios (Planning Commission, as quoted in NIPCCD 1991) reduced from 56.3% in 1977–78 to 39.4% in 1987–88 (see Figure 4), while underweight prevalences (< 75% NCHS weight–for–age) decreased from 59.6% in 1975–79 to 50.0% in 1988–90 (NIN 1991). Thus, both states show similar declines in both poverty ratios and child underweight prevalences. Nonetheless, despite higher rural poverty ratios, Tamil Nadu has a slightly lower underweight prevalence. Kakwani & Subbarao (1990) have shown that the states that have improved their relative poverty position (ranking) between 1973–87 i.e. Andhra Pradesh, Jammu & Kashmir and Kerala, are also the states that have shown an improvement in the nutritional status of the *ultra–poor*[1] during 1970–80.

[1] Lipton (1983) takes 20% as being the irreducible proportion of income spent by the poorest in a wide range of countries on non–food essentials. Given the tendency of food requirement figures to over–estimate real food needs, especially in relation to people living in warm climates, Lipton suggests that it might be more realistic to work with 80% of the FAO/WHO weight–adjusted dietary energy requirements (FAO/WHO 1973). This leads to a 'double 80' rule, according to which people are judged to be *'ultra poor'* if 80% of their income is insufficient to purchase 80% of these FAO/WHO energy requirements.

District–level anthropometric data for Andhra Pradesh for 1978–90 are available only for eight districts surveyed by the NNMB. Analysis of these data suggests a weak and statistically insignificant correlation (Pearsons r = + 0.07, Spearman's r = + 0.22) between household poverty (1987/88) and preschool malnutrition rates (1988/90) in the eight districts. For 1977/78, the correlations are equally weak (Pearson's r = + 0.04, Spearman's r = + 0.00). These weak correlations may be a consequence of universally high underweight prevalences in the eight districts.

Food Consumption and Nutrition

Figures 5 and 6 outline the state–wise level of food and nutrient adequacy in Andhra Pradesh and Tamil Nadu for 1975–79 and 1988–90. Aggregate energy intakes are above 90% of the ICMR recommended dietary intakes of 2350 kcals per consumption unit (CU) per day in both states, though intakes are higher in Andhra Pradesh than in Tamil Nadu. Further, NNMB surveys actually reported a decline in mean energy intakes of 404 kcals in Tamil Nadu (from 2275 to 1871 per CU) and 107 kcals in Andhra Pradesh between 1975/79 and 1988/90 (from 2447 to 2340 per CU). The decline observed for all seven NNMB–monitored states combined was from 2340 kcals in 1975/79 to 2283 kcals in 1988/90 – a decline of only 57 kcals. NNMB explains this decline in energy intakes as being the result of the increase in intakes among the poorest, being less overall than the decline in intakes among the economically better–off. However, these tentative conclusions need urgently to be confirmed with more research. As discussed in Part I, Radhakrishna (1992) attributes a major part of the observed decline in calorie consumption to changes in taste factors, with increasing proportions of

people substituting rice and wheat for coarse grains, animal products for staples, and spending relatively more on non–foods. It is also possible that the severe country–wide drought in 1987 may have had some impact on the observed energy intakes. Radhakrishna (1992), on the basis of an integrated demand model, predicts a levelling off of energy intakes between the years 1987 and 2000.

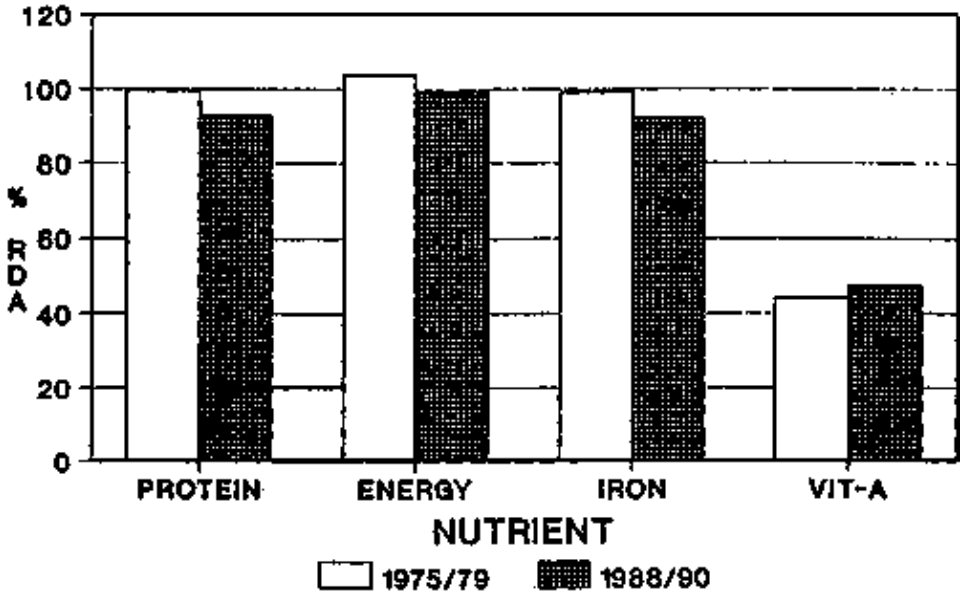


Figure 5. NUTRIENT INTAKE AS PERCENT OF RDA IN RURAL A.P.

SOURCE: NNMB (1991)

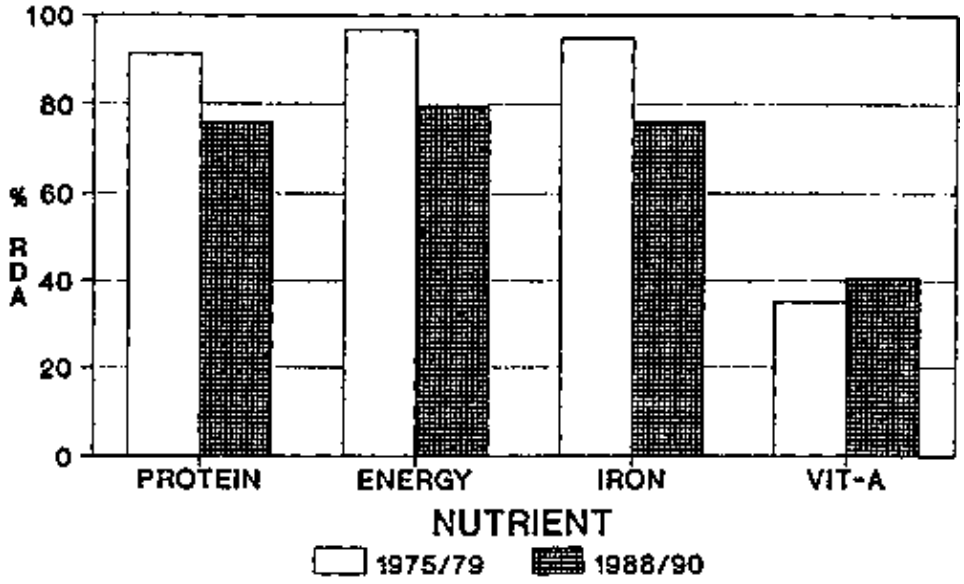


Figure 6. NUTRIENT INTAKE AS PERCENT OF RDA IN RURAL T.N.

SOURCE: NNMB (1991)

Gupta (1987) in an analysis of trends in intra–state inequality in calorie consumption, compared the lowest and highest three income deciles with respect to the percentage change in daily per capita calorie intake, between 1961–62 and 1983. In every state, for both lowest and highest three deciles, there was a reduction in consumption levels within this time period. The changes for Andhra Pradesh and Tamil Nadu were as follows:

	1961–62		***1983***		***% change***	
	L.D.	*U.D.*	*L.D.*	*U.D.*	*L.D.*	*U.D.*
Andhra Pradesh	1535	2714	1192	1947	–22	–28
Tamil Nadu	1458	2637	1128	2145	–23	–19

L.D.: lowest three deciles
U.D.: upper three deciles

Source: Gupta (*1987*)

This shows that, while consumption levels were in general dropping for every household, the level of inequality in Andhra Pradesh reduced, and that in Tamil Nadu increased. However, in both states, the poorest were still consuming significantly less than the richest groups in 1983 (as a ratio, against the richest, the poorest deciles consumed just 61% in A.P. and 53% in T.N.).

Mean protein and iron intakes compare favourably with recommendations in both states, Andhra being better–off. Dietary intakes of vitamin A, however, are much below recommended levels in both states, with the population in most districts consuming between 20–40% of the RDA. Once again, the situation in Tamil Nadu appears worse than that in Andhra Pradesh (see Figures 5 and 6).

Prevalence of vitamin A deficiency signs (Bitot's spots) declined in Andhra Pradesh from 3.1% to 1.0% between 1975–79 and 1988–90 while the corresponding decline in Tamil Nadu was from 2.9% to 0.6%. (Corresponding figures for the country as a whole, as estimated from the eight states surveyed by NNMB are 1.8 and 0.7%) (NIN 1991). Thus in 1988–90, despite a lower per capita intake of vitamin A, Tamil Nadu had a marginally lower incidence of Bitot's spots.

In Andhra Pradesh, a district–wise analysis of nutrient intake data from eight districts suggests a negative correlation (though statistically insignificant, possibly because of the small sample size) between energy adequacy and underweight prevalences in 1977/78, but not in 1988/90 (Pearson's r = – 0.42 in 1977/78 and + 0.15 in 1988/90; Spearman's r = – 0.50 in 1977/78 and + 0.15). Correlations between household poverty and energy adequacy changed from – 0.43 in 1978/79 to + 0.15 in 1988/90. This change in the direction and strength of the correlations implies that factors other than energy adequacy may have a greater role to play in determining malnutrition levels in 1988/90 than was the case in 1977/78. However, these preliminary conclusions need to be supported with analysis of more disaggregated data to allow for adequate sample sizes and statistically significant relationships.

In summary, there has been a moderate decline in preschool underweight prevalence rates in Andhra Pradesh and Tamil Nadu over the last decade (1977/78 to 1988/90), despite a reported decline reported decline in aggregate energy intakes. Nonetheless, about 50% children in both states continue to be under 75% of NCHS reference standards, even in 1988/90, When the Z–score classification is used, the percent preschoolers identified as below – 2SD of NCHS reference standards is as high as 70–80% in the different districts of Andhra Pradesh. Mean dietary intakes of energy and protein appear close to recommended levels, but these aggregate figures are likely to conceal fairly large inter–individual variations, thus explaining the persistence of high prevalence rates despite seemingly adequate energy (and protein) intakes. Further, it is likely that in Andhra Pradesh, the influence of non–dietary factors on malnutrition may have increased over the last decade. Despite low dietary vitamin A intakes, deficiency indices have diminished over time. Nevertheless, prevalence of vitamin A deficiency signs in both states continue to be above the cut–off levels proposed by the World Health Organization for identifying a public health problem. Further, despite higher poverty levels and a poorer household food security situation, nutrition profiles in Tamil Nadu are marginally better than those in Andhra Pradesh (this is further discussed later).

The Political Economy of Nutrition

The Indian economy is going through a severe resource crunch. Both structural adjustment programmes and stabilization programmes are underway with support from the World Bank and the IMF. Inflation rates are very high. Within this socio–economic and political milieu, there is strong government concern for compensatory measures to protect the poorest. While on the one hand large scale subsidies are being discouraged and abjured (for example the proposed reduction in the fertilizer subsidy which before 1992, was of the order of 70,000 million Rs), better targeted subsidies on social welfare schemes i.e. poverty alleviation, human development, and food are beginning to receive stronger political and government attention. In this present context, nutritional considerations have a unique opportunity. Well targeted actions that can alleviate the negative impact of structural adjustment on the poorest have been recommended as necessary accompaniments to adjustment policies (Cornia *et al.* 1987; Gillespie & Mason, 1991). While there has been much discussion about governmental concern and sensitivity vis a vis "adjustment with a human face", fiscal allocations for the year 1991–92 show a negligible share of nutrition (consistent with earlier years), and in fact

a decline in the share of family welfare allocations, with little evidence of planning behind these allocations (Mohan, 1991). Recent government announcements vis a vis reduction in the allocations for the rural development sector (from Rs 210,000 million in 1991–92 to Rs 182,500 million in 1992–93) are being explained away as 'temporary cuts', likely to be restored to their original level after the current year.

The official National Nutrition Policy, the first of its kind in India, is in the process of being finalized. The policy aims to encompass several direct and indirect nutrition–relevant actions under a single head and advocate extension of existing welfare/nutrition programmes to cover all those below the poverty line. Official recognition of the National Nutrition Policy will help bring nutrition issues to the fore and provide a rallying point for incorporating nutritional objectives into indirect nutrition–relevant actions – a much needed boost for political support for nutrition. These actions must, nevertheless, be complemented with a strengthening of the nutrition–information systems in the country – a pre–requisite that can not be met without adequate emphasis on development of institutional facilities to meet the potential demand for nutrition–relevant information. Data generated by the National Nutrition Monitoring Bureau (NNMB), complemented by some data from surveys by the National Sample Survey most populous and poorest states of Bihar, Uttar Pradesh and Rajasthan. The urgent need for strengthening nutrition–information systems to ensure representative, regular and reliable data for meaningful nutrition planning is apparent.

Resource Allocation for Nutrition

India has a system of five–year development plans wherein sectoral budgetary allocations are delineated on the basis of prioritization by the Planning Commission, at central and state government levels. Nutrition is viewed within the social sector. Financial allocations for nutrition have been based primarily on poverty criteria rather than on nutritional criteria *per se* – the lack of regular and countrywide nutrition data and the absence of a national nutrition policy may account for this. Within this general framework, nutritional considerations have been more implicit than explicit – a factor that may have contributed to the relatively low profile of nutritional considerations in the national development agenda.

Table 1 outlines the outlay and expenditure on nutrition in the seventh Five Year Plan (1985–90) for Tamil Nadu and Andhra Pradesh. Expenditure on nutrition at all–India level was a little over half the total nutrition outlay in 1985–86. This gap between outlay and expenditure reflects the diversion of funds allocated for nutrition to other sectors – a clear indication of the relatively low priority accorded to nutrition issues; in this, Tamil Nadu was similar to the all–India picture, with Andhra Pradesh being much worse off, with expenditure being only 11% outlay. Andhra's situation is probably partly explained by the withdrawal of the phenomenally expensive mid–day meal scheme as discussed in a later section of this report.

Table 1: Outlay and expenditure on nutrition, Seventh Five Year Plan 1985–90 (mil. Rs.)

State	***Target 1985–90***	***Outlay 1985–86***	***Expenditure***	***Expenditure as % outlay***	***Expenditure as % target***
Andhra Pradesh	5360	372	41	11.0	0.8
Tamil Nadu	54000	10337	5814	56.2	10.8
All India	165946	30076	16520	54.9	10.0

Source: Subbarao 1989

Figure 7 outlines the state–wise annual real expenditure per child under the poverty line in 1985–86. The poorest states (Bihar, Rajasthan, Uttar Pradesh and Madhya Pradesh), as well as Andhra Pradesh had among the lowest expenditures, while Gujarat and Tamil Nadu spent the highest amounts per child under the poverty line (though, as discussed later, a major chunk of Tamil Nadu's direct nutrition expenditure was accounted for by the untargeted midday meal school feeding scheme).

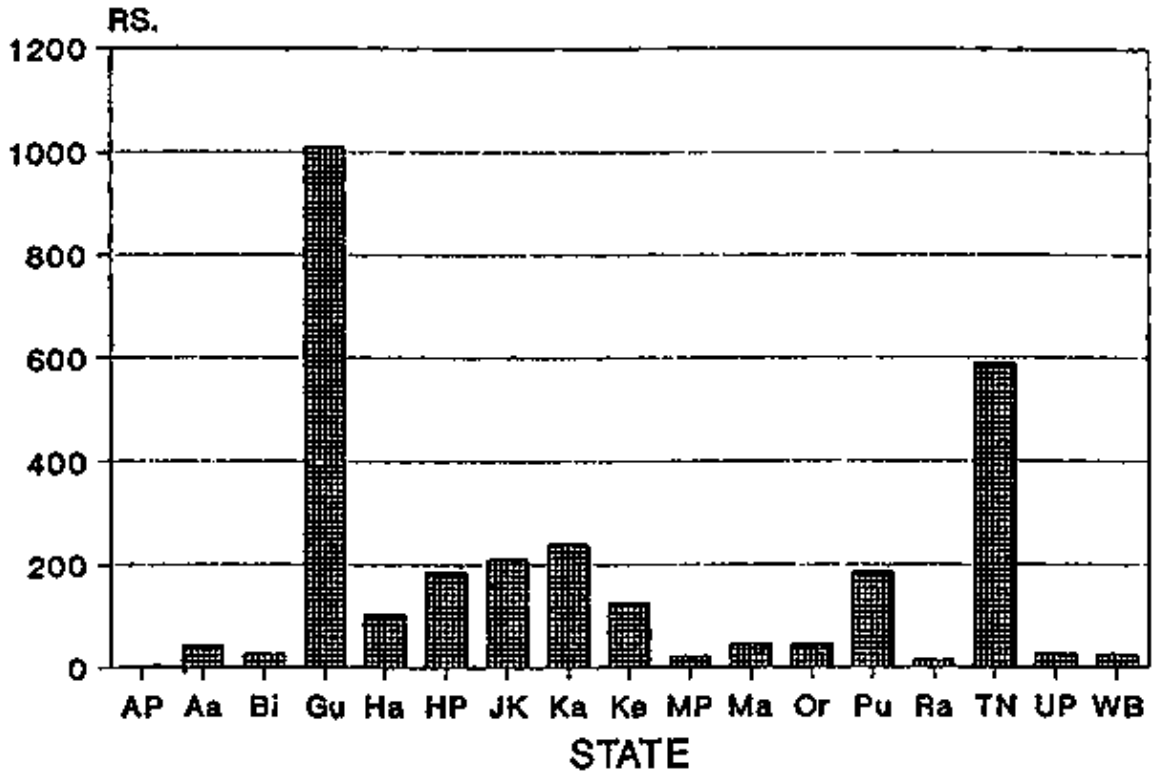


Figure 7. ANNUAL REAL EXPENDITURE (RS.) PER CHILD UNDER POVERTY LINE (1985–86)

SOURCE: K. SUBBARAO (1989)

Over the years, Tamil Nadu has allocated large resources directly to nutrition, while Andhra's nutrition expenditures continue to be low. In the 1989–90 annual plan. 6.1% of the country's total social sector budget was allocated to nutrition, an aggregate figure hiding a wide variation between states with Gujarat and Tamil Nadu at the top with 23 and 22% respectively, and Madhya Pradesh, Bihar and Andhra Pradesh at the bottom with 2.8, 5.0 and 4.6% respectively. Clearly, the need for nutritional inputs (even if poverty criteria are used as proxies) does not match the actual expenditures, these being governed largely by political motivations.

It is difficult to compare states with respect to the proportion of social expenditures allocated to nutrition, as classifications differ – nutrition is part of social expenditure in some states, while in others it may be included within 'rural development' or 'welfare'.

Money allocated to the social services sector – which includes services such as education, health, water supply, housing, welfare, information and publicity, social security, etc – has shown a steady increase over the past several years in both the States; with the share of social expenditure in the total budget ranging from 20–35%. For instance, in the year 1985–86 the social service sector spent about 35% of the total state's budget of Rs. 10112 million in Tamil Nadu and over 28% of the State's total budget of Rs. 9422 million in Andhra Pradesh. In Tamil Nadu, nutrition was clubbed with social welfare programmes, while in Andhra its expenditure was shown separately. The combined budget of social welfare and nutrition in Tamil Nadu was 29.4% of the social sector's budget (i.e. about 10% of the total budget). In Andhra Pradesh during 1985–86 the combined spending on nutrition and Social Welfare was 6.38 (0.04 nutrition plus 6.34 Social Welfare) of the State's total budget. Notwithstanding the difficulties in arriving at the expenditure on exclusive nutrition programmes, the fact that the per capita expenditure on health, social sector and education has increased over the years, suggests some increasing attention to the problems connected to nutrition and its correlates by the Governments (see, for example, Figure 8).

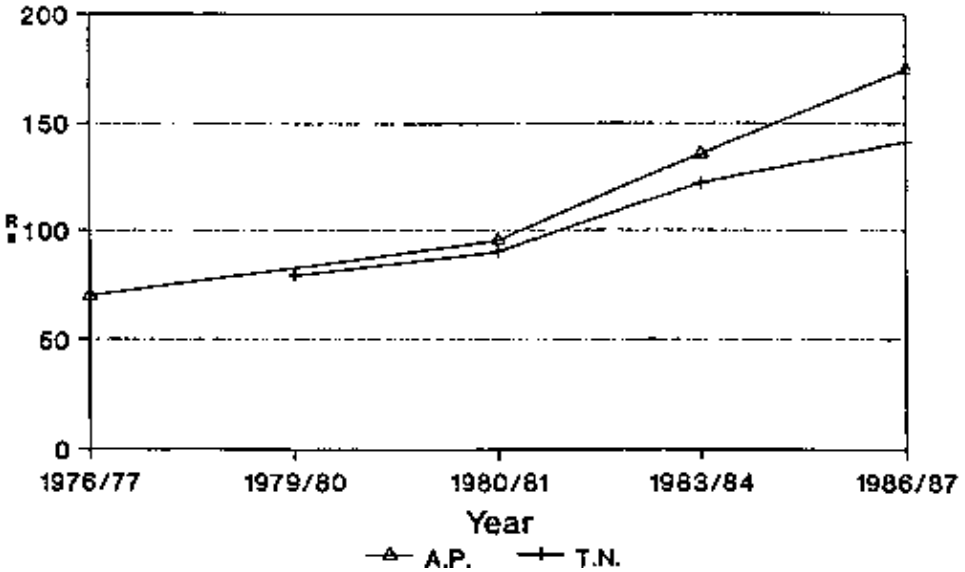


Figure 8. EXPENDITURE ON SOCIAL SERVICES – Per capita (at 1980–81 prices)

Source: RBI Bulletins

NUTRITION–RELEVANT ACTIONS

I – DIRECT NUTRITION INTERVENTIONS

Direct nutrition interventions currently operational in the states of Andhra Pradesh and Tamil Nadu are summarized in Tables 2 and 3 (objectives, components, beneficiaries, coverage and costs). The following sections discuss the design and implementation of each of these programmes in some detail.

A – The Integrated Child Development Services Scheme (ICDS)

The ICDS is probably the largest programme of its kind in the world. It aims to achieve four objectives:

i) to improve the health and nutrition status of children 0–6 years by providing supplementary food to beneficiaries 300 days per year and by coordinating with state health departments to ensure delivery of required health inputs;

ii) to provide conditions necessary for child psychological and social development through early stimulation and education;

iii) to enhance the mother's ability to provide proper child care through health and nutrition education;

iv) to achieve effective coordination of policy and implementation among the various departments to promote child development.

ICDS delivers a package of services comprising supplementary nutrition, immunization, health check–ups, referral services, and health and nutrition education to children under 6 years of age, pregnant and nursing women, and pre–school education to children between 3 and 6 years of age. Thus it adopts a holistic approach to improved child development by reduced incidence of mortality, morbidity, malnutrition and school drop–outs. The integrated package of services offered under the ICDS addresses all three issues of concern i.e. care factors (through the education/information component), health, and to a lesser extent, household food security (through supplementary feeding). A detailed description of the ICDS is provided in Jennings *et al.* (1991).

Initiated in 1975 on an experimental basis in 33 blocks, ICDS now covers around 2200 out of a total of 5500 rural blocks in India. (Blocks have an average population of 110,000. While a majority (92% of "fully operational" projects in September 1991) of the ICDS projects in the country are sponsored/funded by the central Government of India (GOI), through the Department of Women and Child Development (WCD) in the Human Resources Development Ministry, some of the states have initiated state–sponsored ICDS projects. The GOI and the states share ICDS costs. The GOI provides training and operating costs including salaries, equipment, supplies, play materials, petrol and oil expenses, and medical kits, estimated at Rs. 0.9 million per block–year. State governments meet the costs of supplementary food, currently estimated at around Rs. 1.7 million per block–year. As of September 1991, Andhra Pradesh had a total of 141 "fully operational" ICDS projects – 132 centrally sponsored and 9 state–sponsored projects – covering a population base of about 14 million. Corresponding figures for Tamil Nadu are 81 (all sponsored by the central government) and a population of about 8 million.

Table 4 summarizes the implementation of ICDS in Andhra and Tamil Nadu with reference to national averages. Using the percent of projects operational to those sanctioned as an indicator of the state government's commitment to ICDS, Andhra Pradesh has a distinct advantage over Tamil Nadu, as well as over the national average. However, both Tamil Nadu and Andhra Pradesh fall much below the commitment level exhibited by other states such as Gujarat (96%), Karnataka (95%), Haryana (98%), and even Madhya Pradesh (95%). Quality of implementation, as assessed by percent functionaries (*anganwadi* workers or AWWs) appointed and trained, is superior in Tamil Nadu as compared with both Andhra Pradesh and the national average.

The GOI has followed a gradual ICDS expansion policy, based on two kinds of targeting: first to the most disadvantaged areas and, second, within them to vulnerable pre–school children and pregnant and nursing women. The initial geographic focus was on tribal, drought–prone areas and blocks with a significant proportion of scheduled caste population. The programme is also targeted towards malnourished children, but in practice most beneficiaries of supplementary feeding are not selected through nutritional screening. Selection criteria generally depend upon a combination of individual worker's perceptions of which are the poorest households and overall quotas which the Central and individual state governments set for supplementation. Thus there tends to be more area than individual targeting in ICDS.

According to estimates[2], Andhra Pradesh and Tamil Nadu have about 2.64 and 2.40 million poor preschool children respectively. ICDS covers about 1.03 million children in Andhra and 0.44 million children in Tamil Nadu[3]. These figures indicate that even with perfect targeting to the poor households (using poverty as a criterion), ICDS could cover only about 39% of the needy children in Andhra and 18% in Tamil Nadu. Corresponding figures for the country as a whole are close to 50.6%.

[2]. Total population in the two states is estimated at 63.3 and 55.6 million in the 1991 census. According to the Planning Commission, poverty incidence (1987–88) is 31.61% in AP and 32.80% in TN yielding an estimated 20.0 and 18.2 million poor people in the two states respectively. Assuming that preschoolers constitute 13.2% of the total population, this works out to 2.64 million poor children in AP and 2.40 million in TN.

[3]. The Department of Women and Child Welfare reports that in September 1991, 0.90 million children in Andhra Pradesh and 0.41 million preschoolers in Tamil Nadu were covered under the ICDS. After adjusting for the number of centres reporting (87.2% in AP and 92.6% in TN), the numbers of children covered is estimated at 1.03 and 0.44 million respectively for the two states.

Using, on the other hand, Gomez nutritional criteria to identify the 'needy', the two states have about 51.8% and 50.0% "severe/moderately underweight" children (NIN, 1991) i.e. 4.33 and 3.67 million preschoolers in the two states respectively and 58.4 million preschoolers in India. Clearly, even if the ICDS is extended to cover all the needy children at an aggregate level (as proposed by the government), it is unlikely to be able to meet the 'need', the situation being further aggravated by the reality of inadequate area and beneficiary targeting.

TABLE – 2
MAJOR NUTRITION RELEVANT ACTIONS IN ANDHRA PRADESH AND TAMIL NADU

	Beneficiary groups covered	

Program	Implementing agency (s)	Preschool children	Women	School–children	Others	STRATEGY/OBJECTIVES
DIRECT NUTRITION INTERVENTIONS						
1. Integrated Child (ICDS) Development Services	Women and Child Welfare	0–6 Years	Pregnant and lactating women			Reduce child–malnutr. through integrated nutrition/health/preschool education inputs
2. Mid–Day Meals Program (MDM)	Education			2–14 Yrs		Reduce malnutr & increase school attendance through supplementary feeding in schools
3. Tamil Nadu Integrated Nutrition Program (TINP)	Dept. Social Welfare	6–36 Months	Pregnant & lactating women			Reduce malnutr. through integrated nutr/health & strong growth–monitoring & IEC inputs
4. Vitamin A Prophylaxis Program	Health and Family Welfare	1–5 years				Reduction of Vit A def through oral mega–dosing
5. Nutritional Anemia Prophylaxis Prog	Health and Family Welfare	1–6 Years	Preg. & lact. women		Sterilized women	Reduction of anemia through iron/folic acid supplements
6. Goitre Control program	Civil Supplies				Gen. population	Iodized salt distribution to reduce IDD
7. Mobile Food & Nutr. Extension Education	Food and Nutrition Board				Women	Nutrition/health education to improve dietary practices
HEALTH INTERVENTIONS						
1. Expanded program of Immunization (EPI)	Health and Family Welfare	0–6 Years	Preg. Women			Morbidity reduction through immunization
2. Diarrhoeal Disease Control Program (CDD)	Health	0–6 years				Diarrhea–control through ORT & education
3. School Health Services	Health and Family Welfare			6 – 14 yrs.		Provision of improved health facilities
4. Maternal & Child Hlth Program (MCH)	Health & Family Welfare	–	Pregnant women			Provision of improved MCH facilities to reduce IMR & MMR

TABLE 3

COVERAGE AND COSTS OF MAJOR NUTRITION–RELEVANT ACTIONS IN ANDHRA PRADESH & TAMIL NADU

INTERVENTION	ANDHRA PRADESH		TAMIL NADU	
	COVERAGE	ANNUAL OUTLAY	COVERAGE	ANNUAL OUTLAY
1. ICDS	0.402 Mill 0–3 Yrs* 0.501 Mill 3–6 Yrs* 0.194 Mill Preg/Lact*		0.1 85 Million 0–3 Yrs* 0.223 Million 3–6 Yrs* 0.077 Mill. Preg/Lact.*	
2. MDM	NA (Discontinued in 1985)		1.8 Million Preschoolers 6.4 Million School children	1950 Million Rs (1989–90)
3. TINP	NA	NA	0.64 Mill 6–36 Mon children (1988) 0.26 Mill Preg/Lact women (1988)	130.6 Million Rs (1988–89)# (984.5 Million Rs for 1980–89 #)
4. VIT. A PROPH	1.1356 Million$		I Dose: 0.32 Mill (1987–88) II Dose: 0.373 Mill (1987–88)	
5. ANEMIA PROPH	1.635 Million children$ 1.479 Million women$		0.2427 Million Children 0.1281 Million Preg Women	
6. GOITRE CONTROL			None	
7. F & N Extn Edu.			NA	NA
HEALTH:				
1. EPI/UIP	$1.64 Mill DPT, 1.45 Mill Measles, 1.70 Mill BCG, 1.64 Mill OPV, 1.08 Mill DT, 1.06 Mill Tetanus children 1.78 Mill Tetanus pregnant women		1.03 Million Tetanus, 1.14 Mill DPT, 1.14 Mill Polio, 0.826 Mill BCG & 0.86 Mill Measles	6.493 Million Rs (1988–89)
2. CDD			NA	2.286 Million Rs (1988–89)
3. School Hlth.			0.69 Million Children	7.13 Million Rs
4. MCH			0.714 Million Mothers regd 0.410 Million deliveries	8.787 Million Rs (1986)

SOURCES:

i) Data for Tamil Nadu extracted from: Children and women in Tamil Nadu, A situational analysis, 1990, UNICEF.

ii) * Extracted from Dept. Of Women & Child Dev. Status Report on ICDS, Sep 1991.

iii) * From Shekar, 1992.

iv) $ Communication from Directorate of Health & Family Welfare, Govt of Andhra Pradesh, 1992 (Data for 1990–91).

Despite a large volume of research on ICDS, uneven research quality and/or design, non–representative samples and inadequate data–treatment do not allow for valid generalizations about programme impact.

Recent evaluations of the ICDS at a national scale (NFI, 1988) have been critical of its implementation. This study, which covered 386 ICDS centres in 16 states reported among other deficiencies, irregular supply of food at ICDS centres resulting in irregular feeding, inappropriate growth monitoring and health & nutrition education, and inadequate supervision and linkages with health workers. It also alludes to a lack of active community participation because of an inadequate sense of programme ownership among the beneficiary population.

Several other unpublished studies that have examined the issue of community involvement reinforce this (Agarwal & Lata; Gandhi; Paranjpe & Bhagwat; Kumar, Prakash & Lal; Dev *&* Lal; Sharma & Chand: all quoted in Punhani & Mahajan, 1989). The only form of community contribution noted is in terms of buildings for village centres, a trend relatively more typical in rural than in urban or tribal areas. Community involvement could be strengthened through more regular home visits by the AW. The task of eliciting community participation is admittedly difficult in villages stratified by social barriers and economic differentials; therefore, health and nutrition activities are rarely conducted in women's working groups, which were envisaged as a major vehicle for community participation.

There is considerable variability not only in ICDS impact but also in the quality of services provided. Both training and supervision can play an important role in quality assurance. In particular, four training areas are highlighted in evaluations as requiring strengthening: i) there is considerable unevenness in the training imparted by over 200 centres spread all over the country; ii) despite good training manuals, the training syllabus and materials need to be adapted to suit differing rural, urban and tribal conditions; iii) supervisory training is very weak. Consequently, although many supervisors are aware of ICDS deficiencies in their sector, vigorous actions to remedy the situation through more frequent and more extended visits to AWs are not undertaken. The need to supervise a large number of AWs and inadequate mobility also limit their attention to quality issues; iv) existing funding places inadequate emphasis on in–service training of all categories of functionaries.

ICDS sets feeding quotas per block which usually are fully subscribed. Most AW nutritional screening is to identify severely underweight children, who are entitled to food supplementation but because of listlessness and lack of appetite rarely can consume a double ration. Once enrolled, most child beneficiaries continue to receive food regardless of nutritional status until they reach school age. ICDS maintains with some justification that in locales where poverty levels approach 75%, such as many tribal blocks, virtually all pre–school children are at nutritional risk and warrant continued supplementation. However, the cost–effectiveness argument for area targeting rather than individual nutrition screening is weaker in ICDS blocks where poverty levels are substantially lower.

The present supplementation system has other drawbacks. Once a feeding quota is filled, the AWW has little incentive to seek out additional malnourished children for other AW services. Area targeting thus tends to reduce the emphasis on monitoring individual child growth and can detract from worker focus on case management of malnourished children through health check–ups and referral. Evaluations have indicated that long–term supplementation may substitute for food which the child otherwise would receive at home and thus run counter to the development of maternal understanding of the special needs of malnourished children and improved family food behaviour. On the other hand, although the direct impact of the present feeding programme on child nutrition may be less than desirable, it may induce mothers and children to come to AWs (NFI 1988).

Given the documented inadequacies in programme implementation, monitoring and supervision, the likelihood of a favourable impact is small. Further, the studies that do suggest an improvement in nutritional status (such as Tandon, 1983 *&* 1984 and the Punhani & Mahajan, 1989 review of several studies) are based on pre–post designs which fail to account for improvements in nutritional status that may be attributable to factors other than ICDS programme inputs such as secular/temporal trends, changes in socio–economic conditions, and impact of programmes other than ICDS. Where non–ICDS control groups are used, little attention is paid to the comparability of the two groups, and corrections for non–comparability (such as differences in socio–economic status) are not accounted–for in research design or appropriate statistical analyses. Furthermore, none of the evaluation studies reported were double–blind studies, thus leaving the results open to observer bias. The NFI study (1988) suggests a possible reduction in severe underweight prevalence rates in almost all states, an increase in the 'percent normal' in Tamil Nadu and Haryana, and a decrease in the 'percent normal' in Andhra Pradesh, Jammu & Kashmir and Karnataka among ICDS beneficiaries between 1981 and 1986. Nevertheless, the study cautions that the apparent improvement may be an artefact of the change in the populations captured by the ICDS, rather than an improvement in the nutritional status of beneficiaries – an argument, which if tenable, negates the 'observed impact' of all the before–after studies mentioned above.

The most recent (July 1992) national evaluation of the ICDS reports that “minor differences were noticed in the nutritional status of children from ICDS and non–ICDS areas” among under–three year old children suggesting minimal impact on nutritional status. The impact among older children (3–6 years) is reported to be “more prominent”, but no statistical tests are reported to support this hypothesis. Further, impact is reported to be highest in urban areas followed by rural and tribal areas. However, the study states that “...it may be noted that ICDS areas continued to have a large percentage of malnourished children”. The numbers “malnourished” are: 64.5% 0–3 year olds and 64.1% 3–6 year olds in ICDS areas as compared with 68.9% 0–3 year olds and 70.7% 3–6 year olds in non–ICDS areas (all classifications based on the Indian Academy of Paediatrics (LAP) classification which is a modification of the Harvard classification).

Subbarao (1989) has reviewed evidence from several sources to arrive at two cogent conclusions – first that available evidence cannot measure ICDS impact accurately, and second, that there is enormous inter–project (and therefore inter–state) variation in impact which is not apparent in aggregate analyses.

District–wise ICDS coverage data from Andhra Pradesh indicate totally inadequate targeting in relation to poverty criteria (Figure 9). The Pearsons correlation coefficient for percent of households below the poverty line in 1987/88 and the percent (of total eligible) beneficiaries covered under ICDS is –0.68 $p < 0.001$; the Spearman rank correlation being similar at –0.67. Thus, ICDS coverage (area targeting) seems to be in inverse proportion with ‘need’ as identified by poverty criteria. Unfortunately, anthropometric data are available only for the eight NNMB–monitored of the twenty two districts. For these eight districts, the correlation between underweight prevalences and ICDS coverage is relatively high (Pearsons $r = +0.59$; Spearman’s rank order correlation = +0.43). It seems probable that the “sentinel districts” selected by the NNMB for nutrition monitoring may have been selectively picked up for ICDS implementation. This review concludes that ICDS *may* have contributed to some improvement in the nutritional profile of young children, but in the absence of convincing data on such impact, conclusions must remain tentative.

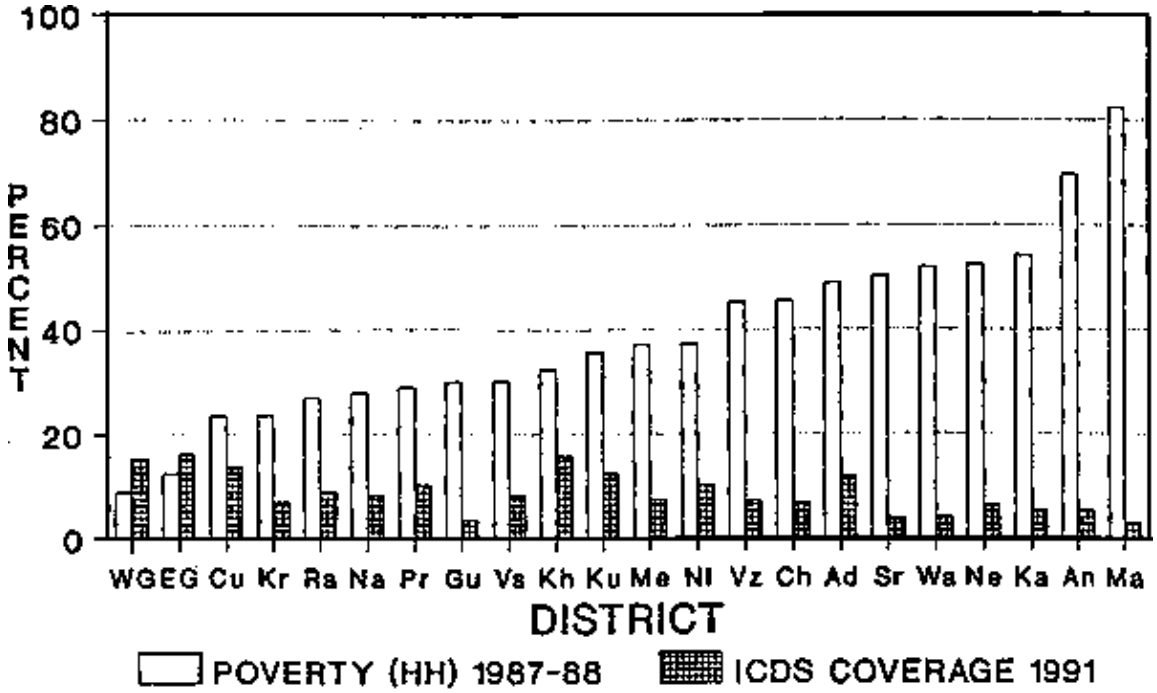


Figure 9. ICDS AND POVERTY – AREA TARGETING IN A.P.

By and large though, the basic design of the ICDS is sound in as much as it is designed to target the most vulnerable groups. Nevertheless, a greater emphasis (in both design and implementation) on the younger 0–3 year age group will help tighten access of ICDS services to those most needy. Where ICDS needs major reorientation is in beneficiary and area targeting (to better match poverty ratios and nutritional criteria where these are available on a reliable and regular basis), in area–specific planning and flexibility, and implementation quality issues such as training, supervision and support. If ICDS efforts could be better targeted to those most ‘nutritionally needy’, and if the delivery of care inputs (growth monitoring and information–education–communication) were to be strengthened, perhaps a much greater impact could be expected.

These efforts would need to be complemented with a greater flexibility in programme implementation to cater for local needs – a direction that would also facilitate the much–needed sense of community involvement and

empowerment. Such flexibility at the grass–roots level could be introduced through several innovations.

For example, ICDS workers should spend more time in the community before starting a new ICDS project/centre. This time should be spent in identifying location/village–specific problems that could be addressed by the ICDS functionaries, in collaboration with and with the active participation of local leaders. Innovative techniques such as Participatory Rural Appraisal (PRA) could be used during this mutual–familiarization process. A small discretionary fund could be made available for actions to be initiated as a response to the "familiarization exercise". For example, if the PRA exercise in a village suggests that the most pressing need is water, ICDS workers should have the flexibility to respond to this need, perhaps even before any mention of nutritional concerns. Once some positive steps have been made in this direction (perhaps ICDS can coordinate with the relevant water department to solve the problem), then and only then should nutritional issues be introduced. Such an approach will help to make ICDS more relevant to local needs, help improve the credibility of the ICDS worker and the programme, and increase community participation. Operational research in this context is essential to test the feasibility of such approaches.

Tamil Nadu has recently introduced a new innovation – the ICDS programme in one rural district (Puddukottai) has been merged with the Noon Meals Programme. This ICDS–NMP merger has resulted in a two–worker ICDS model whereby one worker is responsible for nutrition and health activities, and the second one for the pre–school education activities. Specific evaluations of this new model are not yet available.

To sum up, ICDS has succeeded in reaching around 40% of rural India, mainly the poorest areas, an achievement in itself. ICDS is well–conceived: provision of an integrated package of health and nutrition services through village–based AWs has considerable potential for improving child nutrition and health in India, and promote early childhood development. However, available studies suggest that ICDS impact varies a great deal from block to block. Its training and supervision, health linkages, referral services, mother counselling and nutrition education, coverage of under–threes and degree of community participation all need to be strengthened for ICDS to achieve its full potential. The key issues to be addressed to improve the impact of ICDS on child development are how to ensure that (a) the whole range of ICDS services is provided to the targeted beneficiaries, particularly, under–threes and pregnant women, (b) nutrition supplementation does not become largely a substitute for a part of the home meal, (c) health and nutritional competence of the families is increased accompanied by better weaning and child feeding practices, and (d) coverage of necessary health services is increased, referrals for malnourished children and at–risk pregnant and nursing women are completed and severely underweight children are nutritionally rehabilitated.

B – The Tamil Nadu Integrated Nutrition Programme (TINP)

The Tamil Nadu Integrated Nutrition Project (TINP), a World Bank/IDA assisted health and nutrition intervention offers a package of health and nutrition services to young children and pregnant and lactating women in rural Tamil Nadu. The first TINP project has been followed up with a second generation TINP–II (unless otherwise specified subsequently TINP refers to TINP–I).

TABLE 4
IMPLEMENTATION OF ICDS IN ANDHRA PRADESH AND TAMIL NADU

	NO. PROJECTS		% STAFF APPOINTED			% STAFF TRAINED				COVERA
SANCTIONED	OPERATIONAL*	REPORTING*	TO SANCTIONED			TO APPOINTED			TOTAL	CHILDR
			CDPO	SUP	AWW	CDPO	SUP.	AWW	POP$ (Mill)	(0–6 yr (Millions)
ANDHRA PRADESH 169	141 (83.4% of sanctioned)	123 (87.2% of operational)	47	45	64	71	74	82	14 (21.1%)	0.90

TAMIL NADU 111	81 (73.0% of sanctioned)	75 (92.6 of operational)	56	63	61	94	80	74	8 (14.4%)	0.41	0
INDIA 2424	1962 (91.8% of sanctioned)	1986 (83.0 of operational)	55	59	71	80	86	71	242 (28.7%)	12.9	

Notes:

1. # Figures in parentheses are percentages to total as per 1991 census.

2. * Refers to “Fully operational” projects and “Projects reporting” respectively as reported by Dept. of Women & Child Welfare.

3. $ Estimated approximately @100,000 population for each project sanctioned.

4. Performance figures pertain to the projects reporting, and not to total operational projects and will therefore need to be scaled upwards by the % reporting.

5. State and Centre sponsored projects are clubbed together in this table.

6. CDPO is Child Development Project Officer, SUP. is Supervisor and AWW is anganwadi worker...functionaries of the ICDS scheme.

Source: Computed from Dept. Of Women & Child Welfare, Status Reports on ICDS, Sep 30 1991.

TABLE 5

IMPACT OF THE TAMIL NADU INTEGRATED NUTRITION PROJECT

MEAN WEIGHTS OF BENEFICIARY CHILDREN: NOV 1980 VERSUS NOV 1986

AGE	**NOV’80**			**NOV’86**			**DIFFERENCE**	**P value***
(Months)	**MEAN WT.** (Gm)	**STD.DEV.**	**N**	**MEAN WT.** (Gm)	**STD. DEV.**	**N**	**NOV’ 86 – NOV 80** (Gm)	
6	5157.5	1065.8	20	5915.1	616.6	83	757.6	.006**
7	5884.6	1124.0	76	6178.2	601.5	71	293.6	.049*
8	6179.4	1431.8	27	6516.5	806.1	85	337.0	.252
9	6239.5	1146.4	76	6772.0	764.5	75	532.2	.001**
10	6271.4	1106.8	29	6722.2	858.5	54	450.8	.063
11	6596.9	975.6	48	7208.2	936.4	73	611.3	.001**
12	6905.8	1021.3	39	7297.9	752.3	73	392.2	.039*
13	6982.0	1065.5	82	7434.1	1019.5	64	452.0	.010**
14	7159.5	1113.6	21	7569.4	851.0	80	409.8	.128
15	7082.4	1104.2	202	7900.5	970.3	94	818.1	.000**
16	7198.4	1327.0	16	7717.6	891.0	91	519.1	.150

17	7302.9	573.5	17	7971.0	1268.1	69	668.1	.002**
18	7452.2	1250.0	46	8101.3	1105.6	76	649.1	.005**
19	7796.4	1459.6	56	8228.6	994.5	84	432.1	.056
20	7440.9	661.4	11	8486.3	901.3	51	1045.4	.000**
21	7934.1	1119.5	210	8550.8	886.9	63	616.6	.000**
22	8126.9	1239.7	13	8548.6	923.7	69	421.6	.262
23	7543.7	1084.1	8	8608.2	996.0	73	1064.5	.028*
24	8188.9	881.0	9	8852.6	1008.6	76	663.7	.060
25	8548.6	1312.4	93	9031.0	1220.3	71	482.3	.016*
26	8947.1	1388.7	17	8893.8	1142.8	81	–53.2	.884
27	9003.3	1181.1	289	9167.8	875.0	107	164.5	.134
28	10061.9	1312.6	21	9460.0	1087.6	115	–607.9	.059
29	9390.9	1250.1	22	9689.9	1094.9	99	299.0	.308
30	10083.3	1712.8	24	10022.4	1074.2	105	–60.9	.869
31	9496.9	1373.5	65	9927.4	953.8	93	430.5	.031*
32	9980.0	1066.3	5	10124.7	1062.4	81	144.7	.781
33	10148.5	1355.0	185	10114.1	1110.7	64	–34.5	.840
34	10967.9	1336.2	53	10568.5	1106.2	73	–399.4	.078
35	9930.9	1958.3	36	10651.9	1080.3	53	721.0	.056
36	10768.1	1513.8	51	10389.5	1091.3	36	–378.6	.164

* Differences significant at p <.05
** Differences significant at p <.01

SOURCE: Shekar, 1992.

TINP–I was targeted at 6–36 month old children, and pregnant and lactating women. Project activities were started in October 1980 in one pilot block, and extended gradually to cover 177 out of a total of 385 rural blocks in the state, by 1989/90. Of these, 31 rural blocks have been subsequently converted to ICDS, so that a total of 146 blocks are covered by TINP–I. Area–targeting was attempted inasmuch as the poorest districts not covered by ICDS were selected for preferential coverage under TINP–I. Universal growth monitoring and promotion, well–targeted selective short–term supplementary feeding complemented with a strong information–education–communication component, are among the critical/unique design features of this programme. As with ICDS, a detailed description of TINP–I is provided in Jennings *et al.* (1991). TINP's main goals were:

– to halve malnutrition among children under four years of age;
– to reduce infant mortality by 25%;
– to reduce vitamin A deficiency in the under fives from about 27% to about 5%; and
– to reduce anaemia in pregnant and nursing women from about 55% to about 20%.

The project had four major components: nutrition services, health services, communications, and monitoring and evaluation. The main project strategies were to provide nutrition education and primary health care to pregnant and lactating women and children 6–36 months; to monitor the growth of children in this age group through monthly weighing and growth charting; and to provide supplementary feeding and health checks to children with faltering growth, as well as intensive counselling to their mothers. To provide these services, nutrition centres staffed by part–time women community nutrition workers were set up in about 9000 villages. These were to be assisted by local women's groups created under the project and strengthened health

outreach and referral services.

Official evaluations of the TINP (Govt. of Tamil Nadu, 1989) have suggested a favourable impact of the programme on nutritional status of beneficiaries. The order of impact attributed to TINP is between one–third to a half reduction in prevalence of severe malnutrition among 6–24 month olds, and a reduction of about 50% in severe malnutrition among 6–60 month olds. However, data and analyses to support this claim are weak. A recent assessment by Shekar (1991) provides more convincing evidence for programme impact. The study shows a statistically significant improvement in nutritional status of programme beneficiaries over time of implementation of the programme. Further, as evident in Table 5 the nutritional impact is more pronounced among children less than 24 months of age – precisely the age that needs to be targeted on the basis of "nutritional need". Plausibility analyses (Shekar 1991) add to the conviction that the observed improvement in weights of young children can be attributed to TINP inputs rather than to competing explanations such as secular trends and overlap of beneficiaries with the Noon Meal Programme. Recent unpublished data from the NNMB (NIN 1991b) which show a greater improvement in nutritional status of young children in TINP versus non–TINP areas lend further credibility to the conclusions of a favourable impact (see Table 6).

Table 6: Changes in Percentage of Under–Five Children Below 75% NCHS weight–for–age, between 1979 and 1990 in TINP and non–TINP districts of Tamil Nadu

District	***1979***	***1990***	***Difference***
TINP			
Chengulpet	66.2	48.5	17.7
Ramanathapuram	70.5	58.7	11.8
Tirunelveli	67.6	48.3	19.3
N. Arcot	64.1	55.0	9.1
Madurai	70.2	48.6	21.6
Non–TINP			
The Nilgiris	67.4	58.7	8.7
Thanjavur	62.4	59.5	2.9
Kanyakumari	56.5	44.2	12.3

Source: NIN 1991b

Several design and implementation features of the programme are surmised to have contributed to the success of TINP (Shekar 1991). Among the design features, most noteworthy are the targeting (by both area and beneficiary), a strong information–education–communication component, a well–designed monitoring and information system, and adequate attention to grass–root worker and supervisor workloads. In programme implementation, due attention was given to recruitment of workers, modalities of worker–supervisor interaction, and choice of food supplement. Further, the programme is characterised by strong accountability both within the project because of the emphasis on monitoring, as well as accountability to the donor agency.

The weakest component of the TINP has been its efforts at eliciting community participation (Shrimpton, 1989) – most likely a consequence of the top–down approach in programme implementation, still a characteristic of most development programmes in India.

Also, the project failed to reach its health goals. Although infant mortality declined by 12 to 26 percent in different areas of the project, similar declines also occurred in non–project areas. Just under a quarter of all eligible children received full doses of vitamin A, while 28% of children had not received even one. Half of all eligible pregnant women had not received anaemia prophylaxis.

TINP demonstrates that it is possible to reach a high proportion of younger children who are nutritionally the most vulnerable, and significantly to reduce the prevalence of severely underweight children through well targeted health and nutrition services aided by communication and community mobilization activities. While it did not achieve all of its goals, the project has an unusual number of lessons for the design and

implementation of outreach programmes, particularly in the area of training, supervision and monitoring. Key features include carefully defined recruitment criteria for local workers; limiting field worker tasks to those which are manageable and high priority; specification of daily and monthly work routines; decentralized training systems; supervisory practices which facilitate on the job training; the use of local women's groups to support project activities; the display of performance information to clients and workers at the village nutrition centre; and a management information system which could rapidly detect performers falling below established norms. On the health side, the main lesson is that large scale investment in health infrastructure and supplies is not sufficient to improve performance. Complementary software measures are needed to optimize health workers' performance. With a few design changes in the supplementation criteria, and more focus on maternal nutrition and improved health–nutrition coordination, it may be possible to reduce the prevalence of the moderately (grade II) underweight, resulting in a greater proportion of children in normal and grade I category.

Comparison between ICDS and TINP is difficult; ICDS covers children under six years of age and includes pre–school education whereas TINP focuses on children under three with nutrition and health services only. But several of the observed deficiencies of ICDS – the relative failure to reach under threes, the poor health and nutrition education, and the neglect of home visits and community participation – can be remedied using systems similar to those in TINP.

Costs per beneficiary (omitting pre–school education, and hence comparable) in TINP have been estimated to be close to half those incurred in the ICDS (Dapice 1986, quoted in Berg 1987, p124). The total financial outlay in 1988–89 for TINP was over Rs 130 million with a beneficiary coverage of 0.64 million children in the 6–36 month age group and 0.24 million pregnant and lactating women averaging about Rs 145 per beneficiary per annum. Berg (1987) mentions a cost per beneficiary of US$ 9.41 for 1984–85, with about 30% of the expenditure on food and the remaining 70% on other recurrent costs.

Given the features of TINP design and implementation discussed above, and the documented evidence for impact, it is concluded that the TINP was successful in reducing nutritional deprivation among young children in Tamil Nadu. A major part of this impact is likely to have occurred via improved 'care' factors, complemented by some improvement in access to health facilities. This beneficial effect could, nevertheless, be amplified by strengthening community–involvement in the programme.

TINP–II

TINP–II is designed to cover, in a phased manner, 316 of the total 385 rural blocks in Tamil Nadu, with an estimated total population of 32.8 million. The target group has been extended to encompass young children from birth until six years of age (as against 6–36 month old children in TINP–I). Furthermore, in recognition of the duplication (geographic and age–group) of the services of TINP–I and the Noon–Meal Programme, TINP–II has planned for a merging of TINP and NMP centres, to promote complementarity. TINP–II centres are being opened in select non–TINP–I areas, while existing TINP–I centres are simultaneously being converted to TINP–II centres. TINP blocks will be converted to ICDS depending on governmental allocations for ICDS. A total of 9194 Community Nutrition Centres currently function under TINP–II, covering 98 new blocks, over and above the 177 TINP–I blocks. An additional 5257 centres are to be opened in the coming phases. An IDA loan of US $ 95.8 million spread over an eight year project implementation period (1991–98) has been approved for the second Tamil Nadu Nutrition Project. The specific objectives of TINP–II include:

- reduction of severe malnutrition among 0–36 month old children by 50% in new project areas, and 25% in TINP–I areas;

- increasing the proportion of children classified as "normal" by 50% in new and 35% in TINP–I areas;

- contribute to a reduction in infant mortality to 55 per thousand live births;

- contribute to a 50% reduction in incidence of low birth weights.

Several design features distinguish TINP–II from the first generation TINP–I. These include:

- the target age group is 0–60 months (as against 6–36 months);

– the addition of pre–school education under TINP–II;

– the merger of TINP with NMP, so that two field–level workers will be present at each TINP–II centre. The first will be a TINP designated worker, essentially catering to the health and nutritional needs of beneficiaries, while the second worker will be responsible for pre–school education activities;

– changes in selection criteria for supplementary feeding, thus diluting the relatively tight beneficiary targeting for feeding that was successfully implemented in TINP–I;

– greater emphasis on the communications component, with special attention to developing and operationalizing a specific communications strategy;

– greater emphasis on health service delivery, including the referral system, and structural changes to facilitate this;

– strong emphasis on coordination between health and nutrition service delivery;

– increased outreach and coverage of beneficiaries;

– changes in the training plan to cater to the new programme design.

The new TINP–II design thus includes preschool education, and is less selective in identifying beneficiaries for supplementary feeding. Both features bring the TINP design closer to that of the ICDS. Furthermore, the field–worker: supervisor ratio has also been reduced (from 10:1 in TINP–I to 15:1 in TINP–II) making it akin to the 20:1 ratio followed in the ICDS. There are some indications that much of the uniqueness of TINP design is being lost in this apparent shift towards the ICDS.

Worker training seems to be lagging behind TINP–II phasing–in, so that in many of the newer project areas, the essence of TINP–I is missing. Without the planned training, there are several anomalies relating to the duties of the NMP worker and the TINP worker who have simply been instructed to function from one centre. The two workers are not clear about the demarcation of duties, and/or the changes in the objectives or design of the TINP. The coming years will unfold the actual fate of TINP–II.

C – The Midday Meals Programme

The Midday Meal Programme (MDM) or school lunch programme operating in some of the states in India has a dual objective of improving nutritional status and school attendance concurrently. A small nutrition education component is also supposed to be included, but is rarely implemented. Beneficiaries are provided with one meal, which supplies about one–third of the daily requirement of energy and protein, either at school or at preschool centres.

Tamil Nadu has a massive school lunch programme commonly referred to as the “Chief Minister’s Noon Meal Programme” (NMP). The NMP emerged as a populist scheme with little attention to prioritization of resources. Children between the ages of 2–14 years are fed daily through 63,000 NMP centres, under the scheme at an expense of Rs 0.44 – 0.90 per beneficiary, and a total cost of Rs 2200 million (in 1984 i.e. about 10% of the state’s budget and 20% of its annual expenditure in the sixth five year plan). Expenditures in the seventh plan (1985–90) were estimated at about 1750 million Rs per annum and the coverage is estimated at 6.4 million school children in addition to 1.8 million preschoolers – an average expenditure of Rs 213 per beneficiary per annum. UNICEF (1990) reports an outlay of Rs 1950 million for 1989–90.

While some efforts have been made to evaluate and assert the positive nutritional impact of the scheme (Devdas 1987), the results do not stand up to scientific scrutiny. Several lacunae in the design of the programme point towards the unlikelihood of any significant impact on nutrition. The programme caters only to school children thereby excluding the poorest who cannot attend school, and the target age group does not include the most vulnerable 0–2 year olds. Two other counter arguments are relevant here. First, much of the grain resources for the NMP come from those diverted from the Public Distribution System, and often the rural works programmes (discussed in later sections), thus potentially reducing the poor’s access to food through the PDS. This may also be associated with the fact that the meal provided at school often becomes a substitute rather than a supplement. Second, a major part of the revenue for the programme was generated

by the state government from liquor revenues – a not so desirable promotion for the liquor industry in Tamil Nadu. Harriss (1991) concludes from a case study that "the scheme reaches the poor, but not all poor, probably not the poorest, and not only the poorest children."

Andhra Pradesh's flirtation with a midday meals programme (MDM), as with other states, was short–lived. This programme was initially introduced in a few deprived areas in 1980, was extended by the then new state government to cover all school children in Andhra in grades one to five in 1982–83. Expenditure on the programme rose from Rs 3.1 million in 1981–82 to 292.4 million in 1982–83 accounting for nearly 97% of the total direct expenditure on nutrition support in that year. In 1983–84, total expenditure on the midday meals programme and PDS together in Andhra Pradesh added up to over 12% of the annual plan outlay (Subbarao, 1989) – a level of expenditure that could not be sustained. The MDM, initiated as a populist political gesture, without adequate prioritization and policy formulation, was consequently withdrawn in 1985.

The nutritional benefits of the MDM in Andhra have not been evaluated, but given that the scheme was untargeted, and, as in the case of Tamil Nadu, that it would have diverted food grain from PDS and rural works programmes, and severely constrained the state budget, the sum *toto* benefits are likely to have been minimal, if any. In conclusion, the chances of the NMP having any nutritional impact are negated by the following:

– there is no targeting so that "all children between the ages of 2–14" attending balwadis/schools are covered. Clearly the opportunity costs of reaching the most needy (also the ones most likely to show a nutritional impact), are extremely high;

– only children attending balwadis/schools are covered by the programme. But the most needy group is least likely to be found in balwadis/schools, so that this strategy in fact purposively excludes the most needy;

– the food given in the school/balwadi is given as a substitute rather than as a supplement to the home meal;

– the costs per beneficiary of NMP are nearly double those of comparable programmes.

Recent press releases by the government of Tamil Nadu mention a proposal for extending coverage to children from six months of age onwards, as well as pregnant women (The Times of India, 1992). As described above, there are now plans for merging the NMP with the TINP–II. While this may improve the NMP, it is not clear yet whether resources could not be more effectively used in improving and expanding the ICDS and/or the original TINP.

Other feeding programmes operational in India at various times include the Balwadi Nutrition programme, the Creche Nutrition Programme, and the Special Nutrition Programme. These together make a negligible contribution to state–level figures owing to coverage of small population groups.

D – Vitamin A Prophylaxis Programme

Prevalence of mild vitamin A deficiency in the world ranges between 20–40 million cases at any one time, nearly a half of which is in India. Other sources (Ministry of Health and Family Welfare, undated) report a 5–7% prevalence of "eye–signs" of vitamin A deficiency among children in India, while NNMB (NIN 1991) (which covered eight states in the country) reports a 0.7% incidence of Bitot's spots among children in 1988–90, the figures being 1.0% for Andhra Pradesh and 0.6% for Tamil Nadu. WHO'S cut–off for identifying a public health problem is 0.5% thus identifying both states as vitamin A deficient.

The Government of India has initiated a two–pronged approach to combat vitamin A deficiency in India:

i) *Fortification of vegetable oils.* It is mandatory by law for all vegetable oils marketed in India for human consumption, to be fortified to the level of 25 IU retinol per gram of oil. 60% of the vitamin A utilized in the country is used for fortification of vegetable oils or animal feeds. However, in view of the low level of consumption of vegetable oils by poorer/vulnerable sections, much of this fortification benefits the less vulnerable sections of the population.

ii) *The National Prophylaxis Programme for Prevention of Blindness due to Vitamin A Deficiency.* This was initiated by the government in 1970, to target children 1–5 years of age. A recent review of the situation in 1989 has led to the inclusion of 6–12 month old children with a single dose of 100,000 IU of retinol, linked with the Universal Immunization Programme (UIP). The prophylaxis programme comprises a long–term and a short–term strategy. While the short–term strategy focuses on administration of prophylactic mega–doses of vitamin A periodically, the long–term strategy aims to improve dietary intakes as the ultimate solution to the problem. The four major thrusts of the programme are:

– Promotion of regular consumption of dark–green leafy vegetables or yellow fruits and vegetables;

– Promotion of breast–feeding and colostrum to protect against vitamin A deficiency;

– Oral prophylactic doses of vitamin A as follows: one dose of 100,000 IU to infants 6–11 months, and six–monthly doses of 200,000 IU to children 6–60 months;

– Treatment of vitamin A–deficient cases by administrating: a single oral dose of 200,000 IU of vitamin A immediately at diagnosis, and a follow–up dose of 200,000 IU 1–4 weeks later.

By the fifth year, each child is expected to have received a total of nine oral mega doses of vitamin A under the national programme (although in frequent situations of limited availability of vitamin A, the unstated policy has been to preferentially target the 6–36 month child, and treat deficiencies in the older prescool children). For infants, it is proposed to use the 9–12 month contact for measles vaccine as the point for administration of the vitamin A supplement of 100,000 IU. This link with the UIP has been promoted by WHO as part of it's official policy.

The prophylaxis programme is implemented through Primary Health Centres and sub–centres. Prophylactic doses of vitamin A, (supplemented with nutrition advocacy) are administered by para–medical staff manning the PHC. In areas where the ICDS is in operation, vitamin A administration is conducted under the auspices of the ICDS. Records of administration of doses are kept in registers/weight cards/health cards maintained by ICDS functionaries. In Tamil Nadu, vitamin A prophylaxis (and nutrition education) is implemented through the ICDS and the TINP in areas where these programmes are operational. There has been a successful health education component of TINP directed to vitamin A prophylaxis.

Assessments by the Ministry of Health and Family Welfare (1988) claim that 85% of the target for vitamin A prophylaxis was met in 1987–88. However, these estimates of programme performance seem unrealistically optimistic especially in view of the limitations in supply and logistics of delivery of the prophylactic dose. Further, none of the assessments pertain to information/education/communication efforts. One programme review found a "low" level of awareness of the prophylaxis programme and it's benefits among health workers and the general public.

In Tamil Nadu, coverage in 1987–88 is reported at 0.32 million children for the first dose and 0.37 million children for the second bi–annual prophylactic dose (UNICEF, 1990). In Andhra Pradesh, coverage was reported at 0.37 million children in 1985 (Rao *et al,* 1988). More recent data (Govt of Andhra Pradesh 1992), estimate coverage in Andhra Pradesh at 1.14 million children i.e. about 14% of the total preschool population in the state.

E – Anaemia Prophylaxis Programme

Incidence of anaemia in India is high despite a near–adequate iron intake as discussed in Part I. Inadequate intake and absorption of dietary iron, and the high prevalence of parasitic infections are the primary causes of anaemia in India. The anaemia prophylaxis programme is targeted to young children and pregnant and lactating mothers through the health delivery system or ICDS/TINP. Coverage rates are low, compared to targets – about 1.64 million children and 1.48 million women in Andhra in 1990–91, and 0.24 million children and 0.13 million women in Tamil Nadu in 1987–88 (See Table 3). Other problems with the programme, recognised in the Ministry of Health and Family Welfare/UNICEF 1989 workshop report, included irregular and

short supply of iron tablets to distribution centres, inadequate training of health workers and awareness among beneficiaries (MOHFW/UNICEF 1989).

II – FOOD INTERVENTIONS

The Public Distribution System (PDS)

The PDS is the major food–subsidy/income transfer programme in the country, administered by the Ministry of Food and Agriculture. The per capita energy consumption of the lowest three deciles has been shown to be much below the recommended norms in all states, the situation being exaggerated in the chronically food deficit states, and having deteriorated over time between 1961 and 1983 as judged by results reported by the National Sample Survey Organization (Gupta 1987). (NSSO results are based on consumer expenditure patterns and not on food intake). This situation persists despite national food security. Inequitable access to food due to structural poverty, exacerbated by seasonal variations, underscore the need for an effective household food security system, based on targeted food distribution.

The PDS provides essential food grains (and sometimes other additional items), to poor households at subsidized rates. It is a three tiered network with the Food Corporation of India (FCI) as a national agency, wholesale at the State/District level, and Fair Price Shops (FPS) at the retail level. Regarding the middle level, each State has its own trading corporation, either working on its own account (e.g. Tamil Nadu) or acting as an agent of FCI (e.g. Andhra Pradesh). Allocations of subsidized food are made to the PDS by the central government, these allocations being boosted by the states' own efforts in procuring grain for the PDS. At all–India level, the Fair Price Shops increased from 48,000 in 1960 to about 350,000 in 1990, with increasing de–centralization, covering almost 85% of population. As the number of FPS increased substantially, the amount of food grain distributed through PDS also increased from 13 million tonnes in 1980 to 18 million tonnes in recent years.

The main objective of the PDS system is to make grain available according to need. A recent study however on the utilisation of the PDS by NSSO showed that 44% of the population depend on PDS for kerosene as opposed to only 14% for rice, for example (Sarvekshana 1990). A higher percent of rural than urban population purchase their requirements from sources other than PDS, implying the PDS is tilted more towards urban consumers. Non–availability of the items is one of the major reasons for not purchasing or part–purchasing. As reflected in Figure 10, ironically, the poorest states account for the smallest shares of PDS food supplies from the central government, while a disproportionately large share is allocated to relatively prosperous urban areas. In regions covered by the PDS overall consumption undoubtedly increases, but this may be at the expense of equally poor unincluded households in regions not supplied by the PDS, where consumers pay higher prices directly as a result. Further, past efforts at either household or individual targeting have been minimal, if non–existent. This is particularly relevant in the context of the remarkably high subsidy cost of PDS at over Rs 7500 million per annum. However, both Tamil Nadu and Andhra Pradesh have experimented with targeted variations of the PDS each of which is discussed below.

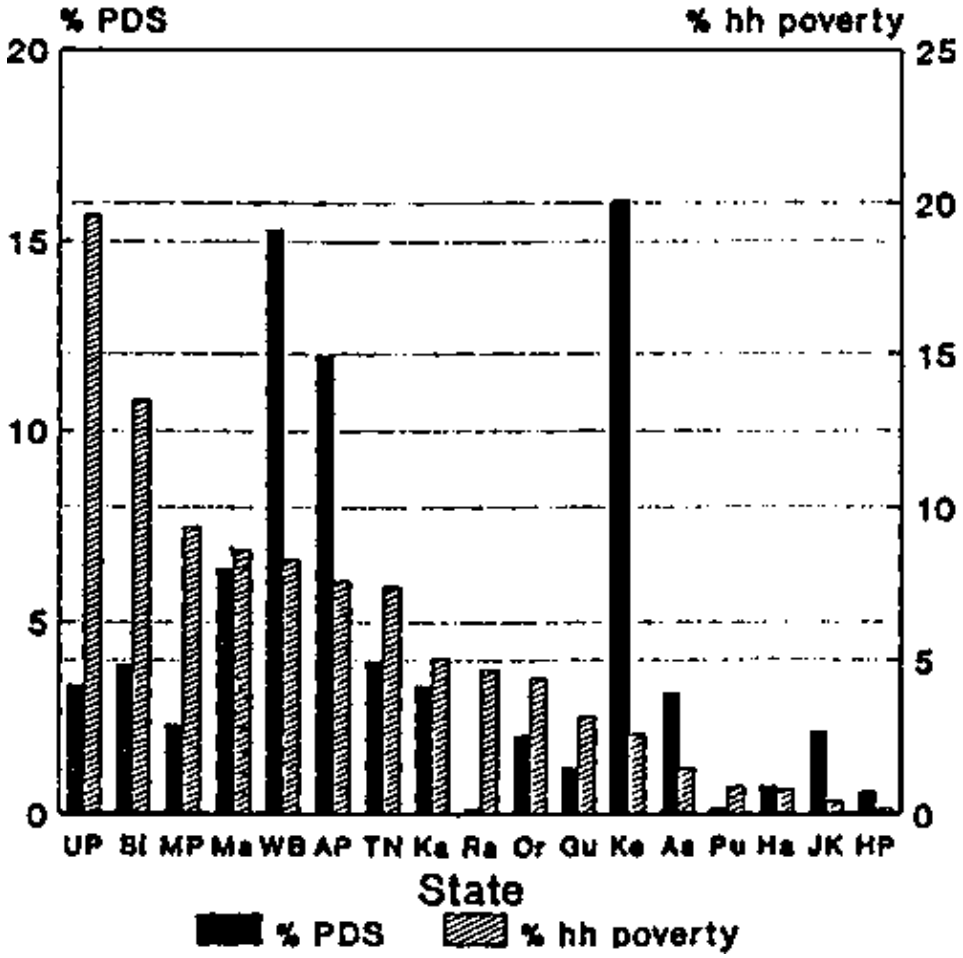


Figure 10. PDS AND POVERTY – By State

Data: 1984 PDS, 1983–84 hh poverty

Subbarao (1989) presents a theoretical calculation to show that an additional PDS subsidy of Rs 1200 million (a mere 16% increase over the Rs 7500 million Rs cost of total subsidy on PDS in 1987) could meet the food gap (by effecting an income transfer of Rs 200 per annum per household) for all the poor in the country if 'perfect targeting' to the poor could be effected. This expenditure could be reduced further by using cheaper/coarser grains, which also would promote self–targeting of the poorer groups, to a certain extent. This calculation, assumes a complementary minimum annual income support of Rs 100 per household through rural works programmes – a not unrealistic assumption.

Experience with the PDS in some states has shown that while it may be possible successfully to tighten targeting to a great extent, "perfect targeting" may be unrealistic in practice. But, recent governmental efforts in structural adjustment have necessitated a reduction in subsidies, and a consequent shift in policy (though *action* on this issue has yet to materialize) towards better area and beneficiary targeting through the PDS. The possibility of commodity targeting (using coarse grains) is also now seriously being considered by the central government (Bhatt 1991a).

The PDS in Andhra Pradesh

Andhra Pradesh, with 7.6% of India's poor, receives 12% of the total subsidized food grains distributed under PDS by the central government (Subbarao 1989). The state has a loosely targeted PDS wherein eligible households are designated as "Green or Yellow card holders" based on income criteria. According to recent estimates (Ministry of Civil Supplies 1991), of all households allocated ration cards, some 75% had the preferential green cards while the balance 25% had yellow cards in 1990. Corresponding figures for 1983 were 80% and 20% respectively, implying some slight tightening in the targeting criteria over the years. Before January 1992, rice, the principal food component of the existing PDS, was supplied to green card holders at Rs 2 per Kg and to yellow card holders at Rs 3.50 per Kg.

The major criticism of the PDS in Andhra is the loose targeting despite shortages in PDS supply so that present coverage of the poorest groups is relatively small. Another problem is the fact that the scheme is socially regressive since rice is disbursed twice a month while the poor subsist from day to day. It is clear from data in Figure 11 that poverty incidence and PDS resource allocation are unrelated. Thus, a situation already demonstrated at state level is also evident at the district level. Further, area–targeting did not improve between 1983 and 1989. The Pearson's correlation coefficient between percent of households below the poverty line (1987/88) and percent households issued PDS 'green cards' (1989) is +0.34 ($p < 0.13$) with the Spearman's rank correlation for the same data at +0.30. When data for the eight districts surveyed by the NNMB are analyzed, PDS targeting however appears extremely efficient (Pearsons's r = + 0.76, Significant at $p < 0.03$; though Spearman's r = + 0.38). These districts seem to have received specialized attention for PDS targeting, possibly as a consequence of their selection by the NNMB as indicator districts. Ironically, the correlations are negative (Pearsons r = –0.09, Spearmans r = –0.25) though statistically non–significant, when 'nutritional need' (as identified by child underweight prevalences available for the eight selected districts) is used instead of poverty indicators. Correlations between ICDS targeting and PDS targeting are also poor (Pearsons r = +0.06 $p < 0.81$; Spearmans r = –0.01), suggesting a probable lack of convergence of area–targeted services offered by the two potentially complementary programmes.

Radhakrishna and Indrakant (1987) have shown the beneficial effects of the PDS on welfare levels of the poor, while also illustrating that this beneficial effect could have been much greater if targeting had been limited to the lowest 40%. This level of targeting would also ensure greater sustainability and cost–effectiveness. In 1983–84. the cost of rice subsidy was estimated at 10% of the total tax revenue of Rs 9650 million. Tax revenue is estimated at Rs 32,580 million in 1992–93, and the cost of the rice subsidy is estimated to be 25% of this – a level that is likely to be unsustainable in the current economic situation. This lack of sustainability is reiterated by the January 1992 announcement by the state government to reduce the rice subsidy and increase the cost of PDS rice from Rs 2 per kilogram to Rs 3.50 per kilogram, and to restrict access to a maximum of 16 Kg (as compared with 20 Kg earlier) per green card family per month.

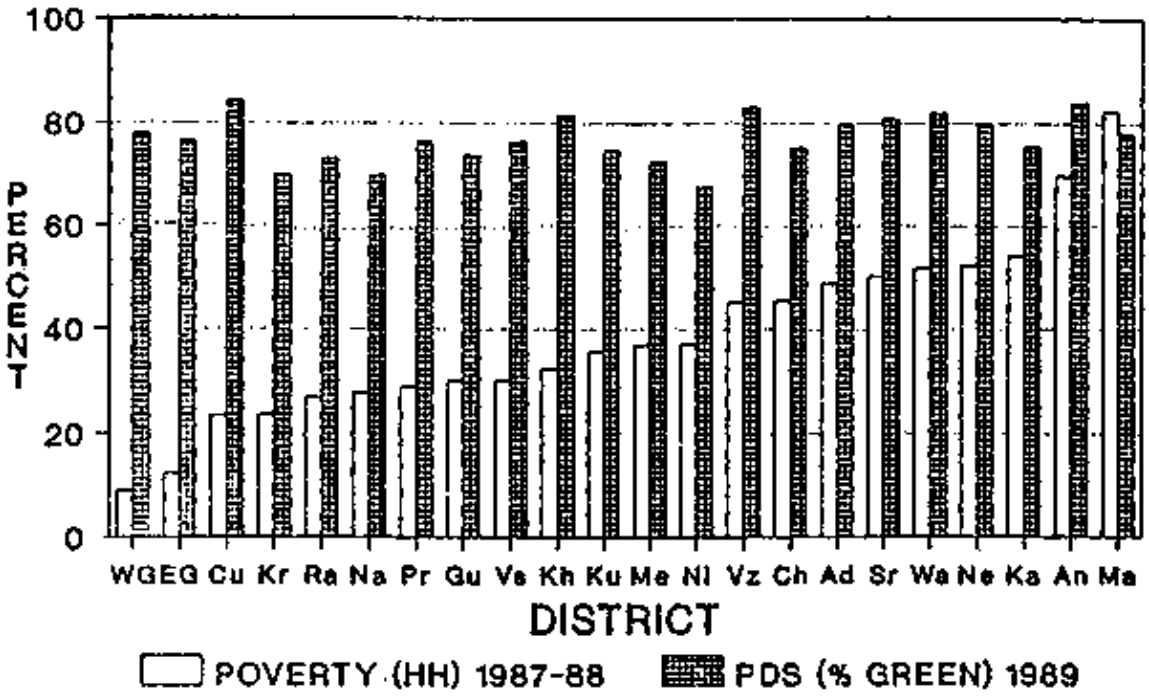


Figure 11. PDS AND POVERTY – AREA TARGETING IN A.P.

In 1989, about 2.1 million tonnes of rice were distributed through the PDS in Andhra Pradesh. Subbarae (1989) has estimated that if PDS was to meet the entire ration quota of only the poorer green card holders, about 2.5 million tonnes of rice would have been required in 1988 – a less than 25% increase in supplies. On the same lines, current resources would be adequate if access is restricted to the poorest 60 percent – a feasible level of tightening – given that poverty level are estimated at 31.6 percent in the state.

In summary, the existing PDS system in Andhra Pradesh fulfills some of the need for food security among the poor. To that extent, the PDS is likely to have contributed towards protecting nutrition within beneficiary households. Nevertheless, there is tremendous scope for enhancing impact by tightening targeting criteria (area and beneficiary targeting), for including nutritional criteria in PDS targeting (thereby reducing leakages to the non–needy), and for tying in complementary PDS and ICDS inputs in areas where poverty and

malnutrition co–exist.

The PDS in Tamil Nadu

Tamil Nadu receives less than it's fair share of grain for the PDS (see Figure 10) from central allocations, so that much of the state's grain for PDS is made available through state–level efforts. With 7.4% of the all–India poor resident in Tamil Nadu, the state receives only 4% of the total grains mobilized under PDS by the central government. This is in direct contrast with Andhra Pradesh, which accounts for 7.6% of the poor and yet is apportioned 12% of the total PDS grain. This inequity in PDS allocations is further underscored by Kerala which has only 2.6% of the poor but over 16% of the PDS grain.

Total food grain channeled through the PDS (state and central efforts together) was 2.14 million tonnes in 1985 (Bulletin Food Statistics, 1986). The targeting criteria used in the Tamil Nadu PDS system is outlined in Table 7. Of the 11.8 million PDS entitlement cards in operation in the state, approximately 8.6 million (73%) are issued to households with incomes less than Rs 6000 per annum (Annadurai, undated), who receive food and other entitlements at prices that are between 40–60% of the prevailing market prices. An estimated 85% of the retail PDS outlets are now located in rural areas (UNICEF, 1990). It should be noted that there is a major need for PDS to operate effectively in urban, as well as rural, areas. If the urban population were to depend totally on the market for food, prices would rise, possibly out of reach of many of the urban poor, and food would be sucked in from rural areas. However, as elsewhere, appropriate targeting to the *poor* in urban areas is crucial.

While the Tamil Nadu PDS system has been rated as among the best targeted in the country, there are still some limitations. While the area–targeting and general outreach of PDS to poor and remote villages is good, the beneficiary–targeting is clearly less so. The fact that 73% households qualify as 'low–income' may have as much to do with under–reporting of incomes as poverty (which demonstrates the difficulty of accurate means assessment through income estimation). Other limitations based on micro–level studies, discussed by Harriss (1991), include: the constrained availability of food grains through the system – the major factor governing access to supplies – and the insensitivity of the system to the needs of large households with the largest dependency ratios. Further, in times of shortages, the poorest households were also the ones most likely to lose access to PDS supplies through the mortgage of their entitlement cards.

Currently, area–targeting of PDS is based on poverty criteria only. With the central government's new focus on revamping the PDS to make it more effective, the following suggestions are tendered:

i) 1700 blocks have been selected by the government (on poverty criteria) for launching the "revamped PDS". It is suggested that nutritional data be superimposed on poverty data to identify further blocks for inclusion. Blocks with the highest poverty levels as well as the highest preschool underweight prevalences should be priority areas for the revamped PDS. Nutritional data for this exercise could be made available from the records of the Ministry of Welfare, ICDS monitoring cell (or the TINP in Tamil Nadu). The ICDS monitoring cell collects monthly nutritional status data from ICDS blocks all over the country. Despite some inadequacies in these data, they could be used for this initial exercise. In fact, this demonstrated use of nutritional data for policy and planning may help to reinforce the need for better nutritional data for the future.

ii) Efforts should be made to link the revamped PDS with other developmental programmes such as the ICDS/TINP, to promote complementarity of inputs (i.e. PDS attacks household food insecurity while ICDS/TINP deal with the 'care' factors). The suggestion in (i) above may be the first move in this direction. The possibility of other innovations should also be explored. One example is the allotment of an extra PDS quota to families certified by the ICDS/TINP worker as having a "malnourished child" in the family.

iii) Greater use of coarse cereals in the PDS to promote self–selection of the poor, since the rich are less likely to purchase coarse grains. However, this must be accompanied by great caution, so that the food commodities selected are acceptable to the poorest in that region/area.

III – POVERTY ALLEVIATION PROGRAMMES

The declining association between agricultural growth and poverty in the post–Green Revolution era presents a strong case for poverty alleviation programmes. Two kinds of poverty. alleviation strategies are evident in India. The first directed through asset–investment, resource development and self employment, and the second through wage–employment schemes and/or rural works programmes. The important schemes in each of these two areas are described below, before available evidence for impact is reviewed and the balance weighed between the two strategies in the current socio–economic environment.

A – The Integrated Rural Development Programme (IRDP)

The IRDP, initiated in selected districts in India in 1978–79, was rapidly extended nationally during the sixth Five Year Plan in 1980–81. The programme, targeted at rural families below the poverty line, is designed to provide a capital subsidy and complementary credit at low interest rates to finance productive investments in income generating assets.

Subsidies for asset acquisition range from 25% for small farmers, 33.3% for marginal farmers, agricultural labourers and rural artisans, and as much as 50% for scheduled castes and tribes. Block–level staff select potential beneficiaries in consultation with the village council (*Gramsabha*), help them select viable investments (such as animal husbandry, agriculture, horticulture, weaving, handicrafts etc), and provide back–up support when needed.

In the sixth Five Year Plan, IRDP coverage (including coverage of scheduled castes/tribes) exceeded targets. However, resource allocations between states were not based on incidence/intensity of poverty, and even the investment per beneficiary varied tremendously among states – partly as a consequence of inadequate credit mobilization in many cases. While both Andhra Pradesh and Tamil Nadu performed slightly above the national average in credit mobilization, states with large tribal populations performed poorly.

In the seventh Five Year Plan (1985–90), the IRDP was expected to cover 20 million beneficiaries, of which 30% were supposed to be women. Based on experience in the sixth plan, several modifications in the IRDP were proposed, including a greater involvement of voluntary agencies and peoples representatives, a higher investment per Beneficiary to facilitate adequate income generation, decentralized planning to ensure better coordination between other sectoral projects and IRDP, establishment of forward and backward linkages for the investments promoted, and improving the role of financial institutions.

The data provided in the mid–term appraisal of the Seventh Plan (GOI 1988) outline the progress of IRDP between 1985–88. While implying a fairly adequate coverage of targets, these data however do not highlight some of the important implementation issues ~ such as mode of selection, degree of targeting, incremental incomes accruing, etc – which vary widely by state. The following can be gleaned from the GOI 1987 evaluation data, based on a survey between October 1985 and September 1986:

i) Targeting was generally good with a majority of the beneficiaries (95% in A.P., 86% in T.N.) concentrated in the less than 3,500 Rs/annum income category;

ii) Using the level of decentralization of beneficiary selection as a criteria for assessing community involvement, Andhra Pradesh did much better than the national average – 87% beneficiaries being selected by the local *Gram Sabha,* as compared to 55% nationally. By contrast, community involvement was almost non–existent in Tamil Nadu, with only 1% selection at local level.

iii) The average assistance given to beneficiaries ranged between Rs 2,930 to 4,035 on a sliding scale – ironically, with the assistance per beneficiary increasing with increasing income i.e. in direct contrast with ‘need’. This, despite the fact that the poorest groups appeared to have relatively high potential for generating income from the IRDP assets as reflected in the Incremental–Capital Output Ratios (ICOR). Again, inter–state variations are large, but both Andhra Pradesh and Tamil Nadu seemed to be less inequitable in the provision of assistance than either the national average or, states such as Madhya Pradesh, Maharashtra and Jammu and Kashmir.

Gaiha (1991) however sounds a pragmatic note of caution in assuming a direct causal relationship between incremental income and IRDP inputs, without due control for exogenous changes, as is done in the four major evaluations of IRDP summarized in Table 8. While there is some degree of convergence in these results, the considerably lower results from the study conducted by the Reserve Bank of India are important to note, as this was the only evaluation that adjusted incremental incomes for higher prices. Gaiha further argues that the poverty threshold of Rs 3,500 per family of five per annum used by each of the evaluations is much below the Rs 4,560 threshold calculated by the Planning Commission for the first year of the sixth plan, thereby inflating the numbers of families that crossed the poverty line as a result of IRDP assistance. He supports his conclusions of a significantly unfavourable impact with results from the National Concurrent Evaluation of the IRDP which show that in A.P. only 9% eligible beneficiaries crossed the poverty line after two years, as compared to just 3% in T.N. This is in consonance with findings in other reviews that, given the ICOR ratios observed, the average assistance given to the poorest was much below what would be required to pull them above the poverty line.

Table 8: Impact of IRDP on beneficiaries

Study	***% hhs that crossed poverty line***	***% hhs that received incremental incomes***
Institute for Financial Management and Research	NR	84
Reserve Bank of India	17*	51*
National Bank for Agriculture and Rural Development	47	82
Programme Evaluation Organisation (GOI)	49	88

* Incomes of beneficiaries at current prices were discounted by 27% to arrive at real incomes at 1981 prices.

Source: Bandopadhyay (1989) as quoted in Gaiha (1990)

It is however argued here that “crossing the poverty line” can not be a justified measurement of programme impact, since it may well ignore even fairly substantial improvement in incomes of the poorest groups, which nevertheless still fall below the poverty line. In fact, the two main objectives of the IRDP – to benefit the poorest, and to reduce poverty – are incompatible for this simple reason. Sundaram and Tendulkar (1985) have shown that, given some assumptions, if the average amount of benefit per family disbursed during the first three years of the sixth Five Year Plan had gone to the poorest 30 per cent of the rural population, then none of the IRDP beneficiary households would have crossed the poverty line – that is, the second objective would have remained completely unsatisfied. If IRDP programmes are to make a significant dent in the problem of ultra–poverty, measures of success other than crossing the poverty line will be necessary.

District–wise IRDP coverage data for Andhra Pradesh are presented in Figure 12. The significantly negative correlation between district–wise incidence of household poverty (1987/88) and percentage of beneficiaries targeted under IRDP (1991) for the 22 districts in Andhra Pradesh is a clear indication of the perverse targeting that has evolved wherby IRDP services seem to be concentrated in better–off areas (Pearson’s $r = -0.76$, $p < 0.00$; Spearman’s rank order correlation is similar at −0.85). The correlations are slightly lower when data are analyzed separately for the eight districts selected by the NNMB for nutrition surveys (Pearson’s $r = -0.67$, $p < 0.07$; Spearman’s $r = -0.57$). Inter–district allocations for IRDP are clearly divorced from poverty criteria, allocations being in inverse proportion to need. Correlations between district–level ICDS and IRDP targeting for the 22 districts are high in Andhra Pradesh, suggesting a convergence of services offered by the two complementary programmes in *non–poor* areas (Pearson’s $r = +0.64$, $p < 0.002$; Spearman’s $r = +0.74$). With respect to IRDP, such non–poor areas are more likely to be well supplied with credit institutions with the capacity to absorb credit to the extent envisaged – one factor possibly contributing to the mismatch.

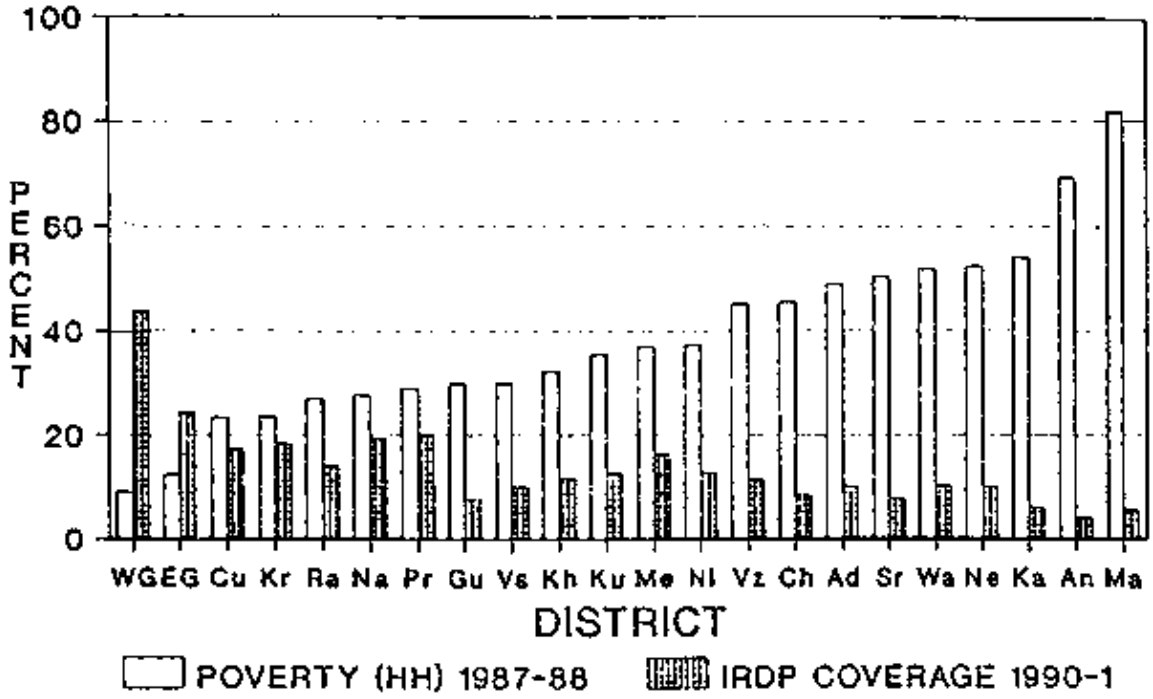


Figure 12. IRDP AND POVERTY – AREA TARGETING IN A.P.

National data reviewed here indicates that the IRDP may have had some impact on the incomes of the poor as reflected in Incremental–Capital Output Ratios and the percentage increase in family income – 38% families increased their incomes by over 50% in the year from October 1985 (GOI 1987) and only 16% reported no increase in incomes. This indication of positive impact is further reinforced by the high level of "investments remaining intact" even in the relatively poorer states. Nonetheless, evidence for supporting the claim for "large scale success" is thin. Further, in Andhra Pradesh, the irrationality of IRDP area targeting does not auger well for plausible impact.

Better area and beneficiary targeting to reach the poorest income groups, improved implementation and back–up support and aftercare, an increase in investments per beneficiary, reduction of leakages due to corruption, and greater involvement of the community, possibly through decentralized administration, are some of the changes that are immediately warranted to facilitate greater impact in the future. Further, as Kakwani & Subbarao (1990) point out, "for *sustained* income generation, it would be necessary to ensure *continued access* to institutional credit for the very poor". For this, it is suggested, access should be continued for a period beyond a one–time grant, especially for the *very poor,* and it should be accompanied by access to guidance and support. Stronger management information systems for programmes such as IRDP would also help to reduce the corruption associated with the programme[4]. If such credit schemes are genuinely to reach the poorest, they may well benefit from the experience in Bangladesh with the highly successful Grameen Bank – a public sector credit institution, providing loans to the poor on reasonable terms and with an excellent repayment record (see description in Basu 1991 p361–3)

[4] Anecdotal evidence does exist to support this. For instance, loans may be sanctioned using another person's name to avoid repayment; or the beneficiary may only receive 40–50% of the sanctioned loan, the rest being usurped by middlemen.

Recent press reports suggest government commitment to increasing the coverage of women under the IRDP to 40% of total IRDP beneficiaries in 1991–92, although in reality the seventh plan achievement of 15% women beneficiaries was only half the target of 30%.

Two other schemes that have evolved out of the IRDP need mention here – the scheme for Training of Youth for Self Employment (TRYSEM) and the DWCRA (Development of Women & Children in Rural Areas) which started in 1979 and 1982–83 respectively. A review of the TRYSEM suggests that the scheme had a low impact in poorer states with low potential demand for services, while in better–off regions the percent of youths trained to those self employed was high (Subbarao 1989) suggesting that the poorer states may need alternative interventions. The seventh plan mid–term appraisal of the DWCRA notes inadequate implementation of the programme.

The NREP initiated in 1980 to replace the food–for–works programmes, aimed to “generate additional gainful employment for the unemployed and underemployed persons in rural areas, to create productive community assets for direct and continuing benefits to poverty groups and to strengthen the rural, economic and social infrastructure to bring about a general improvement in the overall quality of life in rural areas. It also aims to improve the nutritional standards of rural poor through the supply of food grains as part of wages” (GOI Seventh Plan Mid–Term Appraisal, 1988).

The percent distribution of employment under the NREP closely parallels the state–wise percent distribution of the ‘ultra–poor’ (see Figure 13). Kakwani & Subbarao (1990) calculate a rank correlation of $r = +0.74$ (significant at $p < 0.01$) between the distribution of the ultra poor and the man–days of employment generated. Nonetheless, the states of Tamil Nadu and Andhra Pradesh (as well as Uttar Pradesh, Rajasthan, Kerala & Karnataka) seem to have received a greater share of NREP employment than would be justified by the percent of the ‘ultra poor’. The eastern states of West Bengal, Assam and Bihar (the more needy) have received less than their fair share.

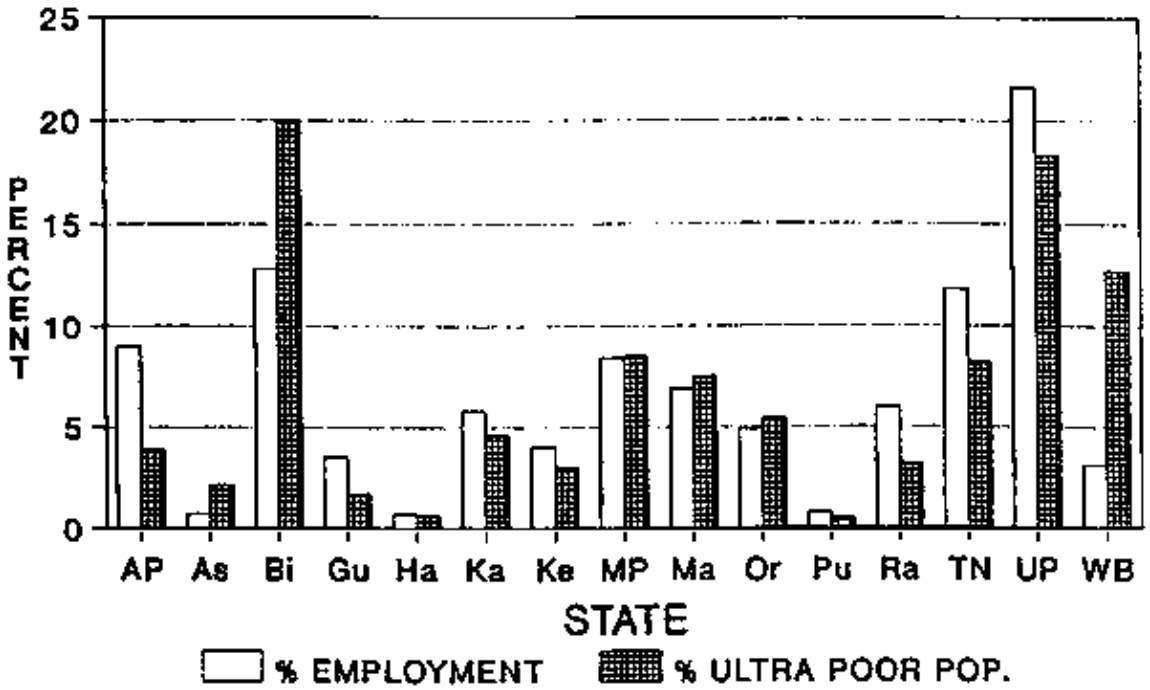


Figure 13 – EMPLOYMENT DISTRIBUTION UNDER NREP (1987–88)

Though the mid–term appraisal of the seventh plan suggests that achievements have surpassed targets, some deficiencies are evident. Andhra Pradesh and Tamil Nadu are the only two states that have employed over 40% women under the NREP, the national figures being about 20%. Women’s participation is the lowest in the poorest central and eastern states. Furthermore, women’s wages are discriminately lower than men’s wages (which are lower than the minimum wage). Participation of Scheduled castes and tribes and that of the rural landless is also estimated to be low (between 17–33%) (Gillespie, 1988). The aim to provide one kilogram of food grain per person per day as part of the wages was not achieved, the average figure being 0.45 kg/day, presumably because of inefficiencies in supply of food grains channelled through the PDS. There is also a mis–match between the grains demanded (rice & coarse grains) and the grains supplied (predominantly wheat). The nature of rural works undertaken under the NREP revealed a strong bias towards construction of rural roads, schools and other infrastructure likely to benefit the ‘less poor’.

An annual report of the Department of Rural Development has noted that “employment provided under NREP is of short duration, often sporadic, and hence fails to generate enough income to create a visible impact on the living conditions of the poor”. The lack of a clear understanding of the programme as a transitionary one, and inadequate planning to coordinate infrastructural requirements with NREP works are some of the other major shortcomings of the programme. The more recently observed move towards decentralized planning and implementation may help in reducing some of these weaknesses.

Kakwani & Subbarao (1990) while conceding the deficiencies of the NREP, summarize the main desirable features of employment programmes i.e. the self–targeting (through relative unattractiveness of the remuneration rates for the less poor); and the capacity to substitute for a social security system, at least for

those able to work. They profess that if deficiencies are tackled, and if women are attracted to work sites (as has been done in both Andhra Pradesh and Tamil Nadu), these programmes “can reach out to the poorest fifth more readily than most alternatives”. This thesis is supported to varying degrees by many others (Gillespie, 1988; Gaiha, 1991; Bhatt, 1991b; Seventh Plan, 1985–90). Further, if NREP area targeting within Andhra Pradesh is as poor as the IRDP targeting (a plausible assumption, given that the two programmes are implemented by the same agency), chances of having reached the poorest are low, the only saving grace being the built–in beneficiary targeting whereby, even in the more prosperous districts, only the poorest would be attracted to the NREP.

It is this self–selection mechanism, providing for a built–in targeting to the poorest which gives wage employment programmes a greater nutritional potential than asset–endowment schemes like IRDP.

Bhatt (1991b) argues for a guarantee of at least 100 days of employment to the most needy, rather than the provision of 50 days work to 40 million households. This would require at an all–India level, an annual financial outlay of Rs 60,000 million (2000 million person–days at unit cost of Rs 30 per person–day). While governmental concern in this area is high, recent allocations of Rs 6,300 million (1989–90 plan outlay), Rs 21,000 million for 1991–92 and Rs 18,250 million for 1992–93 fall far short of this.

C – The Rural Labour Employment Guarantee Programme (RLEGP)

The RLEGP was launched in 1983–84 to provide an employment guarantee to at least one member of every landless labour household up to 100 days in a year and create durable assets for strengthening rural infrastructure. Programme design and implementation is almost identical to the NREP, and most of the issues discussed above are relevant here as well. Employment targets have been overshot as in NREP, but the ‘guarantee’ has not been implemented, because of non–feasibility in small trials. The RLEGP was merged with the NREP in the 1989–90 annual plan. According to recent press reports, the 1992–93 annual plan has dropped all employment guarantee schemes from the Central Planning Budget. However, Tamil Nadu has announced an employment guarantee scheme similar to the widely acclaimed Maharashtra Employment Guarantee Scheme. A sum of Rs 100 million has been allocated for this scheme which is to be initiated in four districts i.e. Dharamapuri, Puddukottai, Pasumpon and Ramanathapuram (The Times of India, Feb 8 1992). The scheme also envisages payment of a small dole (Rs 2/day) to each registered person for whom employment can not be provided.

WHY NUTRITION IMPROVES

The Role of Poverty Alleviation Schemes in Improving Nutrition

The issue of how to alleviate poverty (and thus poverty–related nutritional deprivation) in India has generated several, long sustained controversies, the bases of which are outlined here (see also Clay *et al.* 1988):

> i) *Growth or welfare?* Planning orthodoxy has it that investing in productive activity has to precede investment in welfare, that the latter is most dispensable and that generalized welfare can be replaced by targeted welfare. This conflicts with evidence from Sri Lanka, Kerala, Costa Rica where striking welfare gains derived from long–term investment in education, health and social welfare, in the absence of prior growth and in the presence of considerable poverty and low levels of food consumption. Is there necessarily a trade–off between growth and equity (poverty alleviation) in Indian development? This has been called simplistic (Basu 1991) because i) there is sufficient slack in the Indian economy for *both* growth and equity (it need not be a zero–sum game between the two), ii) there may be no relation whatsoever between the two anyway, and iii) the fact that policies tend to come in bundles (which can be disaggregated) may exaggerate the notion of a necessary trade–off. Basu argues against the belief that it is necessary to prune poverty alleviation programmes if growth is desired, asserting that it is a question of keeping the fiscal burden manageable (e.g. through targeting), providing the political climate remains stable and conducive.

ii) *Poverty alleviation or social security?* Investment in assets and livelihood creation are said by some to have greater consumption multipliers than social security. On the other hand, unemployment, sickness and old age benefits are precisely targeted to those of the poor in households in crisis who are least able to access poverty alleviation programmes as presently administered. Another factor is relative cost – administrative costs of poverty alleviation programmes generally exceed those of social security provision, although the types and targeting of social security are controversial issues.

iii) *Asset endowment or wage employment?* Regarding feasibility, some argue that an insignificant fraction of the poor can be given assets without land and property reform, which is the only guarantee for a mass base to growth. Asset endowment programmes such as IRDP strain administrative and financial capacity, and are more open to corruption e.g. asset capture by untargeted elite groups. Employment provision can be self–targeting and is asserted to increase consumption linkages more than assets creation. It may also preferentially benefit the incomes of women who often form a majority of the workforce. Wage differentials between sexes can be eliminated, with possible knock–on effects on local labour markets. The assets built may include roads, drainage and irrigation channels, which could themselves provide a long–term source of employment, through repair and maintenance as well as stimulating rural non–farm activities, especially trades and services. Reforestation, erosion control and the rehabilitation of agricultural land are other possibilities. On the other hand, some would argue that the relegation of poor to wage labour does not promote long–term independence.

iv) *Cash or kind wage payment?* Cash is much more feasible administratively, less vulnerable to corruption and leakages, although cash payment requires that such newly created demand can be satisfied through marketing channels that function reasonably well. If this is not the case (as in many famine situations), then kind wages, as food, may be a better option. Kind payment recognizes both that buffer stocks need turning over and that markets may not function efficiently.

v) *"Top–down" or "bottom–up"?* A top–down approach would argue for the need to control funding, avoid low level administrative corruption, and ensure regional equity. A "bottom–up" community–based approach would stress the need for flexibility. Administrative capacity may be improved by an increase in responsibility at lower echelons. The direct involvement of the "targets" themselves is truly democratic.

vi) *Targeting versus universalism.* This is relevant to many interventions, not just poverty alleviation. While the fate and final shape of the draft nutrition policy is yet to be decided, among the key factors likely to influence and justify government commitment to nutrition is the notion of targeting actions to those most needy – particularly relevant in the face of the severe economic situation which is not expected to ease in the short or medium term. The issue of targeting is not clear–cut. The argument in favour hinges on the efficient selection of the most needy reducing overall programme costs. However, targeting is not in itself cost–free, for the following reasons:

– the selection of beneficiaries based on application of certain criteria is costly to administrate;

– the targeted (usually the poorest groups) do not have sufficient political power to ensure the services they receive are of sound quality;

– the notion of targeting implies passive acceptance of a benefit, and can be demeaning for the recipient;

– the system of selection may be actively distorted by some non–needy households (e.g. income under–reporting) to qualify for eligibility;

– there may be an disincentive element whereby borderline eligible cases reduce their output/status to qualify;

– targeting is invasive involving constant probing and policing.

This is not at all to suggest that targeting is not a good idea, just that the question of how far the process of selection should be pushed, needs to be considered carefully. The costs above need to be weighed against the overall costs of universal coverage of a programme. One option with great potential is *self–selection of the beneficiary.* This can be done, for example, through subsidising less–preferred coarse grains – normally the staples of the poorest groups (i.e. commodity targeting in the PDS), or providing guaranteed work at wage rates that, while providing for a decent livelihood, are not sufficiently high to attract less–poor groups (e.g NREP).

While the 'nutrition–connection' between poverty alleviation programmes and nutritional well–being is implicit in the definition of a poverty line based on calorie criteria, neither the NREP or IRDP have been explicitly evaluated for their effects on nutrition. Poverty alleviation schemes are potentially highly important for future nutritional improvement. Associations between poverty reduction and improved nutritional status are well documented in the literature, and it is also evident from prior research (e.g. Leslie and Paolisso 1989), that an improvement in women's income has a much greater impact on nutritional status of vulnerable groups as compared with a comparable improvement in total family income.

In the face of the limited success of the IRDP based on poverty criteria especially in reaching female–headed households as well as the poorest groups, the plausible impact on nutritional well being is likely to be small. In Andhra Pradesh, nonetheless, area targeting of IRDP is high, thus improving the likelihood of some positive impact. Investment and self–employment schemes such as the IRDP and TRYSEM may not be suited to the needs and level of infrastructure development of the poorest states. A tendency towards such inappropriateness is seen in a state–wise analysis wherein Bihar and West Bengal (among the poorest states) have received much lower IRDP inputs than would be justified by their poverty ratios. On the other hand, the poor in the better–off states, such as Andhra Pradesh, may be able to derive greater benefit from such schemes (to that extent, ironically, a mismatch between IRDP inputs and state–wise poverty ratios may in fact facilitate the programme's impact on such groups).

In the context of the NREP and RLEGP at an all–India level, the fact that the two programmes together provide only about 1% of total employment, and women's participation (as well as those of scheduled castes/tribes) is as low as 20%, nutritional impact is likely to be limited. But again, in both Tamil Nadu and Andhra Pradesh, where women's participation is much higher (42% and 44% respectively) than other states, it is likely that NREP had a relatively greater positive impact on nutrition. No evaluations, except one small study (Radhaiah *et al* 1985) touch upon the potential or accrued nutritional benefits. Nutritional objectives should be explicitly defined for poverty alleviation schemes, reflected in programme design, and thereafter used to evaluate nutritional benefits against in all future efforts. The disproportionately higher share of both Andhra Pradesh and Tamil Nadu in NREP, as also the greater participation of women in the NREP may have contributed to the observed nutritional improvements in these states. In the absence of hard data, however, these conclusions must remain tentative.

Given the history of anti–poverty programmes in India, self–targeting rural works schemes may be seen as a better alternative for the poorest, provided these are preceded by adequate planning to link community infrastructure needs with works, and better area–based and seasonal targeting. Such a shift in policy will necessitate further decentralization of planning to the district/block level – where needs and opportunities can be better assessed by beneficiary communities and households. While some self–targeting is intrinsically built in to rural works programmes (and this may be NREP's greatest advantage), the scope for focusing in further on the poorest needs to be capitalized upon, especially in the light of the changing economic scenario in the country. Thus it may be nutritionally a better option to provide more person–days to fewer (poorer) people. This built–in self–selection of the poorest, however, does not include the old and disabled, so programmes such as the NREP (now rechristened Jawahar Rojgar Yojana or JRY) should be complemented with social security for the old and disabled. Finally, there is a need for a better monitoring and information system to improve accountability and reduce corruption, and an explicit recognition of nutritional objectives from planning to evaluation.

Earlier sections of this report have shown that the improvement in nutritional status of young children in Andhra Pradesh and Tamil Nadu has been modest over the last fifteen years, with the improvement being manifested in a decline in severely underweight prevalences (through a rightwards shift in the anthropometric distribution) with little change in other categories. In the following two sections, we draw upon data presented earlier to analyze and prioritize the factors that may have contributed to this decline in the two states, and those that potentially limited it. Tables 9 – 11 summarize salient aspects of the nutrition–relevant actions in Andhra Pradesh and Tamil Nadu examined in the sections above. Table 9 considers whether interventions are underway in the right places (coverage with respect to need, area and beneficiary targeting), whether the objectives and services are appropriate to the problem, as well as the quality of implementation and whether

any impact has been documented. Table 10 assesses interventions from a Triple A perspective, and addresses the following questions: was 'need' identified?, was the intervention targeted with respect to this need?, was the community empowered by the intervention?, and was institutional support built into its design? Finally, Table 11 provides a matrix which aims to score different interventions with respect to certain factors (identified by Shrimpton 1989) relating to the type and extent of community involvement. In each of Tables 9 to 11 the interventions are scored according to a scale of 0 to 5 (worst to best). This has been done by the authors, based on the analysis of the different actions presented here – hence subjective based on objective data.

TABLE 7

THE PUBLIC DISTRIBUTION SYSTEM IN TAMIL NADU
TARGETING OF PDS COMMODITIES
(As on 31st March, 1988)

Sl. No.	Name of the commodity	Scale of supply	Retail issue price (Rs./kg)
1.	*Rice*	For Card holders whose monthly income is below Rs. 1,000 raw rice or boiled rice at 4 kg per adult and 2 kg per child subject to the maximum of 12 kg. per family in addition to that of 3 kg. raw rice per family card.	
			Common rice Rs 1.75
			Fine rice Rs 2.25
		For Card holders whose monthly income is above Rs. 1,000 raw rice only is issued at 4 kg per adult and 2 kg per child subject to the maximum of 12 kg. per family card.	
			Superfine rice Rs 2.50
2.	*Sugar*	500 gms. per capita per month	5.10
3.	*Wheat*	20 kg. per card per month in Plain areas and 30 kg per card per month in Hill areas.	2.20
4.	*Palm oil*	Scales fixed from time to time	13.65
		subject to availability	
5.	*Kerosene*	Madras city and headquarters of Municipalities (10 litres per family card)	
		Other municipalities (6 litres per family card)	Price ranging from Rs. 2.19 to Rs. 2.53
		Township and town panchayats (5 litres per family card)	
		Rural areas (3 litres per family card)	

SOURCE: Statistical Hand Book of Tamil Nadu, 1988

TABLE 9

ASSESSMENT OF INTERVENTIONS VIS A VIS NEED

TABLE 9 ASSESSMENT OF INTERVENTIONS VIS A VIS NEED

INTERVENTION	TARGET GROUP	COVERAGE	SERVICES/OBJECTIVES	QUALITY

	DOES IT TARGET THE RIGHT GROUP?		WHAT % OF VULNERABLE GROUP DID IT COVER?*			DO THE SERVICES OFFERED MATCH THE NEEDS?	IS IT WELL IMPLEMENTED				PRO IM
	AREA TARG.	BENEFICIARY TARGETING	AI	AP	TN		AI	AP	TN	AI	H CONV IMP B DEMON
ICDS	1	3	51%	34%	18%	3	2	2	3	1	
TINP	3	5	–	–	53%	4	–	–	4	–	
MDM	0	1	–	–	NA	1	–	–	3	–	
VIT A PROPH.	3	4	?	?	?	3	?	?	?	?	
ANEMIA PROPH.	3	4	?	?	?	3	?	?	?	?	
PDS	2.5	0 2 4 #	?	>100%	>100%	5	1	3	3	1	
IRDP	1	2 3 3 #	7.7%	?	?	3	1	2	2	2	
NREP/RLEGP	1?	2 3 3 #	NA	NA	NA	4	1	2	2	7	

NOTES:

1. AI = ALL INDIA NATIONAL AVERAGE; AP = ANDHRA PRADESH; TN = TAMIL NADU.
2. * Percent children covered currently to those below the poverty line, assuming perfect targeting.
3. # Numbers refer to AI, AP & TN respectively.
4. $ 3.747 Million families covered (Planning Commission, 1988). Using family size estimate of 5, this is equal to 18.735 Million Pop = 7.7% of 242 Million Pop below poverty line.

TABLE 10

ASSESSMENT OF NUTRITION–RELEVANT ACTIONS IN THE CONTEXT OF THE TRIPLE A STRATEGY

INTERVENTION	WAS "NEED" IDENTIFIED? (ASSESSMENT)	WAS PROGRAM TARGETED TO NEED? (ANALYSIS OF RESOURCES AND NEEDS)	WAS COMMUNITY "EMPOWERED"? (ACTION & COMM. INVOLVEMENT)	WAS INSTITUTIONAL SUPPORT BUILT IN TO PROGRAM DESIGN
ICDS	3 (Poverty criteria)	3	1	3
TINP	4 (Poverty & Nutritional crit)	4	2	5
MDM	0 (No)	0	0	1
PDS	3 (Poverty criteria)	3	0	3

IRDP	3 (Poverty criteria)	2	3	2
NREP/RLEGP	3 (Poverty criteria)	3	3	2

NOTES:

1. Rankings are made on a scale of 0 to 5 (Worst to best).
2. All rankings are subjective and are based on program operations in Andhra Pradesh and Tamil Nadu.

TABLE 11

COMMUNITY INVOLVEMENT IN DIRECT & INDIRECT NUTRITION INTERVENTIONS*

INTERVENTION	**NEEDS ASSESSMENT/ ACTION CHOICE**	**ORGANIZATION**	**LEADERSHIP**	**TRAINING**	**RESOURCE MOBILIZATION**	**MANAGEMENT**	**ORIENTATION OF ACTIONS**
ICDS	2	2	2	3	1.5	2	3
TINP	2	3	2.5	5	1.5	2	5
MDM	1	1	1	1	1	1	1
PDS	2	1	1	1	1	1	3
IRDP	2.5?	2	2.5	?	1	2	3
NREP/RLEGP	2.5?	2	2.5	?	1	2	3

NOTES:

1. Ratings are based on the matrix for ranking Nutrition–Relevant Actions with respect to levels of community involvement suggested by Shrimpton (1989).

Why Nutrition Improved in Andhra Pradesh

Overall declines in poverty levels in Andhra Pradesh have been close to the average decline noted in the rest of the country as a whole, and may have contributed to some of the observed improvement in the nutrition profile. Direct expenditure on nutrition in Andhra Pradesh has been very small compared with other states, with only one direct nutrition intervention, the ICDS, of limited coverage.

Given the poverty ratios, Andhra Pradesh has received more than its fair share of IRDP, NREP and PDS inputs. A disaggregated analysis at the district level shows that the two districts that exhibited the maximal decline in underweight prevalences in the last fifteen years were Guntur and Chittoor (Figure 14). However, these two districts experienced only moderate declines in poverty (11.0 and 13.4% respectively as compared with 22.8% decline for the state overall) over the period 1977–87/88, so that changes in poverty can not readily explain the large nutritional improvement (Figure 15), *unless the ultra–poor in these districts benefited disproportionately.* ICDS coverage was very low in Guntur, and less than that seen in other districts in Chittoor. IRDP coverage was also low in both these districts (Figure 12). Instead, a more likely explanation for the improvement lies in the disproportionately high PDS inputs in the two districts. The percentage of preferential green PDS cards far exceeded underweight prevalence levels or poverty ratios (Figure 11) and hence probably provided an adequate household food security buffer.

These data should not be interpreted to advocate inequity in PDS allocations, but to show that when PDS

supplies are far in excess of need, benefits do trickle through to the poor. However, when PDS supplies are limited, as was the case overall in Andhra Pradesh, a better management of these should entail tighter targeting to ensure preferential supply to the needy. These conclusions are supported by the observed negative correlation (Pearsons r = –0.42, Spearmans r = –0.50) between underweight prevalences and adequacy of energy intakes (observed for the eight districts for which data were available) implying a strong household food security problem in 1977. This correlation was reduced (to +0.15 and +0.15) in the 1988–90 data set, implying that food security may not have been a major limiting factor in 1988–90 after the PDS was in place in the eight districts surveyed by NNMB (which received relatively high PDS inputs).

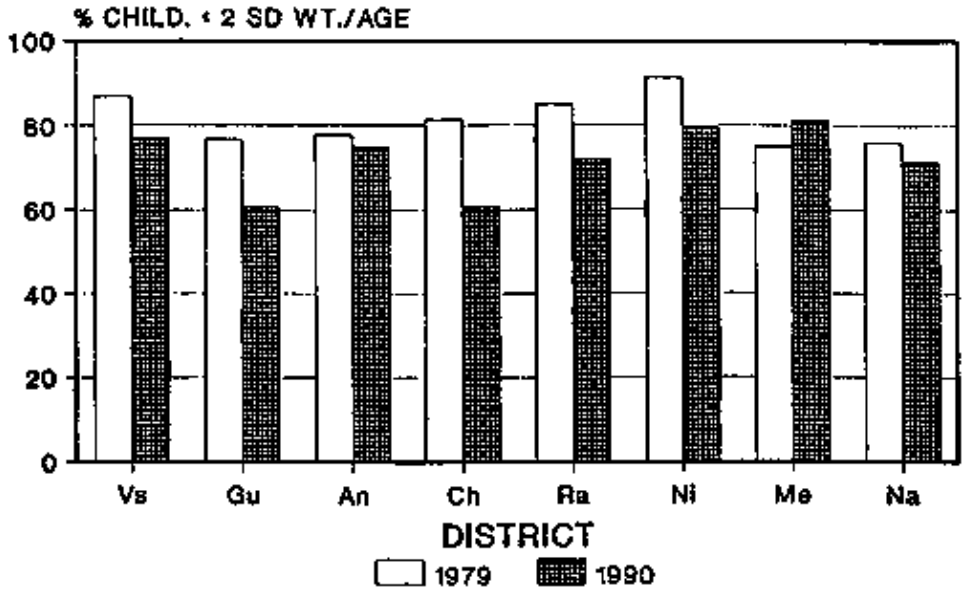


Figure 14. DECLINE IN UNDERWEIGHT PREVALENCE – Preschool children in A.P.

SOURCE: NNMB (1991)

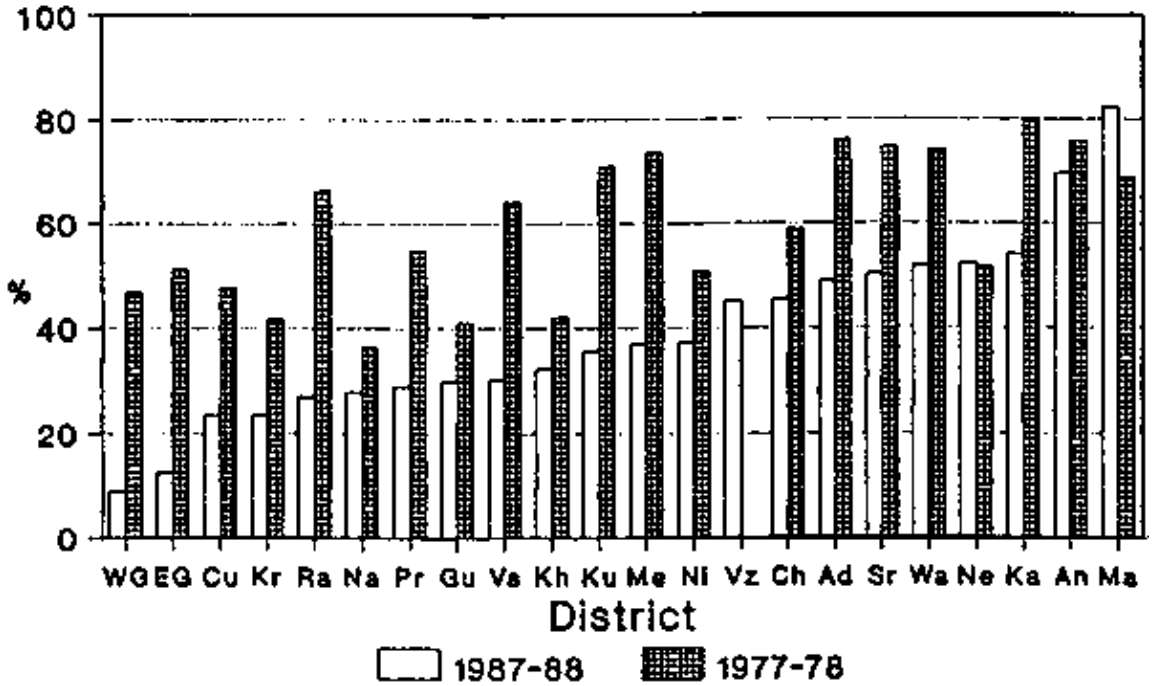


Figure 15. TRENDS IN POVERTY – By District in A.P.

Direct nutrition interventions such as the ICDS in Andhra Pradesh had a relatively low coverage, and are unlikely to have had a substantial impact. Their impact could, perhaps have been enhanced by better area and beneficiary targeting, and by improved implementation.

We therefore conclude that the PDS which aims at improving household food security, and possibly the NREP with high female participation (42% of the workers) and self–targeting to the poorest households, are both likely to have had major roles in facilitating the observed nutritional improvements seen in the eight

NNMB–surveyed districts of Andhra Pradesh over the last fifteen years. Where food entitlements under PDS were targeted in excess of 'nutritional need' (as in the case of both Andhra Pradesh and Tamil Nadu states), the impact was much more pronounced. In the light of resource constraints though, better area and beneficiary targeting in the future is warranted. The lack of adequate direct–nutrition interventions focusing on improvement of care factors and access to health care may have however limited the nutritional improvement, especially in areas with a substantial reduction in poverty ratios. Perhaps, a better support structure for improving access and utilization of health facilities and direct nutritional interventions with a strong focus on improving care factors are needed to shift the nutrition profile of the less severely malnourished in Andhra Pradesh.

Why Nutrition Improved in Tamil Nadu

The overall changes in the nutritional profile in Tamil Nadu are very similar to those in Andhra Pradesh i.e. a reduction in the proportion of severely underweight children, with little change in prevalence of the less severe forms, except in TINP–I districts where an improvement is also observed in the less severe forms. This, despite Tamil Nadu's unprecendentedly large investment in direct nutrition expenditures.

As discussed earlier, a major chunk of the nutrition expenditure in Tamil Nadu is directed to the totally untargeted Noon Meals school feeding scheme with questionable nutritional benefits. Similarly, benefits from the ICDS in Tamil Nadu are likely to have been small. In contrast, NNMB surveys have registered a greater improvement in the nutritional profile in districts where the TINP–I has been operational (see Table 6). Improvement has been observed in both a reduction in the prevalence of the severely underweight and an increase in the percentages of children in the 'normal' and less severe weight–for–age categories. The targeted and tailored inputs of the TINP–I, with a strong emphasis on the maternal and child care (and to a limited extent health) inputs, in complement with the strong and relatively well–targeted PDS inputs which provided the much–needed boost to household food security among the poorest, were all important factors. The fact that incidence of vitamin A deficiency in Tamil Nadu reduced much more dramatically than that in Andhra Pradesh, despite a near constant intake of vitamin A, also suggests that programmes such as the TINP–I (which included prophylaxis against vitamin A deficiency, and improved maternal care factors such as breastfeeding and use of colostrum etc) may have contributed to the improved nutritional profile. In addition, Tamil Nadu had strong NREP inputs with a relatively high participation of women (44%, as against 20% national–level), which is likely to have contributed to some of the observed improvement in both the TINP and non–TINP areas.

CONCLUSIONS

Where the household food security efforts are complemented with inputs that focus on the health and care–related preconditions for adequate nutrition, the response is discernible even among the less severe forms of malnutrition. Future nutrition–relevant actions should support a mix of programmes directed at all three clusters of underlying nutrition problems. All of these efforts must, nonetheless, be targeted to those who are 'nutritionally needy' and the nutritional agenda must be explicitly recognized and cited in all poverty–alleviation or food–security programmes. Overall, a four–pronged short–term approach is necessary to alleviate nutritional problems until overall development through long term measures of food production, employment, education and fertility control make these approaches unnecessary. This approach would include:

i) Improving household food security

There is an urgent need for improvements in programmes that aim to reduce household food insecurity, current attempts in this area, such as the Public Distribution System (PDS) and the National Rural Employment Programme (NREP) having had some, though limited success. Better rurally–targeted PDS schemes such as those implemented in the states of Tamil Nadu (and to a lesser degree in Andhra Pradesh) have been more successful than the less–precisely targeted PDS in the rest of the country. Without a stricter targeting of needy households, escalation in programme costs in any case renders its sustainability questionable, particularly in the current economic climate. Mismatches in PDS inputs vis–a–vis poverty levels are just as likely to be within–state as between–state, thereby underscoring the necessity for revision/re–orientation of allocation criteria and enforcement. Once the PDS is located in the right block, it can be self–targeted on the poorest households through disbursement through fair–price shops of less–preferred

foodgrains (e.g. millets as opposed to rice), which are the staples of these poorest groups, but not the less−poor.

The nutritional impact of asset−endowment poverty alleviation schemes such as the Integrated Rural Development Programme (IRDP), it is argued here, have been very limited. On the other hand, the wage−employment schemes such as the National Rural Employment Programme (NREP) are likely to have had a greater nutritional impact. The NREP certainly offers potential for driving future nutritional improvements providing a guarantee of an increased number of days work per year to fewer poorer people (particularly women) in resource−poorer areas can be achieved through more decentralized planning. The assets generated should also be those that would support future livelihoods in these poor communities.

ii) Improving health and care factors

In some states such as Tamil Nadu, the preschool child (in TINP areas) seems to be better insulated (than other states/national averages) against the effect of household food insecurity, possibly because of the combined protective effect of a well−targeted, implemented and monitored nutrition programme, along with good rural health services, immunization and nutrient−prophylaxis.

Less precisely targeted nutritional interventions such as the Special Nutrition Programme (SNP) and the Noon Meals Programme (NMP) are not likely to have had a major impact on nutrition among the most vulnerable. Programmes such as the NMP have immense (disturbing) potential for gathering massive momentum and appeal, particularly when initiated on a surge of populist politics. Once this takes place, the chances of reversing the “commitment” become bleak even if serious distortions in the social services sector occur at the cost of other deserving programmes, including in particular those relevant to nutrition.

Integrated nutrition and health programmes are relevant and appropriate but could be strengthened. Strengthening should be in terms of strict targeting for younger (1−3 years) children and women during pregnancy/lactation belonging to poverty groups. ‘Area targeting’, which is in practice, should be supplemented with household and ‘individual’ targeting to focus the benefits and reduce the cost of these programmes, namely supplementary feeding, massive dose of vitamin A and iron/folic acid distribution etc. The lessons learnt in programmes like TINP should be utilized fully to optimise results. The weak points in implementation however, such as poor inter−departmental coordination, irregular monitoring, systematic evaluation without adequate arrangements for feedback and corrective action, should be eliminated through instituting an effective MIS (Management Information System) at District/Taluk/Block/village level.

Improvements in the nutritional status of young rural children seen during the last decade, in the absence of a notable increase in income levels and dietary energy levels of households speak of the beneficial impact of these expedient short term nutrition−related approaches. Although it is difficult to delineate the relative contribution of direct nutritional inputs (from the health care and educational efforts), to the improvement observed, the presence of a nutrition component probably also results in greater acceptance of other ongoing health programmes. Recent ICDS evaluations have shown that supplementary feeding can provide an incentive for obtaining community participation in health programmes.

iii) Combating gender discrimination

From the above discussion of nutrition−relevant actions, the involvement of women is clearly prominent. For so many reasons (see Gillespie and Mason 1991 for example), the capabilities of women and the resources which they control are crucial contributing factors to nutritional outcomes. Set against this, the problem of gender discrimination looms. Although it may not be as marked and pernicious as in northern India, gender bias and female infanticide has been documented as a real problem in Tamil Nadu (George *et al.* 1992; see discussion in Part I). What can be done to alter deeply−rooted gender relations that result in such practices? A holistic approach is required for changing such a complex system of values about girls and women, and extensive study of the underlying social dynamics (such as marriage payments, marriage links among villages, women’s economic opportunities, etc) would be helpful in constructing needed pro−female policies aimed at raising the social and economic status of women, and hence reducing female infanticide. Scholarships for women, special emphasis on women in poverty alleviation schemes, reservations in local community organizations for women are some possibilities. Gender relations are not set in stone. One example of beneficial change in Tamil Nadu was women’s use of their voting power to reinstate prohibition.

iv) Facilitating involvement of the nutritionally−vulnerable social groups

For obtaining enlightened participation of the nutritionally−vulnerable sections of the community, pre−programme interaction involving appropriate means of communication (mass media and inter−personal), adjusting time and place of service delivery to suit the peoples' convenience and giving due regard to cultural sensitivities are some essential concerns. A continuing programme of Information, Education and Communication (IEC) as part of nutrition and primary health care programmes would help sustain benefits. The IEC component, even in a tightly monitored programme like the Tamil Nadu Integrated Nutrition Programme (TINP) has been found wanting in the strength needed for creating a lasting impact.

Overall, future efforts directed at nutritional improvement must strike a balance between direct nutrition interventions and poverty alleviation schemes. However, both strategies must concentrate on tighter targeting i.e. improved area, community/family and individual targeting based on both poverty (preferably ultra−poverty) and nutritional criteria. Such recommendations must necessarily be complemented with two other crucial changes in programme design − a greater flexibility to accommodate area−specific needs, and improved monitoring, evaluation and accountability. Greater community involvement is another requisite which may, nevertheless be facilitated by the increase in design flexibility. The socio−political and economic environment is conducive to such reforms. Further, if interventions are to be closely linked with poverty and nutrition criteria, existing means for generation of reliable, representative, and continuous information on these indicators will need to be strengthened.

REFERENCES

Bandopadhyay, D. (1989) Poverty Alleviation through Special Employment Programmes in Rural India. In: Islam, R. (ed.) *The Elusive Target: The Evaluation of Target−Group Approaches to Employment Creation in Rural India,* New Delhi: ILO/ARTEP, 79−136.

Basu, K. (1991) The Elimination of Endemic Poverty in South Asia: Some Policy Options,. In: Dreze, J. and Sen, A. (eds) *The Political Economy of Hunger, Volume HI: Endemic Hunger,* Clarendon Press: Oxford.

Berg, A. (1987) *Malnutrition: What Can be Done? Lessons from World Bank Experience,* Johns Hopkins University Press: Baltimore.

Bhatt, E. (1991a) Streamlining PDS: Better Targeting is the Key, *The Economic Times,* New Delhi, September 7 1991.

Bhatt, T. (1991b) Employment Programmes: An Assessment, *The Economic Times,* New Delhi, October 1.1991.

Bulletin of Food Statistics (1986), Government of India, New Delhi.

Census of India (1991) *Andhra Pradesh Provisional Population Totals, Paper 1, Series 2.*

Census of India (1991) *Tamil Nadu Provisional Population Totals, Paper 1, Series 23.*

Mohan, C. N. (1991) Adjustment with a Human Face?, *The Economic Times,* New Delhi, August 1 1991.

Chidambaram, G. (1989) *TINP: Terminal Evaluation, Volume 1.*

Cornia, G.A., Jolly, R. and Stewart, F. (eds) (1987) *Adjustment with a Human Face Volume I:* Protecting the Vulnerable and Promoting Growth, Clarendon Press: Oxford.

Department of Rural Development, Annual Report, Government of India, New Delhi.

Department of Women & Child Welfare (1991) *Status Reports on* ICDS, Government of India, New Delhi, September 30 1991.

Department of Women & Child Welfare, Ministry of Welfare (undated) *Draft National Nutrition Policy.*

Devadas, R. (1987) *Chief Minister's Nutritious Meal Programme: An Appraisal,* Government of Tamil Nadu, Madras.

FAO/WHO (1973) Energy and Protein Requirements, Report of a Joint FAO/WHO Ad Hoc Expert Committee, March 22 – April 2, 1971, *FAO Nutrition Meetings Report Series No. 522,* Rome, Italy; Geneva, Switzerland.

Gaiha, R. (1991) Poverty Alleviation Programmes in Rural India: An Assessment, *Development and Change,* 22, 117–154.

George, S., Abel, R. and Miller, B.D. (1992) Female Infanticide in Rural South India, *Economic and Political Weekly,* May 30 1992

Gillespie, S.R. (1988) Poverty Alleviation in India, In: Clay *et al.* (1988) *op. cit*

Gillespie, S.R. and Mason, J.B. (1991) *Nutrition–Relevant Actions: Some Experiences from the Eighties and Lessons for the Nineties,* ACC/SCN State–of–the–Art Series, Nutrition Policy Discussion Paper No. 10, United Nations, Geneva.

Government of Andhra Pradesh (1992) Directorate of Health and Family Welfare

Government of India (1987) Department of Rural Development, *Concurrent Evaluation of IRDP: Main Findings of the Survey for October 1985 to September 1986,* New Delhi.

Government of India (1988) *Seventh Plan: Mid–Term Appraisal Report,* New Delhi.

Government of Tamil Nadu (1989) *Terminal Evaluation of the Tamil Nadu Integrated Nutrition Project,* Government of Tamil Nadu, Madras.

Gupta, S. (1987) Inter–State Variations in Food Consumption, Nutritional Adequacy & Levels of Poverty, *USAID/India Occasional Paper No. 4,* New Delhi.

Harriss, B. (1991) *Child Nutrition and Poverty in India: Noon Meals in Tamil Nadu,* Concept: New Delhi.

Jennings, J., Gillespie, S.R., Mason, J.B., Lotfi, M. and Scialfa, T. (1991) *Managing Successful Nutrition Programmes,* ACC/SCN State–of–the–Art Series, Nutrition Policy Discussion Paper No. 8, United Nations, Geneva.

Jha, S. (1991) Targeting subsidies: What needs to be done, *The Economic Times* New Delhi October 16 1991.

Kakwani N. and Subbarao K. (1990) *Rural Poverty in India: 1973–86,* Working Paper, Policy, Research and External Affairs Division, World Bank, Washington D.C.

Karakal, M. and Irudeyarajan, S. (1991) *Economic and Political Weekly,* 23 February 1991.

Leslie, J. and Paolisso, M. (eds) (1989) *Women, Work and Child Welfare in the Third World,* AAAS Selected Symposia Series 110, Westview Press: Boulder, Colarado.

Lipton, M. (1983) *Poverty, Undernutrition and Hunger,* World Bank Staff Working Paper No 597 Washington DC.

Miller, B. (1981) *The Endangered Sex: Neglect of Female Children in Rural North India,* Cornell University Press: Ithaca, New York.

Ministry of Civil Supplies (1991) Government of Andhra Pradesh (personal communication), December 1991.

Ministry of Health and Family Welfare (1988) *Family Welfare Yearbook 1987–88,* Government of India.

Ministry of Health & Family Welfare (undated) *Policy on Management of Vitamin A Deficiency,* Government of India, New Delhi.

Ministry of Health and Family Welfare and UNICEF (1989) Report of the Meeting on Prevention and Control of Nutritional Anaemia, New Delhi, November 1989.

Mohan N. C. (1991) Adjustment with a human face? *The Economic Times,* New Delhi, August 1 1991.

National Institute of Nutrition (NIN) (1991) *Repeat Survey,* National Nutrition Monitoring Bureau, NIN, Hyderabad, India.

National Institute of Nutrition (NIN) (1991b) Unpublished data from Repeat Survey. National Nutrition Monitoring Bureau. NIN, Hyderabad, India.

Nutrition Foundation of India (NFI) (1988) *Integrated Child Development Services: A Study of some Aspects of the System.* NFI Scientific Report No. 7, New Delhi 1988.

National Institute for Public Cooperation and Child Development (NIPCCD) (1991)

Government of India (GOI) (1988) *Mid–term Appraisal of the Seventh Five Year Plan* (*1985–90*), Planning Commission, Government of India, New Delhi.

Government of India (1989) *Annual Plan 1989–90,* Planning Commission, Government of India, New Delhi.

Pulley, R.V. (1989) *Making the Poor Credit Worthy,* World Bank Discussion Paper, Washington DC.

Punhani, R. and Mahajan, R. (1989) *Research on ICDS: An Overview, Volume I (1975–85),* National Institute of Public Cooperation and Child Development, New Delhi.

Radhaiah, G., Vijayaraghavan, K. and Rao, N.P. (1985) Evaluation of NREP in Andhra Pradesh, *Journal of Rural Development,* 4 (3) May 1985.

Radhakrishna. R. and Indrakant (1987) *Effects of Rice Market Intervention Policies in Andhra Pradesh,* Working Paper No. 15, Centre for Economic and Social Studies (CESS), Hyderabad.

Radhakrishna, R. (1992) Trends in nutrition: Emerging challenges; and Nutrition: Need for effective intervention, *The Economic Times,* New Delhi, February 10 and 11 1992.

Rao P. R., Lakshmi R. R. *et al.* (1988) *Nutritional Content of Community Care Services Delivered Through Health and Non–Health Channels: A Multi–Centric Study,* National Institute of Nutrition, Indian Council of Medical Research, Hyderabad.

Reddy S.S. (1991) *Poverty and Agricultural Growth in Rural Andhra Pradesh: Inter District Analysis,* Centre for Economic and Social Studies, Hyderabad, India.

Reddy, V., Rao, P., Shekar, M. and Gillespie, S.R. (1992) *Nutrition in India, Part I,* ACC/SCN, Geneva.

Registrar General (1991) *Population of India, Census Results and Methodology,* Vital Statistics Division, 52–54.

Sarvekshana (1990) Volume 8, No. 4, Issue No 43, April–June 1990

Shekar M. (1991) *The Tamil Nadu Integrated Nutrition Project: A review of the project with special emphasis on the monitoring and information system,* Cornell Food and Nutrition Policy Programme Working Paper No. 14, Ithaca, New York.

Shrimpton R. (1989) *Community Participation in Food and Nutrition Programmes: An Analysis of Recent Governmental Experiences,* Cornell Food and Nutrition Policy Program, Ithaca, New York.

Subbarao, K. (1989) *Improving Nutrition in India: Policies and Programmes and Their Impact,* World Bank Discussion Paper No. 49, Washington DC.

Sundaram, K. and Tendulkar, S.D. (1985) Anti–Poverty Programmes in India: An Assessment, In: Mukhopadhyay, S. (ed) *The Poor in Asia: Productivity–Raising Programmes and Strategies,* Asian and Pacific Development Centre: Kuala Lumpur.

The Tamil Nadu Corporation For Development of Women Limited (1986) *Women in Tamil Nadu: A Profile.*

Tandon, B.N. *et al.* (1983) A Coordinated Approach to Children's Health in India: Progress Report after Five Years (1975–80) *Lancet ii,* 109–11.

Tandon, B.N. *et al.* (1984) Impact of Integrated Child Development Services on Infant Mortality Rate in India, *Lancet ii,* 157.

The Times of India (1992) *Job Guarantee Scheme in Tamil Nadu,* February 8 1992.

UNICEF (1990) *Children and Women in India: A Situation Analysis,* UNICEF, New Delhi, India.

UNICEF (1990) *Children and Women in Tamil Nadu: A Situation Analysis,* UNICEF, Madras, India.

UNICEF (1990) *Strategy for Improved Nutrition of Children and Women in Developing Countries,* Policy Review Paper E/ICEF/1990/1.6, UNICEF, New York; JC 27/UNICEF–WHO/89.4. Review, UNICEF, New York.

World Bank (1991) *Gender and Poverty in India,* The World Bank, Washington DC.

GLOSSARY

AWW	Anganwadi worker of the ICDS programme
CDPO	Child Development Project Officer of the ICDS programme
EPI	Expanded Programme of Immunization
ICDS	Integrated Child Development Services scheme
IEC	Information–Education–Communication
IMR	Infant Mortality Rate
IRDP	Integrated Rural Development Programme
MCH	Maternal & Child Health Programme
MDM	Mid–Day Meal programme
NIN	National Institute of Nutrition
NMP	Noon Meal Programme
NNMB	National Nutrition Monitoring Bureau
NREP	National Rural Employment Programme
PDS	Public Distribution System
RLEGP	Rural Landless Employment Guarantee Programme
TINP	Tamil Nadu Integrated Nutrition Project
UIP	Universal Immunization Programme

ABBREVIATIONS OF A.P. DISTRICTS (USED IN FIGURES)

WG	West Godavari
EG	East Godavari
Cu	Cuddapah
Kr	Krishna
Ra	Rangareddy

Na	Nalgonda
Pr	Prakasam
Gu	Guntur
Vs	Visakhapatnam
Kh	Khammam
Ku	Kurnool
Me	Medak
Ni	Nizamabad
Vz	Vizianagaram
Ch	Chittoor
Ad	Adilabad
Sr	Srikakulam
Wa	Warangal
Ne	Nellore
Ka	Karimnagar
An	Anantapur
Ma	Mahabubnagar

ANNEX: NATIONAL INSTITUTE OF NUTRITION

In the context of the proposed National Nutrition Policy it is imperative that a comprehensive knowledge of the prevalent national problems and their correlates are clearly known, and their precise interrelationship understood so that appropriate intervention strategies (long–term and short–term) can be formulated, implemented and monitored for their efficacy and impact. In keeping with this overall objective, the National Institute of Nutrition (NIN), since its inception in 1918, has been actively engaged in studying the problems of Nutrition at regional and country level and identifying feasible solutions to the problems.

In the 1970s, the Institute through special epidemiological studies defined the type and extent of nutritional problems, delineated their causality and identified the vulnerable segments of population. Having done that, NIN formulated appropriate intervention strategies for implementation through the existing health and welfare agencies. Notable examples of the studies, which paved the way for the integration of nutrition interventions with the country's health policy are:

- Studies on pre–school children
- Studies on Infant Feeding Practices
- Studies on nutrient supplementation such as:

    a) massive dose vitamin A distribution,
    a) iron and folic acid supplementation
    c) supplementary feeding and
    d) fortification of salt with iron and iodine.

The fact that the results of most of the above studies have become an integral part of the package of health services, delivered at primary health care level (village), is the proof of strength of the Institution in shaping the National Health Policy in as much as it concerns nutrition.

While pursuing its research goals in the laboratory, clinic and community, the Institute addressed itself to building–up of a sound and systematic database on diet and nutritional status of the people by establishing a National Nutrition Monitoring Bureau (NNMB) with the twin objectives of:

– conducting diet and nutrition surveys on a continuous basis, and
– undertaking impact evaluations of nutrition programmes periodically.

Thus, the Bureau since inception in 1973, has not only generated a bank of nutrition data from rural and urban segments of Indian population but also undertaken evaluation studies on various ongoing nutrition related actions like supplementary feeding, vitamin A prophylaxis, anaemia prophylaxis and applied nutrition programmes; and projects like India Population Project (IPP) in Kamataka and Integrated Child Development Services (ICDS). Results of these studies while highlighting the operational constraints of the programmes suggested ways and means of improving their performance and effectiveness.

Training of professionals involved in the implementation of nutrition–related programs is another important activity of the Institute. The major training courses offered are the Certificate Course in Nutrition for teachers from medical colleges, Master of Science (M.Sc. Applied Nutrition), Orientation Course for Middle Level Personnel and the Certificate Course in Human Nutrition for Teachers from Agricultural and Home Science Colleges.

UNITED NATIONS – ADMINISTRATIVE COMMITTEE ON COORDINATION – SUBCOMMITTEE ON NUTRITION (ACC/SCN)

The ACC/SCN is the focal point for harmonizing the policies and activities in nutrition of the United Nations system. The Administrative Committee on Coordination (ACC), which is comprised of the heads of the UN Agencies, recommended the establishment of the Subcommittee on Nutrition in 1977, following the World Food Conference (with particular reference to Resolution V on food and nutrition). This was approved by the Economic and Social Council of the UN (ECOSOC). The role of the SCN is to serve as a coordinating mechanism, for exchange of information and technical guidance, and to act dynamically to help the UN respond to nutritional problems.

The UN members of the SCN are FAO, IAEA, IFAD, ILO, UN, UNDP, UNEP, UNESCO, UNFPA, UNHCR, UNICEF, UNRISD, UNU, WFC, WFP, WHO and the World Bank. From the outset, representatives of bilateral donor agencies have participated actively in SCN activities. The SCN is assisted by the Advisory Group on Nutrition (AGN), with six to eight experienced individuals drawn from relevant disciplines and with wide geographical representation. The Secretariat is hosted by WHO in Geneva.

The SCN undertakes a range of activities to meet its mandate. Annual meetings have representation from the concerned UN agencies, from 10 to 20 donor agencies, the AGN, as well as invitees on specific topics; these meetings begin with symposia on topics of current importance for policy. The SCN brings certain such matters to the attention of the ACC. The SCN sponsors working groups on inter–sectoral and sector–specific topics. Ten–year programmes to address two major deficiencies, vitamin A and iodine, have been launched.

The SCN compiles and disseminates information on nutrition, reflecting the shared views of the agencies concerned. Regular reports on the world nutrition situation are issued, and flows of external resources to address nutrition problems are assessed. State–of–the–Art papers are produced to summarize current knowledge on selected topics. As decided by the Subcommittee, initiatives are taken to promote coordinated activities – inter–agency programmes, meetings, publications – aimed at reducing malnutrition, primarily in developing countries.