
Food Security and Nutrition: Vision 2020

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I. INTRODUCTION

The concept of food security has undergone considerable changes in recent years. Food availability and stability were considered good measures of food security till the seventies and the achievement of self-sufficiency was accorded high priority in the food policies of developing countries. Though India was successful in achieving self-sufficiency by increasing its food production and also improved its capacity to cope with year-to-year fluctuations in food production, it could not solve the problem of chronic household food insecurity.

This necessitated a change in approach and as a result, food energy intake at household level is now given prominence in assessing food security. It has become common practice to estimate the number of food insecure households by comparing their calorie intake with required norms. However, the widely accepted norms of the level of calorie intake required for overcoming under-nutrition have been questioned. Nutritionists argue that the energy intake is a poor measure of nutritional status, which depends not only on the nutrient intake but also on non-nutrient food attributes, privately and publicly provided inputs and health status (Martorell and Ho, 1984). The non-food factors which influence biological absorption are also considered as important for food security as food factors.

It is suggested that the assessment of malnutrition should be based on outcome measures rather than input measures (ibid). The suggested outcome measures include anthropometric measures, clinical signs of malnutrition, biochemical indicators and physical activity. Outcome indicators are more closely related to health and functional capacity. Among the outcome measures, anthropometric measures are considered to have an advantage over other indicators since body measurements are sensitive to even minor levels of malnutrition whereas biochemical and clinical indicators, on the other hand, are useful only when the level of malnutrition is extreme.

In policy design, a distinction is made between transient and chronic food security. Transitory food insecurity is associated with the risks related to either access or the availability of food during the off-season, drought and inflationary years and so forth. Policies such as those relating to price stabilization, credit, crop-insurance and temporary employment creation are initiated for stabilizing the consumption of the vulnerable groups. In contrast, the problem of chronic food insecurity is primarily associated with poverty and arises due to continuously inadequate diet. The strategy to overcome this problem includes intervention (agricultural production programmes, infrastructure, human resource development, etc.) to raise the purchasing power of the poor through the endowments

of land and non-land assets and by generating employment opportunities, as well as long-term growth-mediated interventions to improve food availability and incomes of the poor.

India is one of the few countries which have experimented with a broad spectrum of programmes for improving food security. It has already made substantial progress in terms of overcoming transient food insecurity by giving priority to self-sufficiency in foodgrains and through procurement and public distribution of foodgrains, employment programmes, etc. However, despite a significant reduction in the incidence of poverty chronic food insecurity persists in a large proportion of India's population. At the national level, we have solved the problem of food security which is reflected in mounting buffer stocks. Yet, there are millions of food insecure and undernourished people in India. The limitation is not food supply, but food distribution. Careful consideration of food security requires moving beyond food availability and recognizing the low incomes of the poor. It is also important to recognize the choices that households and regions face, including exploitation of natural resources when incomes fall short. Substantial human resources are wasted due to malnutrition related diseases. Vision 2020 should aim at complete eradication of food insecurity, both chronic and transient. Productivity generated by technological innovation particularly in less endowed areas and vibrant rural non-farm sector hold the key to eradicate food insecurity. The Asian countries which made substantial progress in the reduction of poverty, created productive off-farm opportunities. What factors are critical for facilitating this transition in the rural India? What are the required policy reforms and their companion institutional arrangements? Some of these issues are addressed in Radhakrishna (2002).

II. TRENDS IN FOOD PRODUCTION

Over the years, India has made rapid progress in the production of food (Table 1). The annual growth rate of food production including non-cereal food increased from 2.1 per cent during the 1960s to 3.0 per cent in the subsequent decade and further to 3.8 per cent during the 1980s. Between 1960 and 1980, food production barely kept pace with the population but in the 1980s per capita food production increased at a satisfactory rate of 1.6 per cent per annum. There seems to have been some diversification in food production in the 1980s on account of the impressive growth of output of oilseeds and livestock products. The diversification of food production more or less conforms to the growth pattern of domestic demand.

India achieved near self-sufficiency in the availability of foodgrains by the mid-seventies. The trend rate of foodgrain production improved from 2.3 per cent during the 1960s and 1970s to 2.9 per cent in the eighties (Bhalla and Singh 2001). It is particularly noteworthy that India could build enough buffer stocks to cope with year-to-year variations in foodgrain production. Field studies reveal that during the 1987 drought, stable foodgrain prices, PDS supplies and the availability of consumption credit enabled drought affected villages to maintain their consumption at the same level

as in normal years (Acharya, 1989; Bidinger, et al., 1990). The annual fluctuations in the per capita availability of foodgrains declined in the eighties and nineties when compared to the previous period (Rao and Radhakrishna, 1997) and there was a decline in the seasonal as well as regional variations in the prices of foodgrains (Bhalla, 1994).

Table 1
Annualised Compound Growth Rates of Food Production and Population Growth
 (Per cent per annum)

Year	Food production		Population Growth Rate
	Aggregate	Per capita	
1961-63 – 1971-73	2.11	-0.10	2.24
1971-73 – 1981-83	3.00	0.84	2.23
1981-83 – 1991-93	3.77	1.62	2.02
1991-93 - 1997-99	2.72	0.90	1.84

Sources: FAO, *State of Food and Agriculture*;

The growth of food production slowed down to 2.72 percent per annum in the nineties. Ironically, even at the low growth rate of foodgrain production, the supplies outstripped the effective demand and the nineties has seen a rapid increase in the stock of foodgrains held by the government. Disposal of stocks has become a cause of concern. The domestic supplies are more than adequate to prevent food gaps.

The relative cereal price which showed a decline in the seventies and eighties, registered a rise in the nineties. Moreover, in high inflation years, cereal prices rose even higher (Ravi, 2000). An increase in cereal price significantly reduce the calorie intake of the poor as their price elasticity of food/calorie estimates of price elasticity is numerically large. The upward trend in the real price of cereals in the nineties had coincided with a slowdown in the decline of poverty.

Despite favourable terms of trade for agriculture and normal behaviour of the South-West monsoon, the growth of food production has been sluggish during the nineties and agricultural product diversification in the poor rain fed areas from coarse cereals to oilseeds and horticultural production has come to a slowdown. The sluggish growth of agricultural production could be attributed to :

- (a) decline in public investment in agriculture particularly in irrigation since the early 1980s (the annual growth rate being 4.0 per cent in 1980s and 1.9 percent in the 1990s); as a result, expansion in irrigation input usage and technological improvement have slowed down in the last decade.

- (b) the low public investment on agricultural research (0.5 percent of GDP as against the 1 percent recommended by the ICAR) adversely affecting the technological progress in agricultural production;
- (c) decline in the annual growth rate of fertilizer consumption from 7.8 percent in the 1980s to 4.3 percent in the 1990s;
- (d) deceleration in the annual growth rate of area under HYV from 4.9 percent in the 1980s to 2.8 percent in the 1990;
- (e) intensive cultivation and depletion of soil fertility due to wheat-rice rotation year after year in the North-Western region.

India needs an agricultural growth rate of 4.0 to 4.5 per cent to reduce poverty and food insecurity significantly (Rao and Radhakrishna, 1997). This is within the reach. At this growth rate, agricultural development would diversify into dairying, animal husbandry, fisheries, floriculture, horticulture and other areas. These activities are likely to be labour intensive. The best strategy would seem to be to target a growth rate of about 2.2 per cent per annum and achieve it by improving the total factor productivity. This will make available more land and water resources for the cultivation of high value-added crops. If flexibility on the supply side is facilitated, production will adjust to the market forces and generate higher incomes in the rural areas. This would also spur the growth of agro-processing industries in rural areas.

The challenge to food security comes mainly from the slow growth of purchasing power of the people in the rain-fed eco-systems. Efforts must be made to help them by developing drought resistant seeds, cost-effective dry-land farming techniques. In addition, rain water harvesting techniques, moisture conservation, inter-cropping are imperative to stabilize and improve the production in the dry-land areas. It is also essential to explore the possibilities for cost-effective expansion of irrigation. Appropriate pricing of water, electricity and fertilizer and rationalization of minimum support prices would augment resources available for investment in irrigation, rural infrastructure and prevention of soil degradation.

III. FOOD AND NUTRIENT INTAKE

Cereal Consumption

NSS consumption data reveal that the per capita consumption of cereals has been declining since the early seventies (Radhakrishna and Ravi, 1992, Rao, 2000). Between 1970-71 and 1997-98, the per capita cereal consumption declined by 0.72 per cent per annum in the rural areas and by 0.74 per cent per annum in urban areas. The cereal consumption in rural areas fell from 15.35 kgs per capita/month

in 1970-71 to 12.5 kgs in 1997-98 while the same in urban areas fell from 11.36 kgs to 10.4 kgs during the same period. The declining trend is visible in most of the states. The decline is very prominent in Punjab and Haryana where the decline is as much as about 6 kgs per capita per month in rural areas. What is most striking is the low per capita intake of cereals in the most prosperous Punjab (9.8 kgs in rural and 9.7 kgs in the urban areas in 1997-98) and the converse in the backward state of Orissa (16 kgs in rural and 13.25 kgs in urban areas). The striking decline in cereal consumption is attributed to changes in consumer tastes and preferences towards superior food items as the incomes of the household increases (Radhakrishna and Ravi 1990, 1992). This is partly due to the diversification of the food basket in Punjab and Haryana in favour of superior non-cereal foods, particularly milk and milk products, vegetables and fruits, etc. More recently, Rao (2000) has shown that the decline has been sharper in the rural areas where improvements in rural infrastructure made other food and non food items available to the rural households. Reduction of manual work in agriculture due to farm mechanization might have also reduced the felt need for cereals. Rao further observes that a reduction in the intake of food grains on this account should not be taken as a deterioration in human welfare.

IV. FOOD EXPENDITURE, FOOD CONSUMPTION, AND CALORIE INTAKE

Data from NSS surveys show that per capital consumer expenditure at constant (1990-91) prices steadily increased since 1970 both in rural and urban areas. It increased around 1.5% per annum in both the areas during '70s and '80s; and around 1.2% per annum in rural areas and 2.8% per annum in urban areas during the '90s (Table 2). It appears that economic reforms benefited the urban households more than the rural ones. But the increase in consumption expenditure did not reflect in food expenditure. Per capita food expenditure at constant prices increased around 0.9 per cent per annum during the first two decades while it declined at 0.9 per cent per annum in rural areas and stagnant in urban areas during the last decade.

Per capita cereal consumption expenditure at constant prices declined both in rural and urban areas throughout this period for all the expenditure classes, except the bottom 30% during the first two decades (Table 2). The decline is more in rural areas than in urban areas. The fall in cereal consumption was more than compensated by increased consumption of non-cereal food during the first two decades and as a result, per capital calorie intake increased at 0.2 per cent during this period both in rural and urban areas. However, this did not continue during the '90s when the per capita calorie intake fell by about 0.4% in urban areas and by twice as much in rural areas. It implies that the consumption of non-cereal food items could not compensate the loss of energy intake due to fall in cereal consumption during this period.

In the case of the bottom 30% of the population, there has been hardly any perceptible improvement in the cereal and nutrient intake in the rural and urban areas despite a significant improvement in their real per capita expenditure. There has been a substantial diversification of the consumption basket of the poor in favour of non-cereal food items such as milk and milk products, sugar and gur and other food items. These tendencies would not be a major cause of concern if the intake levels were nutritionally adequate. The per capita intake of the bottom 30% at 1600 – 1700 K.Cal/day, falls short of the required norm. The food gap of the bottom 30% can be met by providing to them around 10 million tones of foodgrains.

Table 2
Growth Rates of Total Expenditure, Food Expenditure and the Cereal Expenditure at 1990-91
Prices
and Per Capita Calorie Intake
(Per cent per annum)

	Bottom 30%	Middle 40%	Top 30%	All classes
Rural				
Per capita cereal expenditure				
1970-89	0.09	-0.58	-1.28	-0.69
1990-98	-1.38	-2.34	-2.43	-2.14
Per capita food expenditure				
1970-89	1.34	0.87	0.74	0.89
1990-98	-0.48	-0.78	-1.12	-0.88
Per capita calorie intake				
1970-89	0.16	0.15	0.40	0.23
1990-98	-0.96	-1.63	-1.76	-1.53
Per capita total expenditure				
1970-89	1.71	1.40	1.45	1.54
1990-98	1.19	1.11	1.23	1.18
Urban				
Per capita cereal expenditure				
1970-89	0.07	-0.33	-0.18	-0.18
1990-98	-0.67	-0.55	0.30	-0.28
Per capita food expenditure				
1970-89	1.29	1.19	0.69	0.97
1990-98	0.08	0.03	-0.23	-0.08
Per capita calorie intake				
1970-89	0.31	0.05	0.32	0.21
1990-98	-0.58	-0.74	-0.05	-0.44
Per capita total expenditure				
1970-89	1.44	1.50	1.40	1.45
1990-98	1.70	2.27	3.31	2.77

Source: Ravi (2000).

Micro nutrient deficiency is equally common among the population, more so in the vulnerable groups such as women and children. These two groups are more prone to certain deficiencies than the adult male population. Iodine deficiency is common among the populations living in the sub-Himalayan region and other hill regions of the country. Vitamin-A deficiency, which leads to preventable blindness in the children is more common among the children from the rural households. Iron deficiencies widely prevalent among the pregnant women. As per the latest NFHS-2 survey, about half of the pregnant women suffer from iron deficiency and consequent anemia – 35 per cent suffer from mild anemia, 15 per cent from moderate and 2 per cent from severe.

Even though the question of desirable diet from nutritional perspective is still controversial, we can make certain policy options to overcome the nutritional deficiencies. The most important problem to be attended is to increase the energy intake of the bottom 30% of the expenditure class. The deficiency of energy intake of the bottom 30% can be rectified by increasing agricultural productivity in rain fed areas, making available food at an affordable price through the public distribution system (PDS), and other poverty alleviation programmes. The micro-nutrient deficiency can be cost-effectively rectified by supplementary nutritional programmes to the children and the expectant and lactating mothers.

V. NUTRITIONAL STATUS

The National Nutrition Monitoring Bureau (NNMB) and National Family Health Survey (NFHS) provide data on nutritional status general as well as vulnerable groups using Gomez classification (in case of children) and bio-mass index (BMI) classification in the case of others. The NNMB data show that the instance of under-nutrition among children and chronic energy deficiency (CED) among other population, even though slowly declining still alarmingly high in the late nineties and their incidence is higher than that of income poverty.

The percentage of children suffering from severe malnutrition in rural areas of eight states covered by the NNMB declined from 15.0 in 1975-79 to 6.4 in 2000-01 (Radhakrishna 2000). If moderate and severe malnutrition is taken together, the percentage of children suffering from malnutrition declined from 62.5 to 47.7 per cent during the same period (ibid.). The decline in the percentage of severely malnourished children is visible across all National Nutrition Monitoring Bureau (NNMB) sample states except Orissa. The decline is very striking in Kerala and Tamil Nadu. In spite

of some improvement in nutritional status, nearly half of the rural children are suffering from malnutrition.¹

State	Malnutrition among children					CED among Adults
	Rural (1993) NFHS*	Urban (1993) NFHS*	Total (Rural and Urban) (1993)NFHS*	Total (Rural and Urban) 1998-99 NFHS**	Rural 2000-01 NNMB***	1996 Rural NNMB@
Andhra Pradesh	52.1	40.2	49.1	37.7	39.9	39.9
Assam	51.8	37.3	50.4	36.0		
Bihar	64.1	53.8	62.6	54.4		
Gujarat	45.8	40.5	44.1	45.1	48.9	53.1
Haryana	39.4	33.0	37.9	34.6		
Himachal Pradesh	48.3	30.2	47.0	43.6		
Jammu & Kashmir	N.A.	N.A.	44.5	34.5		
Karnataka	N.A.	N.A.	N.A.	43.9	47.6	53.8
Kerala	30.6	22.9	28.5	26.9	28.8	33.2
Madhya Pradesh	59.4	50.1	57.4	55.1	63.9	53.3
Maharashtra	57.5	45.5	52.6	49.6	52.2	51.0
Orissa	N.A.	N.A.	55.3	54.4	54.4	57.3
Punjab	47.4	40.0	45.9	28.7		
Rajasthan	41.1	43.9	41.6	50.6		
Tamil Nadu	42.1	32.3	46.6	36.7	39.0	37.3
Uttar Pradesh	N.A.	N.A.	49.8	51.7		
West Bengal	N.A.	N.A.	56.8	48.7		
Arunachal	40.3	36.2	39.7	24.3		
Manipur	31.6	25.9	30.1	27.5		
Nagaland	30.5	19.7	28.7	24.1		
Tripura	50.0	31.6	48.8	N.A.		
Meghalaya	47.2	37.5	45.5	37.9		
Mizoram	34.5	22.0	28.1	27.7		
All-India	59.9	45.2	53.4	47.0	47.7+	48.5+

*Children under 4 years, Weight for age, Percentage below two standard deviations, NFHS-1

**Children under 3 years, Weight for age, Percentage below two standard deviations, NFHS-2

***Children between 1-5 years, Weight for age, Gomez Classification, NNMB

@ BMI < 18.5 kgs./m²

+ All-India estimate is an average of its 8 sample states

There are substantial inter-state variations in the malnutrition levels of children under-five years; in 2000-01, the percentage of moderately and severely malnourished children varied between 29 in Kerala and 64 in Madhya Pradesh (Table 3). In terms of nutritional status of children, middle-income states such as Kerala, Tamil Nadu and Andhra Pradesh performed better than higher-income states like Gujarat and Maharashtra. Not surprisingly, poorer states such as Madhya Pradesh and

¹ Children of the poor communities suffering from malnutrition not only do not achieve full genetic growth potential and end up as adults with small body size but are also exposed to a greater risk of child mortality. Pelletier et.al. (1996) identify malnutrition as a major cause of death in developing countries. Their results reveal that malnutrition, by virtue of its synergistic relationship with infectious disease has a powerful impact on child mortality in India.

Orissa showed worst performance. It is worth noting that with low food energy intake, Kerala and Tamil Nadu could perform better. National Family health Survey (NFHS) data also reveals similar pattern (Table 3).

NNMB data indicate that in 1996, around half of the rural adult population in the eight sample states suffered from Chronic Energy Deficiency (CED) and the extent of malnutrition among the adults was almost as much as that of children (Table 3). The regional patterns are similar to those of malnutrition among the children (NNMB). CED was found to be lower in Kerala (33 percent) and Tamil Nadu (37 percent) and higher in Gujarat, Maharashtra and Madhya Pradesh (above 50 percent).

Inter-state variations reveal weak correlation between nutritional status and calorie consumption. The state-level mismatch between food intake and nutritional status could be attributed to the differences in education, health, availability of safe drinking water, environmental sanitation and personal hygiene which intervene between the food intake and nutritional status. A better environment would reduce food wastage due to infections and diseases. The better nutritional status at a comparatively lower level of food consumption in Kerala and Tamil Nadu could be due to the better health care and nutritional interventions².

Does all this imply that the calorie intake matters little? While empirical evidence tends to suggest a positive association between the calorie intake and nutritional status, the responsiveness is likely to be affected by the factors relating to health and environment. What is a desirable diet from a nutritional perspective thus remains unsettled in view of the controversies. It is also unclear as to how much of the malnutrition is due to an inadequate diet and how much due to the environment³

VI. PUBLIC DISTRIBUTION SYSTEM (PDS)

India has a large programme of public food distribution through fair price shops, accounting for a significant part of the government's budgetary subsidies. The PDS in its present form—a producer price-support-cum-consumer subsidy programme—has evolved in the wake of foodgrain shortages of the sixties. It was then mainly confined to urban and food deficit areas with its emphasis primarily on

2 Kerala and Tamil Nadu have better health care and educational facilities and coverage of the PDS. The per child public expenditure on nutrition as well as per capita public expenditure on social sector have been high in these two states for the past few decades.

3 Sekler (1982) observes that severe malnutrition is caused by nutrient intake deficiency and the 'moderate' and 'mild' malnutrition is due to environmental factors. He argues that the former problem calls for nutritional intervention and the latter environmental intervention. There is as yet, not much empirical basis for his position.

price stabilisation till the late seventies. The welfare dimension of the PDS has gained importance since the early eighties and its coverage has been extended to rural areas in some states as well as to areas with a high incidence of poverty. The food subsidy of the Central Government, at Rs.17,612 crores, accounted for 0.89 per cent of GDP in 2001-02. In the wake of economic reforms, the PDS is perceived to be the main safety net to protect the poor from potential short-run price-induced adverse effects of economic reforms.

PDS supplies have increased rapidly since the mid-sixties: the annual average supply increased from 6.5 million tonnes during 1961-65 to 18.4 million tonnes during 1990-92, declined to 12.86 million tonnes in 1994-95 and then increased to 18.69 million tonnes in 1998-99. A noteworthy feature of these trends is the response of government supply to fluctuations in production; it is higher in drought years than in normal ones. For instance, in 1979-80 and 1987-88—the years associated with low foodgrain production—the government supplies were substantially higher than in normal years. In both the years, the government increased the supplies through both PDS and employment generation programmes to prevent famine, though the procurement levels were lower than in normal years. It is noteworthy in this context that there were only a few instances of deaths due to starvation.

The recent large increases in procurement prices and the consequent upward revisions in the central issue prices have had an adverse impact on the efficacy of the PDS. The price advantage to the farmers has resulted in the parastatal Food Corporation of India (FCI), buying up more wheat and rice than it can manage for the simple reason that it had no option but to buy whatever is offered to it at the minimum support price. The procurement of cereals for Central pool was 35 mt in 2000-01 and 46 mt in 2001-02 as against the off-take of cereals of 11 mt in 2000-01 and 12 mt in 2001-02. Buffer stocks have reached uneconomic levels of 46 mt on 1st January 2001 which further increased to 58 mt on 1st January 2002, exceeding the norms. The carrying cost of buffer stocks accounted for 42 per cent of the Central food subsidy in 2001-02.

The substantial increases in minimum support price (MSP) benefited mainly the farmers with marketable surplus from Punjab, Haryana, Western U.P. and Andhra Pradesh, which account for 80 per cent of wheat and rice procurement. In other states without food procurement, wheat and rice have been sold at less than MSP as market could not absorb all the market arrivals at high MSP.

It is important to ask whether the poor have benefited from the increased tempo of the PDS operations and what is the efficacy of the PDS in distributing food to the poor. Many empirical studies have shown severe biases in the inter-regional distributions of the PDS supplies—states with the high incidence of poverty such as Bihar, Orissa and Madhya Pradesh received a lower share. Further, with

few exceptions, the PDS remained an untargeted programme (Radhakrishna, et al., 1997). In comparison with other anti-poverty programmes, PDS has been found to be the costliest (ibid). PDS has been found to deliver 100 kcal of nutrients at three times the cost under the direct nutrition programmes like integrated child development scheme(ICDS). In terms of cost of per rupee income transferred, PDS has also been found to be inferior to employment programmes.

Re-focusing of PDS should be a priority task. Welfare gains from food subsidy can be substantially enhanced by rationalizing minimum support prices scheme and improving the targeting efficiency of subsidized food distribution. If India sustains a growth rate higher than 6 per cent per annum and succeeds in maintaining food price stability, there may not be much need for subsidized grain distribution after 2010 other than for feeding the malnourished children, aged etc. and for food distribution in extreme scarcity situations in drought prone areas. However, fresh challenges to PDS may come from price volatility in the world market. Price stabilization will soon emerge as a major function of food management.

VII. FOOD DEMAND

The food demand will be driven by income and population growth, urbanization, food prices and income distribution. Food demand projections have been made using the piece-wise linear expansion system (LES) model developed at Centre for Economic and Social Studies(CESS), Hyderabad. The projections given below assume real expenditure growth of 5 per cent per annum between 2000 and 2020, increase of population to 1.343 billion in 2020, rate of urbanization and rural-urban disparity consistent with the historical trends and the inequality in the income distribution and relative prices same as in 1998. Under these assumptions, the demand is projected to grow at 2.2 per cent for cereals during 2000-10 and 2.0 per cent during 2010-20, 3-4 per cent for edible oils and pulses, and 4-5 per cent for milk and milk products, meat, fish, eggs, fruits, vegetables, sugar and gur.

At the current cereal intake of 143 kgs./per capital/annum, cereal requirement for household consumption will be around 192 million tons in 2020. The requirement will be more if the increase in household demand due to income growth is also considered. At 5 per cent per annum growth in total expenditure, and population of 1.343 billion, household cereal demand works out to 221 million tons in 2020 and for foodgrains 241 million tons (Table 4). With a grossing factor of 1.14, the total (household plus non-household) demand for cereals may be around 253 million tons. The above cereal demand projections are made with the assumption of stability of tastes and preferences in food consumption. If the secular trend of food grain production as witnessed during the last two decades is sustained, the production of additional 57 million tons of cereals and 76 million tons of total food grains in the coming two decades may not be out of reach for India. The demand projections may turn

out to be on a higher side if the secular trend of change in consumer preferences away from cereal consumption persists. Demand for superior food items such as dairy and animal husbandry products, sugar, fruits and vegetables are expected to grow much faster during the coming decades. The estimated demand in 2020 for milk and milk products will be around 166 million tons, edible oils 11 million tons, meat, fish and eggs 11 million tons, sugar and gur 25 million tons and fruits and vegetables 113 million tons. However, there may be a significant growth of demand for feed grains as milk consumption is likely to increase at a high rate. The balance of 35 million tons over and above the direct household cereal consumption can absorb any reasonable increase in feed grain demand.

A major challenge to food security comes from dietary diversification of the poor. If cereal pricing is left to the market forces, government playing the facilitating role, land will be released from rice and wheat cultivation to meet the growing demand for non-cereal crops such as oilseeds, fruits and vegetables in accordance with diet diversification. This policy would facilitate agricultural diversification in tune with emerging demand patterns. Long term food security demands that research in production technology of non-cereal food as well as technology access to the poor small producers should be promoted. Improvement in the quality of food items and reduction in transaction costs associated with their market access need to be policy priorities.

Table 4: Projections of Households food demand - All India		
(million tons per annum)		
	2010	2020
Rice	97.99	118.93
Wheat	72.07	92.37
Other Cereals	14.11	15.57
All Cereals	181.12	221.11
Pulses	14.58	19.53
Food grains	195.69	240.64
Milk & Milk Prod.	106.43	165.84
Edible Oils	7.67	10.94
Meat and Fish	7.25	10.80
Sugar & Gur	17.23	25.07
Fruits & Vegetables	75.21	113.17

VIII. WTO AND FOOD SECURITY

The Indian agricultural scene has witnessed changes following the economic reforms in the nineties as well as with the establishment of World Trade Organisation (WTO) in the mid-nineties. While the world trading environment has become more liberal, transparent and rule bound than before, it would have become even more favourable had the developed countries adhered strictly to the Uruguay Round agreement and permitted better access to imports from developing countries.

India seems to be a victim of thirty years of agricultural policy with an exclusive focus on spreading HYV seed fertilizer technology in a few potential regions for achieving food self sufficiency. Consequent to the adoption of this strategy India achieved self-sufficiency in foodgrains by the mid-seventies and is currently facing the problem of disposing off huge foodgrains stocks. It is observed that self-sufficiency in foodgrains is partly due to the weak purchasing power of the poor. As a remedial measure it is suggested that India should diversify its agriculture and get a foothold in the world food market. The diversified and accelerated agricultural growth would enhance the food security by improving the purchasing power of the poor.

However, even after the establishment of WTO, the agricultural trade did not improve much during the transition period since agricultural prices have sharply declined in the world markets and there has been no reduction in the degree of protection by the developed countries. The protectionist measures are coming in the form of non-tariff measures and preventing the entry of agricultural commodities from developing countries by resorting to anti-dumping restrictions in one form or another. Some concessions under the Green and Blue Boxes do not favour developing countries. Some of these concerns should figure in future negotiations.

The deceleration in the agricultural growth during the nineties is more due to internal factors such as decline in public investment in agriculture (irrigation and research) slow down in the growth in fertilizer consumption. Slow rise in the expenditure on agricultural research and so on. It is argued that if India is to benefit from the emerging opportunities opened up by liberalized agricultural trade, major reforms have to be undertaken on the domestic front. It is recognized that cereal prices in the world market which have declined during the nineties are unlikely to rise on account of reforms in the developed countries. Fresh challenges also have come from the sharp fall in the international price of some commercial crops. For instance, Kerala's agricultural economy has been severely affected by a dramatic drop in world prices which has led to greater transient poverty among its farming community. As domestic food economy gets integrated with the world market, it will experience price volatility.

India should depend on cost-reducing technology through domestic reforms, promote agricultural diversification and put pressure on the developed countries to open up their markets for value added agricultural products. While formulating an appropriate agricultural strategy some key issues of concern are ⁴:

- (a) How to utilise the emerging opportunities from liberalised trade for the diversification of economic activities in rural areas?
- (b) What reforms are needed to improve the purchasing power of the poor?
- (c) What type of safety nets are needed to protect the domestic food security from the fluctuations in international agricultural prices which are more volatile than domestic prices?

IX. CONCLUDING OBSERVATIONS

While India achieved success in combating transient food insecurity caused by droughts or floods, it miserably failed to make much dent in chronic food insecurity as reflected in the low energy intake and high incidences of malnutrition. The overall improvement in nutritional status has also been very slow. There is a chronic under-nourishment in about half of the population, particularly among the vulnerable groups of children, women and elderly from the lower half of the expenditure class. Curiously, the proportion of consumption expenditure spent on food is slowly going down even in the households with chronic under-nourishment. Under nourishment in the bottom 30% of the expenditure class is alarming. And even the middle 40% is not free from it. The mounting food stocks miserably failed to banish mass under-nourishment. While the current growth rate would significantly reduce income poverty by 2010, the chronic food insecurity is likely to persist. Moreover, with the recent shift to a more market-oriented and outward-looking macro-policies, the poor are likely to be exposed to the resultant risk of market uncertainties. As a result several types of programmes need to be targeted exclusively to the poor aimed to (i) eliminating transient food insecurity on account of inadequate access to food in periods of crises (ii) reducing chronic food insecurity by enhancing their capabilities to participate in the growth process (iii) reducing malnutrition among pre-school children and women and (iv) improving basic services (safe drinking water, health care etc.) to the poor. The portfolio of poverty alleviation programmes (PAP)s should be contextual and suit the specific needs of the poor communities. Socially excluded groups are highly heterogeneous and, therefore, poverty reducing effects of any intervention based on a uniform package of programmes would be weak.

⁴ C.H. Hanumantha Rao has suggested an agricultural strategy for accelerating agricultural growth in the changed context. See his presidential remarks in Krishna Rao (2000). See also Rao and Jeromi (2000).

Improvement in food consumption is a necessary but not a sufficient condition for overcoming the problem of malnutrition in India. Apart from inadequate food consumption, the other important causes of malnutrition are high incidence of gastrointestinal and respiratory infections and behavioural factors such as faulty child feeding and weaning practices, all of which contribute to the low absorption of nutrients from the food consumed. Economic growth, left to itself, may not have a dramatic impact on nutritional status in the near future, although it provides greater opportunities for public intervention. Effective and efficient food and environmental interventions are needed until all the citizens are adequately fed.

[(This paper substantially draws on Rao and Radhakrishna (1997) and Radhakrishna (2002)]

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