

**Towards a Food Secure India and South Asia :  
Making Hunger History**

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## **Contents**

I.	Introduction	1
II.	Status of Food Security	2
III.	Trends in Food Supply and Demand	6
	Trends in Food Production	6
	Trends in Food Consumption	9
	Trends in Nutrition	11
	Food Requirements	12
IV.	Analysis of Food Security Situation	15
	Availability	15
	Access	19
	Utilization/Absorption	20
	Stability	21
	Linkages with Millennium Development Goals (MDGs) and SAARC Development Goals (SDGs)	21
V.	Programmes and Activities of Different Sectors for Food Security	23
	Lessons Learnt from Past Initiatives	23
	Ongoing Programmes and Activities	24
VI.	Issues and Challenges	26
VII.	Future Vision, Major Policies, Strategies and Programmes of Food Security	30
VIII.	South Asian Solidarity for Food Security	40
IX.	References	45

# **Towards a Food Secure India and South Asia: Making Hunger History**

**R.B. Singh\***

## **I Introduction**

The FAO convened World Food Summit, 1996, defined food security as "physical and economic access at all times, to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life." The concept has further been refined and enlarged, as elaborated by the National Commission on Farmers (NCF, 2006), which implies that every individual has the physical, economic, social and environmental access to a balanced diet that includes the necessary macro and micro nutrients, safe drinking water, sanitation, environmental hygiene, primary healthcare and education so as to lead a healthy and productive life.

Further, food security has three inter-dependent dimensions: (a) National or Macro Food Security, essentially amounting to the local (domestic) availability of food (b) Household Food Security and (c) Individual Food Security, the latter two largely determined by the physical and economic access to the available food. Moreover, food security concept has temporal and spatial dimensions which underpin that food must originate from efficient and environmentally benign production technologies that conserve, enhance and sustain the natural resource base of crops, farm animals, forestry, and inland and marine fisheries.

The world produces and stocks more than enough food to feed the global population. Yet, about 850 million people are food insecure. Population projections suggest that by the year 2015 the world's population will be around 8.3 billion, and to adequately feed this number of people, the present world food production will have to be more than doubled (FAO, 2007). This will have to be attained from natural resources (land, water and biodiversity) which are increasingly becoming scarce, degraded and vulnerable to the climate change, underpinning the significance of appropriate technologies, knowledge support systems and policies which will increase resource use efficiency and productivity.

The share of GDP Agriculture to total GDP in most developing countries has been declining, but the degree of direct dependence of the people on agriculture continues to be high, hence the declining and stagnating farmers' income and widening rural-urban divide. This situation has occurred due to stagnation or decline in domestic production, and the marginal and poor farmers are the worst sufferers. Agricultural growth will thus have to be revived and accelerated. The recent steep rise in international prices of foodgrains is providing a major handicap to low-income food deficit countries and is exacerbating food insecurity.

As regards South Asia, comprised of Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka, the region accounts for 23 per cent of the world's population, but generates hardly 2 per cent of the global income. Housing 40 per cent of the world's poor

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(living on less than US\$ 1 a day) and 35 per cent of the world's under-nourished, the region has the highest concentration of poverty and hunger in the world. More than 56 per cent of the world's low-birth-weight babies are born in South Asia. Although the percentage of under nourished people in the South Asian region as a whole during the triennium ending 2003 had declined to 22 per cent from 26 per cent during the base line triennium 1990-92, the number of hungry had increased by over 8 million people during the same period.

Focusing on India, despite the Green Revolution, in number terms, the country is home to one-fourth of the world's hungry and poor. During the last one decade, despite having achieved national level (macro) food security and the boost in the overall GDP growth, agricultural production and rural income growths have slowed down considerably and outstripped by the population growth rate. With little reduction in the number of undernourished and poor people, the country is far behind in achieving the Millennium Development Goals and the targets set at the World Food Summit.

The high and increasing population pressure notwithstanding, slow down in production growth and the distributional and economic access problems have aggravated the household and individual level (micro level) food insecurities. The deceleration in GDP agriculture and the boost in GDP non-agriculture had widened farmer – non farmer income and the huddle of under-nourished rural people has increased in recent years. Further, the absorption food security, especially in rural areas and urban slums, continues to be unsatisfactory.

The paper begins with a detailed analysis of the various elements of food security, then it describes the various policy and programme restructurings and interventions to meet the challenges and constraints encountered and highlights the ongoing and additional efforts needed for achieving the Millennium Development Goals. Finally, country perspectives for South Asian strategies on sustainable and comprehensive food security have been discussed.

In recent years, the food security and agrarian distress issues have been analysed by the Government, Government-appointed bodies, viz. the 2006 Report of the National Commission on Farmers (NCF) entitled “Serving Farmers, Saving Farming: From Crisis to Confidence”, the National Planning Commission document entitled “Agricultural Strategy for the Eleventh Plan : Some Critical Issues” 2007, the National Development Committee's Sub-Committee on Agriculture and Related Issues (Chaired by Hon'ble Agriculture Minister, 2007), and by the academia. This paper draws considerably from these recent major reports/studies.

## **II Overview of Food Security**

The Green Revolution, launched in the late 1960s, had overwhelmingly impacted the various dimensions of food security. It helped India triple its foodgrain production between 1968 and 2000 and consequently in halving the percentages of food insecurity and poverty (even though the population had almost doubled during the same period), thus rendering India a food self-sufficient nation (at macro level) - indeed a laudable achievement. Per caput dietary energy supply (DES) increased from 2370 kcal/day in 1990-92 to 2440 kcal/day in 2001-03, and prevalence of under-nourishment in total population decreased correspondingly from 25 to 20 per cent (Table 1). Between 1993/94 and 1999/2000, 58 million individuals came out of the poverty trap, the number of poor

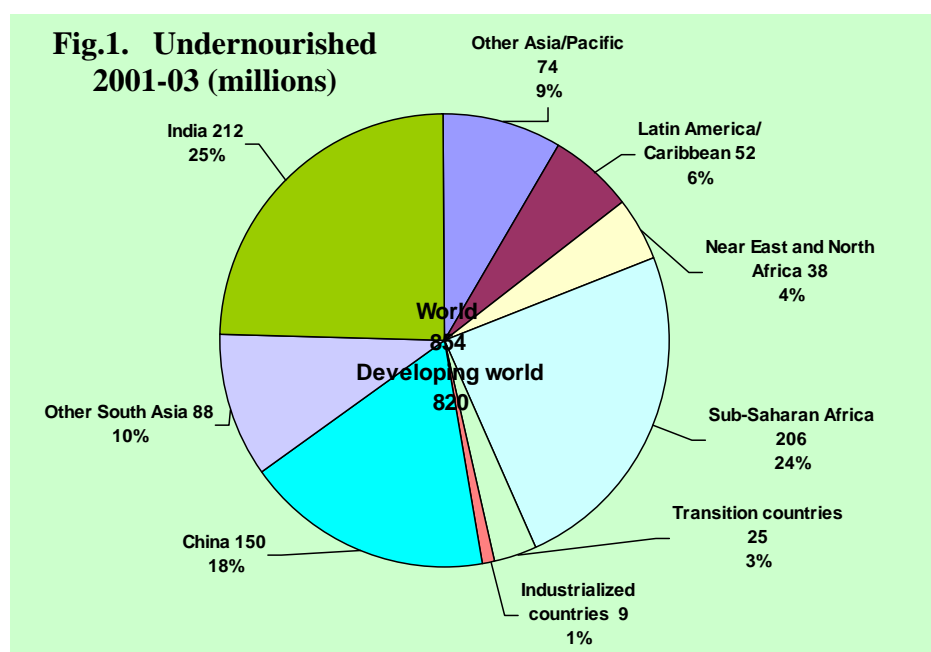
dropping from 317 million to 259 million. Other livelihood indicators such as literacy rate and longevity also increased significantly. Life expectancy at birth in 2005/06 was over 63 and 66 years respectively for males and females against 58 and 59 years in 1986-91 (Agricultural Statistics at a Glance, 2007).

**Table 1 : Per capita dietary energy supply (DES) and prevalence of undernutrition in total population**

Year	Dietary energy supply (kcal/day)	Prevalence of undernourishment (%)
1990-92	2370	25
1995-97	2450	21
2002-2004	2470	20

Source : FAO, RAP, 2007/15

The above achievements of macro level food security and discernible improvement in the per capita consumption and India's ability to address the problem of mass hunger, starvation and food shortages notwithstanding, having 212 million of the 854 million under- and mal-nourished people of the world, based on the numbers available for triennium ending (TE) 2003 (Fig.1), the country is home to one-fourth of the world's under-nourished people. The latest available figures (2005-07) show that while the percentage of undernourishment remained at 20 per cent, the number at 221 million surpasses the base year of the World Food Summit by six million (Table 2). This situation is ascribed primarily to the high and increasing population pressure (nearly 16 million being added annually to the already 1.1 billion population) and to the distributional and economic access problems, aggravating the household and individual level food insecurities.



Source: FAO, 2006

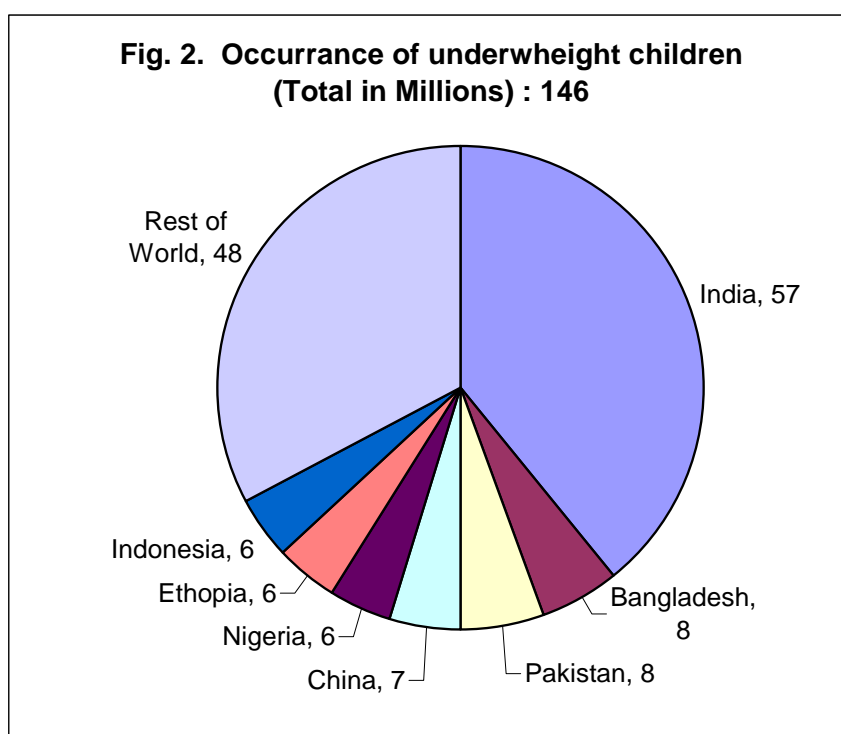
As regards nutritional security, as per FAO's latest food insecurity report, micronutrient and vitamin A deficiencies posed greatest health problems in India. Nearly 57 per cent of the pre-school children in India suffered from vitamin A deficiency against 41 percent in

Sub Saharan Africa and 16 percent in China. In 2005, in India infant mortality rate (under 1) was 56. As per NFHS – 3, 19 per cent of our children are wasted, 38 per cent are stunted and 46 per cent are underweight, accounting for 39 per cent of world’s underweight children (Fig. 2).

**Table 2. Number and percentage of undernourished people in India since the base year (1990-92 World Food Summit)**

Year	Total Population (Million)	Undernourishment	
		Number (Million)	Per cent
1990-92	863	215	25
1995-97	949	202	21
2001-03	1050	212	20
2005-07	1116	221	20

Source : Ministry of Agriculture, GoI and FAO 2007.



Source: FAO, RAP, 2007

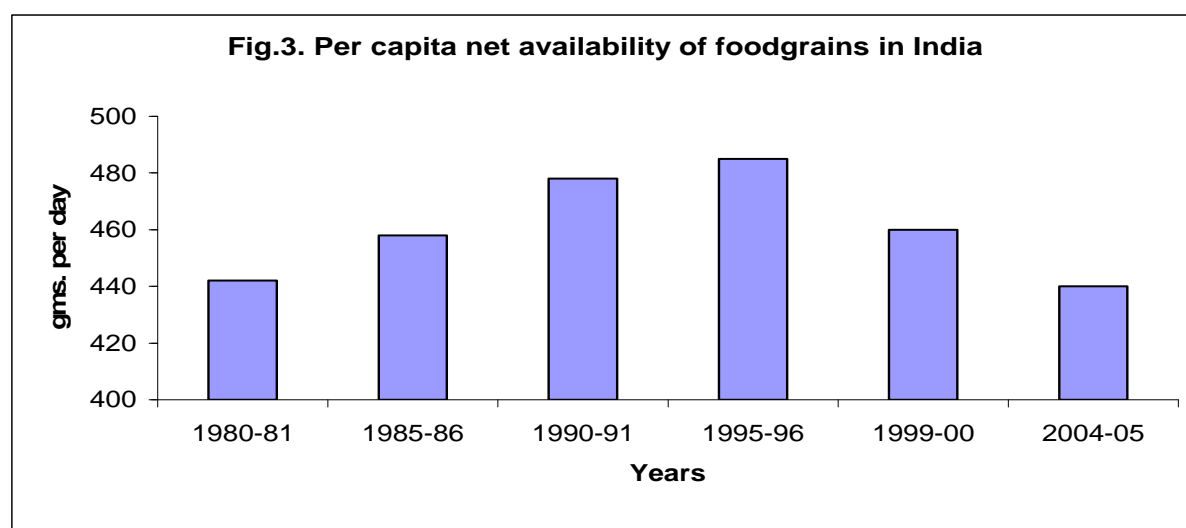
The manifestation of food insecurity can be categorised as (1) chronic food insecurity, (2) nutritional insecurity, (3) insecurity caused by lack of food absorption and (4) transitory food insecurity. There are both supply side and demand side factors that may lead to chronic food insecurity. On the supply side are: (a) food production, (b) imports and (c) distribution (public distribution system or PDS). The demand side depends on : (i) population growth (ii) purchasing power, (iii) product price/subsidy and (iv) extent of social community support such as the Integrated Child Development Services Scheme (ICDS), Food for Work Programme, National Rural Employment Guarantee Scheme, etc. There are some groups of people who are more at risk than the chronically food insecure people for not getting sufficient and adequate food. The most vulnerable under this category are the pregnant and nursing mothers, unborn babies, as well as children under five, as they are in critical period of their lives where they have special nutritional needs.

There are serious concerns relating to the adequacy of food intake. Output of cereals increased at a much faster rate than population during the post Green Revolution period till mid 1990s, peaking to 501 gm per day in 1995/96. Since then it has declined to 446 gms/day during 2001-2005. The output of pulses has remained almost stagnant for a long time. Consequently, per capita availability of pulses, a major source of protein in the country, showed a sharp decline (Table 3), thus aggravating the protein deficiency. Now, even cereals production has stagnated causing per capita availability to decline. In fact, the per capita net availability of foodgrains in 2004/05 was at the same level as in 1980/81(Figure 3).

**Table 3: Per capita per day availability (in gms) of foodgrains in India since 1971**

Period	Cereals	Pulses	Foodgrains
1971-1975	393	44	437
1981-1985	417	39	456
1991-1995	445	37	482
2001-2005	414	32	446

Source : Planning Commission, 2007



Source : Agricultural Statistics at a Glance, 2006 and earlier years.

As per the latest figure available, at the macro level, per caput/day food availability is 512 gms, which meets the recommended level. This is derived from the current annual production of 2006 million tonnes of foodgrains, 87 million tonnes of milk, 32 billion eggs, 4.6 million tonnes of meat and 6.0 million tonnes of fish. Given the yield gaps and untapped yield potential, the prospects of new yield- and productivity-enhancing technologies, agro-ecological congeniality of the country, and stabilization of the population by 2050, India is capable of producing the needed food within its territory, as is happening today. But, despite the national level food security and strong economic growth, the total number of undernourished people has not declined in recent years. Thus, while adequate production and income growth at the national level are necessary, these are not sufficient for eradicating undernutrition and poverty. Specific measures must, therefore, be adopted to address the different components of comprehensive and effective (household and individual level) food and nutritional security

### III Trends in Food Supply and Demand

#### Trends in Food Production

Over the Five Year Plans, between 1950-51 and 2006-07, India's total foodgrains production, quadrupled from about 50 million tonnes to over 200 million tonnes (Fig. 4). Between 1962-63 and 2006-07, foodgrains production increased from about 82 million tonnes to 208 million tonnes, primarily due to the increase in cereals production, particularly rice and wheat, from 70 million tonnes to 194 million tonnes (Table 4). Oilseeds and sugarcane productions had also increased substantially. But, the production of pulses remained more or less stagnant, around 12 to 13 million tonnes.

**Table 4: Production of main food commodities, 1962/63 to 2006/07.**

Commodity group	Unit	TE 1962/63	TE 1972/3	TE 1982/83	TE 1992/3	TE 2003/04	TE 2006/07
Foodgrains	Million tonnes	81.6	103.5	130.8	174.8	199.7	208.0
Cereals	Million tonnes	69.6	92.6	119.5	161.7	186.5	194.1
Pulses	Million tonnes	12.0	10.9	11.3	13.0	13.2	13.6
Oilseeds	Million tonnes	7.2	8.6	10.5	19.1	20.3	14.6
Sugarcane	Million tonnes	101.9	121.6	176.7	241.0	293.5	256.7*
Potato	Million tonnes	2.9	4.7	9.9	15.6	24.2	23.8*
Milk	Million tonnes	20.2	23.0	34.0	55.8	87.7	89.4*
Eggs	Billion nos	3.2	6.6	10.8	21.7	40.8	45.2**
Fish	Lakh tonnes	12.2	18.3	24.1	41.2	61.8	63.0**

*Source : Agricultural Statistics at a Glance, 2006 and Agricultural Research Data Book, 2007*

*\* for biennium 2004-05 & 2005-06. \*\* For 2004-05 only.*

Per capita production of foodgrains increased from 183 Kg during the early 1970s to 207 Kg by the mid-1990s (Table 5), even as the country's population increased by more than 50 per cent. After the mid-1990s, foodgrain production failed to keep pace with population growth. Per capita production of cereals has declined by 17 Kg and pulses production by 3 Kg during the last decade. "This could pose a serious threat to food security as the country identifies its food security with foodgrain security" (Chand, 2007).

**Table 5: Per capita production of foodgrains (1971 to 2007) (in kg)**

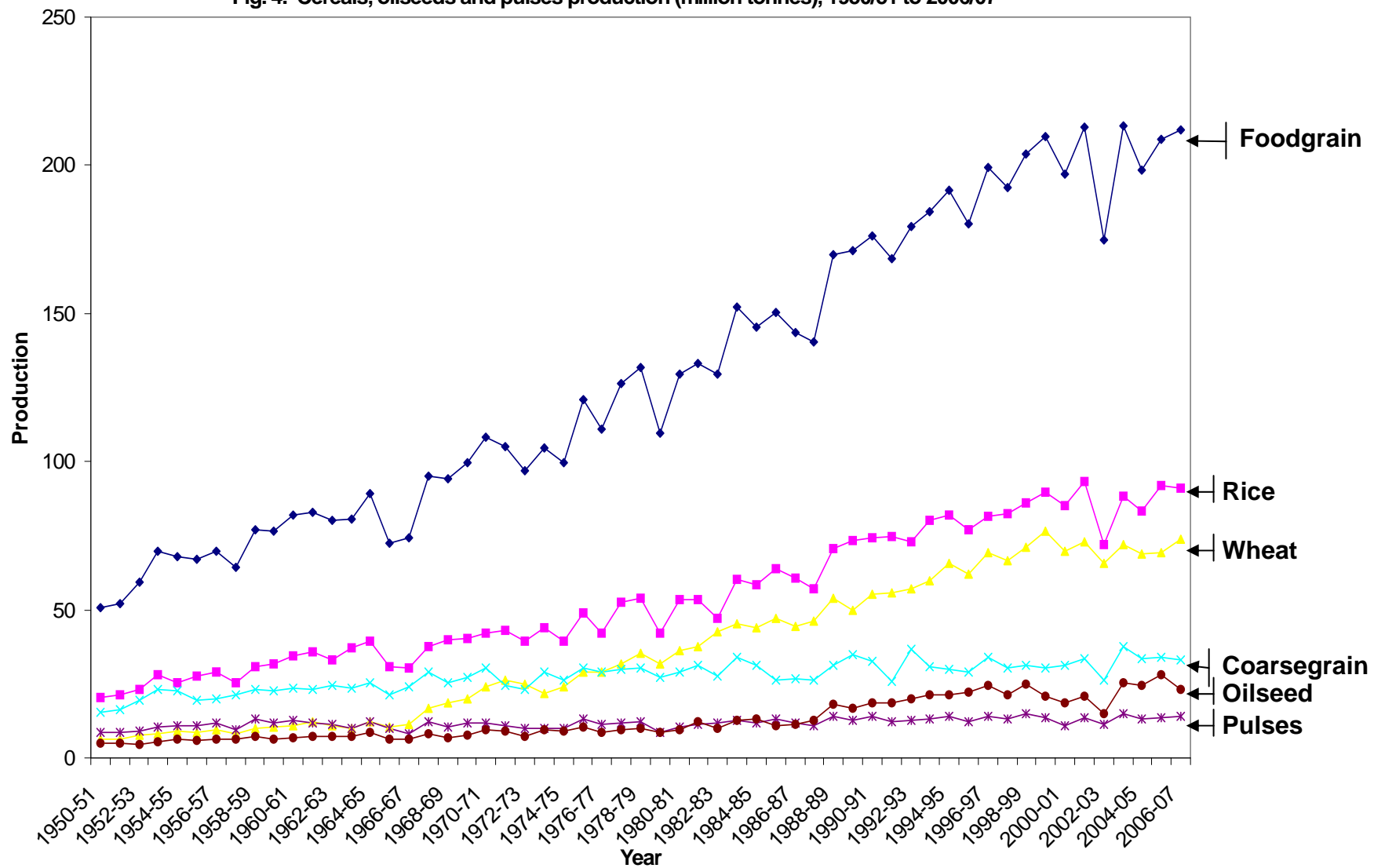
Period	Cereals	Pulses	Foodgrains
1971-75	164	19	183
1976-80	172	18	190
1981-85	179	17	196
1986-90	182	16	198
1991-95	192	15	207
1996-2000	191	14	205
2001-05	177	12	189
2004-07#	175	12	186

*# Figures for the year 2006-07 are based on fourth advance estimates which place foodgrain production at 216 mt.*

*Source: Economic Survey, GoI, New Delhi.*



Fig. 4. Cereals, oilseeds and pulses production (million tonnes), 1950/51 to 2006/07



As regards livestock, milk production multiplied from 23 million tonnes in the triennium ending (TE) 1972-73 to 88 million tonnes in the TE 2003-04. Today, with an annual production of nearly 100 million tonnes, India is the largest milk producer in the world. Eggs production had multiplied almost 15 times. It is important to note that the ownership of livestock is more egalitarian and the sub-sector's contribution to GDP agriculture has increased from 18 to 26 per cent during the past 15 years. The livestock production outlook for the 11<sup>th</sup> Plan is extremely encouraging (Table 6).

**Table 6: Livestock production projection towards the end of the 11<sup>th</sup> Plan**

Sl. No.	Livestock Products	Growth Rate (in percent)	Unit	Projection for the Year	
				2006-07	2011-12
1.	Milk*	5	Million Tonnes	99.05	126.42
2.	Meat**	10	Million Tonnes	6.50	10.47
3.	Egg	10	Billion nos.	49.00	78.91
4.	Wool*	2	Million Kg.	43.33	50.04

Source : \* Department of Animal Husbandry and Dairying, GoI, 2007

\*\* FAO, Food Outlook Global Market Analysis, No. 1, June 2006

With the present fish production of 6.6 million tonnes (3.8 million tonnes inland and 2.8 million tonnes marine), increasing from 1.2 million tonnes in 1962/63, India ranks third in total fisheries production and second in aquaculture in the world, accounting for 18% of national agricultural exports worth about Rs. 8000 crore, and employing nearly 7 million people annually.

The quantum jumps in cereals productions were realized through quantum jumps in yields. For instance, cereals yield increased from 750 kg/ha in TE 1962-63 to 1915 kg/ha in TE 2003-04 and to 1936 kg/ha in BE 2006-07 (Table 7). It is heartening to note that about 70 to 75 per cent of the production increases in most of the commodities were through increases in yield per hectare. It may be further noted that while the Green Revolution had occurred essentially in wheat and rice, its spill over effect was visible in other commodities and production systems. However, the yields have unfortunately been stagnating in recent years.

**Table 7: Yield (kg/ha) of main food crop commodities, 1962-2006.**

Commodity group	TE 1962/63	TE 1972/73	TE 1982/83	TE 1992/93	TE 2003/04	BE 2006/07
Foodgrains	698	848	1030	1406	1671	1684
Cereals	750	924	1150	1599	1915	1936
Pulses	499	500	492	562	598	588
Oilseeds	493	520	580	761	904	986
Sugarcane	42961	48902	56251	65129	66477	65376
Potato	7362	9520	13247	15507	18574	17490

Source : Agricultural Statistics at a Glance, 2006 and Agricultural Research Data Book, 2007.

From cereals production growth rate of about 3 per cent during the Green Revolution decades, 1965-1995, the growth rate has declined to 1.54 per cent during 1994/95-2005/06 (Table 8), and was lower than the population growth rate (1.7 per cent) during the same period. Such continued decline for over a decade had not been witnessed for such a long period (Planning Commission, 2007). However, since 2006/07 there is some revival of the production system which must be sustained and further strengthened.

**Table 8: Growth rates (per cent) of cereals production, area and yield (1994/95 to 2005/06)**

Staple food	Production	Area	Yield
Rice	1.53	0.25	1.09
Wheat	1.88	0.94	0.85
Coarse Cereals	1.60	-1.00	2.18
All Cereals	1.54	0.02	1.35

Source : FAO, RAP, 2007/15

Winter maize in Eastern States replacing part of wheat acreage, and *khariif* (rainy season) maize replacing part of rice acreage in Southern States have triggered a new crop diversification pattern which may substantially augment the food and feed supplies. On the other hand, despite high potential, production and consumption of *Jowar* (sorghum) and its products have dropped by over 40% between 1993-94 and 2004-05 (61<sup>st</sup> Round NSS, 2007).

The stagnating or declining production of pulses and oilseeds has seriously distorted the supply-demand balance, and the country has to meet about 15 and nearly 50 percent of the domestic consumptions of pulses and edible oils through imports, respectively, pointing to the urgency of raising productivity and production of both pulses and oilseeds. The “sunrise” food sectors, namely, livestock, fishery and horticulture registered about 4 per cent growth rate during 1996/97 to 2003/04 (Table 9) which needs to be accelerated to about 6 per cent during the 11<sup>th</sup> Plan period to achieve the targeted overall agricultural growth rate of 4.1 per cent.

**Table 9: Growth rates in output of various sub-sectors of agriculture at 1993-94 prices**

Period	Crop Sector	livestock	Fishery	Fruits and vegetable	Non horticulture crops	Cereals
1980/81 to 1989-90	2.71	4.84	5.93	2.42	2.77	3.15
1990/91 to 1996/97	3.22	4.12	7.41	5.92	2.59	2.23
1996/97 to 2003/04	0.61	3.76	4.28	3.66	-0.31	-0.11

Source : Planning Commission, 2007

### Trends in Food Consumption

A mid term review of the Xth Plan (2002-2007) based on the National Accounts Statistics (NAS) data had revealed that real per capita food consumption had declined after 1998-99 despite fall in relative food prices. Per capita consumption declined absolutely in case of cereals, pulses and edible oils and its growth decelerated for all types of food, including fruits, vegetables and milk. The NAS data further shows that input use and productivity growth had decelerated on the supply side. This was accompanied by low demand growth and higher farm income variability.

The National Institute of Nutrition (NIN) Survey 2002, based on data available from nine states showed that, with very few exceptions, the median calorie consumption in rural areas was far below the Recommended Daily Allowance (RDA) levels in all the states for all groups. In all the age groups of children, 1-3 yrs, 4-6 yrs, 7-9 yrs, the RDA is higher than the median calorie intake in all the nine states, with Gujarat, Orissa, Tamil Nadu and Kerala recording the lowest levels. With regard to pregnant women and lactating mothers the median is below the RDA in seven states, the scenario for pregnant women being the worst in Kerala and West Bengal and for lactating mothers in Tamil Nadu, Madhya Pradesh and Maharashtra (data were not available from several states, such as UP, where the food insecurity situation might be worse). India

Nutrition Profile (INP) data, 1998, which had the merit of providing district level data, had identified several nutrition hot spots. Such data should be updated regularly to enable disaggregated location- specific and need based actions and interventions.

The food consumption pattern in India varies widely, being influenced by regional, ethnic, income and agricultural production differentials. The distribution of foods, both within the household and community is unfavourable to some vulnerable groups due to low income and purchasing power which further reduces the availability of these foods. National Nutrition Monitoring Bureau (NNMB) time series data in eight States from 1975 to 2005 show that over the last three decades there has been decline in cereal and pulse intake. Improvement in per capita intake of milk over years has been small. Intake of vegetables and fruits also continues to be very low. In rural areas there has not been any significant increase in per-capita intake of fats/oils and sugar/jaggery. Data from NNMB rural surveys suggest that dietary intake has not undergone any major shift towards increase in intake of fat/oils, sugar and processed food in rural population. However in urban slum dwellers there has been an increase in oil intake and some increase in sugar intake (Table 10).

The 56th round of the NSS (1999-2000) had compared per consumer unit/day calorie intake of lowest deciles and all classes in rural and urban areas. The analysis showed no difference in levels of energy intake between the rural and urban settings. Irrespective of rural or urban areas, the calories intake in the Lowest Decile was about 800 kcal lower than that in the All Classes. This trend has serious policy implications for targeting public sector food security support to the food insecure people.

The 61st round of NSS (April 2007) had compared the consumption of the various food items in 1993/94 and 2004/05. It revealed that cereal consumption per person per month had declined from 13.4 kg to 12.1 kg (by nearly 10%) between 1993-94 and 2004-05 in rural India and from 10.6 kg to 9.9 kg in urban India (6-7%). Consumption of *jowar* and its products dropped by over 40% in both rural and urban areas. As regards other food items, the consumption of milk, meat (mostly poultry), egg, fish, fruit and vegetables and edible oils had increased both in rural and urban areas.

**Table 10: Dietary intake in rural and urban areas**

	NNMB						INP (1995-96)		RDA	
	Rural			Urban Slums			Rural	Urban		
	75-79	88-90	96-97	00-01	04-05	75-79				93-94
Cereals & Millets	505	490	450	457	396	416	380	488	420	460
Dairy products	116	92	85	85	116.6	42	75	126	143	150
Pulses & Legumes	34	32	29	34	28	33	27	33	55	40
Vegetables										
Green leafy	8	9	15	18	16	11	16	32	23	40
Others (includes tubers)	54	49	47	57	109	40	47	70	75	60
Fruits	13	23	24	25	27	26	26	15	37	50
Fats & Oils	14	13	12	14	14	13	17	14	21	20
Sugar & jaggery	23	29	21	21	14	20	22	20	22	30

Source: NNMB, NIP. Survey Population: Rural & Urban. Sample Size NNMB, Rural, 33048 (1975-79), 14391(1996-97), 30968(2000-01), 32500(1975-80), 5447(1993-94);NIP (46457)

The decline in cereals consumption was consistent with the thrust on diversification, but the impact and adequacy of the increased consumption of other food items was yet to be realized.

Overall employment growth, particularly rural employment, and real agricultural income remaining stagnant, the demand side remained weak despite weakening food prices. This means that the demand side can no longer be ignored, underpinning the need for developing and applying new technologies to enhance competitiveness, and to adopt policies and programmes to increase rural incomes and employment.

### **Trends in Nutrition**

India has achieved food security at the national level but food security at the individual or the family level has not been adequate. Malnutrition is not the result of a single cause but of multi-faceted problems acting singly or in combination with other complex factors like poverty, purchasing power, health care, ignorance and even the national policies relating to food agriculture distribution etc. The past efforts have succeeded in eliminating starvation deaths and famines as also Nutritional Deficiency Syndromes like Pellagra, Beri Beri, Scurvy, Kwashiorkor etc. Severe malnutrition among preschoolers has reduced appreciably and nutritional status of adults has improved significantly.

However, we have a long way to go. The nutrition indicators reveal that nearly 46% of our children under-3 years suffer from moderate and severe undernutrition. Thirty six per cent females and 34% males suffer from Chronic Energy Deficiency. Nearly 22% of all children born in the country whose birth weight was reported have Low Birth Weight and malnutrition has become an intergenerational cycle. Micronutrient deficiencies are widespread; 79% of children under-3 years suffer from anemia. Dietary intake of iron from Indian dietaries has always been low. Vitamin A deficiency in young children is rampant because of decreasing intake of protective foods like fruits, vegetables, milk and milk products. The prevalence of Iodine Deficiency Disorders are still at 10% level on an average while as per WHO it should be less than 5%. The infant mortality rate of 57 per thousand live births is unacceptably high.

Following the declaration of the Global Nutrition Conference, 1992, the Government of India adopted the National Nutrition Policy and prepared a Plan of Action on Nutrition. Identifying nutrition as a development indicator, the National Nutrition Policy advocates a series of actions in different spheres like food production, food distribution, health and family welfare, women and child development, communication, nutrition surveillance etc. Both direct and indirect policy instruments have been advocated.

The Tenth Plan had aimed at achieving substantial reduction in the severe grades of under nutrition and health hazards associated with it without massive increase in the cost through effective implementation of strategies for prevention, early detection and management of macro and micronutrient under nutrition. The targets were, however not met, but the Planning Commission (Approach Paper, 11<sup>th</sup> Plan) felt that desired results could be attained provided that :

- Optimum use is made of available infrastructure and trained manpower to undertake intensive persistent nutrition education to improve knowledge, attitudes and practices.
- There is focused attention on universal screening of vulnerable groups of population at risk for early identification of those with nutritional problems.
- Convergence of health, nutrition, and family welfare services is assured to ensure efficient implementation of health and nutritional interventions.
- Intensive monitoring of improvement and mid course corrections is institutionalised with the involvement of the community based organizations and *Panchayati Raj* institution.

## Food Requirements

In order to achieve balanced nutrition and inclusive growth, considering the trend of diversification of the food basket and experience on the factors underlying growth during the past decade, attaining and maintaining a steady growth in cereals, pulses and oilseeds is essential and an accelerated growth of livestock, fishery and horticulture sub-sectors will be required. On this basis, desired growth rates must be attained in food items to achieve comprehensive food and nutritional security. In addition, in order to capture new export opportunities in the globalised world and also to achieve the targeted growth rate of 9% overall national GDP, as suggested by the Planning Commission for the 11th Plan, agriculture GDP must attain an overall growth rate of 4% or more (Table 11).

**Table 11. Proposed, growth rates for different sub - sectors of agriculture during XI<sup>th</sup> Plan.**

Sub-sector	Output share %	Proposed growth rate (% per annum)
Crops	46	2.7
Foodgrains	26	2.3
Oilseeds	6	4.0
Other crops	14	3.0
Horticulture	21	5.0
Livestock	25	6.0
Fisheries	4	6.0
Total		4.10

Source : Planning Commission, 2007

A widely accepted study by the Indian Agricultural Research Institute (Kumar, 1998), which is still valid, had projected that from the level of 1994/95, by the year 2020 the cereal production should increase by 55 per cent and that of pulses, fruits and vegetable should more than double (Table 12). The production of milk, meat and eggs and fish should increase by about 150 per cent (Table 13) as seen from Table 12, area under foodgrains in 2010 will be only 121 million ha against 124 million ha in TE 1994-95. Therefore, the projected additional production towards the years 2010 and 2020 must accrue entirely through yield increases of about 50 to 100 per cent over the base year TE 1994-95 (Table 14).

**Table 12. Production Targets for foodgrains and horticultural products for the Years 2010 and 2020**

Item	TE 1994/95		Area in year 2000 to 2010 (mha)	Production Target (mt)	
	Area (mha)	Prod (mt)		2010	2020
Rice	42.19	78.1	42.18	103.6	122.1
Wheat	25.13	60.8	26.24	85.8	102.8
Coarse grains	33.25	32.6	30.69	34.9	40.9
Total cereals	101.57	171.5	99.11	224.3	265.8
Pulses	22.59	13.4	21.69	21.4	27.8
Foodgrains	124.16	184.9	120.8	245.7	293.6
Fruits	3.2	33	3.2	56.3	77
Vegetables	5.1	71	5.28	112.7	149.7

Source: Kumar, Praduman, 1998. Food Demand and Supply Projections for India. Agricultural Economics Policy Paper 98-01. New Delhi: Indian Agricultural Research Institute

**Table 13. Production (million tonnes) targets for livestock and fisheries for the years 2010 and 2020.**

Item	TE 1992/93	2010	2020
Milk	55.8	104.0	143.0
Meat & Eggs	-	5.4	7.8
Fisheries	4.1	8.2	11.8

Source: Kumar, Praduman, 1998. *Food Demand and Supply Projections for India. Agricultural Economics Policy Paper 98-01. New Delhi: Indian Agricultural Research Institute*

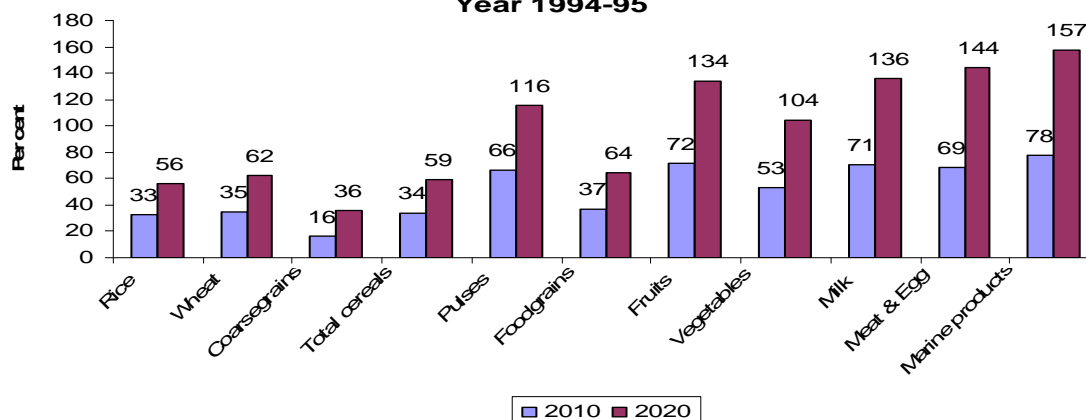
**Table 14. Target Yield (kg/ha) Levels to Meet the Future Demand**

Crop	Yield achieved in TE 1994/95	Required yield level	
		2010	2020
Rice	1851	2456	2895
Wheat	2420	3270	3918
Coarse grains	979	1137	1333
Total cereals	1688	2263	2682
Pulses	593	987	1282
Foodgrains	1489	2034	2447
Fruits	10281	17656	24063
Vegetables	13921	21345	28352

Source: Kumar, Praduman, 1998. *Food Demand and Supply Projections for India. Agricultural Economics Policy Paper 98-01. New Delhi: Indian Agricultural Research Institute*

As seen in Figure 5, the average yield at the national level is required to be improved by 33 per cent for rice, 35 per cent for wheat, 16 per cent for coarse cereals, 66 per cent for pulses, 37 per cent for vegetables and 72 per cent for fruits by 2010 over the base year 1994-95. By 2020, the yield level over the base period yield is required to be improved by 56 per cent for rice, 62 per cent for wheat, 36 per cent for coarse cereals, and 116 per cent for pulses. The production of livestock and poultry products must be improved by 70-80 per cent by the year 2010 and 136-157 per cent by the year 2020. This level of yield improvement requires serious efforts on part of the National Agricultural Research System (NARS). The emphasis for achieving the required increments in yield levels must be placed on regions where the current yield levels are low.

**Fig. 5 Required Improvement in the Productivity Over the Year 1994-95**



Source : Kumar, Praduman, 1998. *Food Demand and Supply Projections for India. Agricultural Economics Policy Paper 98-01. New Delhi : Indian Agricultural Research Institute.*

For the Terminal Year of the 11<sup>th</sup> Plan (2011-12), the Planning Commission, using four approaches, one each based on simplistic, and normative and two on behaviourist approach, worked out the foodgrains demand at 217 million tonnes to 244 million tonnes. Similarly, in the case of oilseeds and sugarcane, based on the bahaviouristic approach, by 2011-12, the oilseed requirement works out to 53 million tonnes and sugarcane requirement works out to about 350 million tonnes, after taking into account an average export of about 5.5 lakh tonnes of sugar per annum and 12 lakh tonnes (1/4 of the three months requirement) for buffer. However, if the present level of imports is maintained in the case of edible oils, the production of about 36 million tonnes would be required to meet the demand by the end of 11<sup>th</sup> Plan. The supply side has also been worked out (Table 15).

**Table 15. Comparative Demand and Supply Projections for Terminal Year of 11<sup>th</sup> Five Year Plan, 2011-12 (in million tonnes)**

Crops	Demand Projections for 2011-12	Range of Production Supply Projections for 2011-12
Foodgrains	244@@	214 – 240 (from alternative methods)
Oilseeds	53	45**
Sugarcane	340#	278-334 (from alternative methods)

*Source : Report of the Working Group on Crop Husbandry, Agricultural Inputs, Demand and Supply Projections and Agricultural Statistics for the Eleventh Five Year Plan (2007-12).*

*@@ includes 2 million tonnes for augmenting buffer stock and average export of 8 million tonnes # includes 12 lakh tonnes for augmenting buffer stock and average export of 5.4 lakh tonnes of sugar \*\* The supply projections for oilseeds are based on realization of potential yield. This supply assessment would improve self sufficiency level in edible oils from existing 55% to 80%. However, if the level of edible oil imports to meet the domestic demand is assumed to be retained at present level (4.7 million tonnes), then the supply would require to be of 36 million tonnes of domestic production of oilseeds.*

Focusing on foodgrains (cereals and pulses), Chand (2007) has projected that the total demand for cereals will grow to 218.9 million tonnes by the end of the 11<sup>th</sup> Plan and it would reach 261.5 million tonnes by the year 2020-21. Demand for pulses in the same period would grow to 16.1 and 19.1 million tonnes. Domestic demand for foodgrains is projected to reach 235.4 million tonnes by the end of 11<sup>th</sup> Five Year Plan and 280.6 million tonnes by the year 2020-21 and these do not include export demand. He further observes that despite the declining trend in per capita direct consumption of foodgrains, total demand is projected to increase at 2 per cent per annum in the medium term on account of an increase in the population, and the need for grain as feed and in related purposes. This implies that to guard against an adverse impact on food security, the growth rate in domestic foodgrain production needs to accelerate three to four times the growth rate attained during the last decade (1997/98 to 2006/07) which was a meager 0.48 per cent.

The Prime Minister has rightly emphasized the need to double annual foodgrain production from the present about 210 million tonnes to 420 million tonnes within the next 10 years. Since land is a shrinking resource for agriculture, the pathway for achieving these goals has to be higher productivity per units of arable land and water. Factor productivity will have to be doubled, if the cost of production is to be reasonable and the prices of our farm products are to be globally competitive. On an average, rice and wheat yields will need to be enhanced by about 40 percent and pulses, oilseeds, maize, millets, sorghum and horticultural commodities yields by about 50 to 100 percent.



## **IV Analysis of Food Security Situation**

The comprehensive definition of food and nutrition security provides guidelines for developing an effective operational strategy for achieving the goal of freedom from hunger. Three major dimensions of hunger should be considered: (i) chronic or endemic hunger resulting from poverty-induced under nutrition, (ii) hidden hunger arising from micro-nutrient malnutrition, caused by the deficiencies of iron, iodine, zinc and vitamins in the diet and (iii) transient hunger caused by seasonal fluctuations in food availability and disruptions in communication and transport arising from natural or manmade disasters.

The food and nutrition security systems must also address the three issues of availability, access and absorption. Availability of food at the household level depends upon food production, and the operation of a resource-poor consumer-friendly Public Distribution System (PDS) operated with homegrown foodgrain stocks and or imports. Access to food depends on livelihoods / purchasing power. Absorption of food is influenced by access to clean drinking water, environmental hygiene and primary healthcare.

### **Availability**

Level of domestic production of foodgrains is the main determinant of macro level food availability and food security particularly in low income countries like India. At household level the availability depends on physical access (marketing infrastructure and distribution programme of Government) and economic access (relationship of food prices and consumers' income).

As regards the domestic production, during the Green Revolution era, the food production growth rate of about 3 per cent had outstripped the population growth rate of about 2 to 2.2 per cent, resulting in significant increase in per capita food consumption despite nearly 16-18 million people being added every year to the huge population of nearly 800 million in the 1980s. This was possible through the synergistic congruence of modern technology (improved seeds), irrigation expansion, enhanced fertilizer use, MSP, research-extension-farmer linkage and strong political will and support to agriculture. Nearly 75 to 80 per cent of the increase in production had accrued through the increase in yield levels, particularly of wheat and rice.

During the last about one decade, however, the foodgrain production has almost stagnated and huge production gaps exist. The natural resources, particularly land, water and biodiversity, have degenerated, population pressure continues to intensify (although the population growth rate has come down from over 2 per cent during the 1980s to 1.5 per cent now but this still means addition of nearly 16 million people every year). In order to bridge the supply-demand gap, the Government has recently initiated several programmes, including the National Food Security Mission (NFSM) and the Rashtriya Krishi Vikas Yojana (RKVY) (Ministry of Agriculture, 2007). The NFSM aims to add 10 million tonnes of rice, 8 million tonnes of wheat and 2 million tonnes of pulses during the next four years (Ministry of Agriculture, 2007).

FAO Global Perspective Studies Unit, 2006, has projected that food consumption levels in India from current average level of about 2,400 kilocalories per capita per day will increase to about 3,000 kilocalories per day in 2050. By then, the population may stabilize at 1.5 billion. As is typical of countries with rising incomes, the share of calories derived from cereals is declining in India, and is projected to fall below 50% by 2050. Conversely the share of calories derived from higher-value foods like fruits and vegetables, vegetable oils and livestock products is projected to increase, with the most rapid growth projected in the case of chicken. In aggregate terms, projected demand for cereals (for direct human consumption) is projected to rise from 159

million metric tonnes in 1999-2001 to 243 million tonnes in 2050, an increase of 53 per cent, or 0.9 per year (Table 16). This growth will help decline number of undernourished from 221 million people (about 22% of the population) now to 70 million people (about 5% of the population) by 2050 (Table 17).

**Table 16: Demand for food by food group, million tonnes, India**

Food group	1999-2001	2015	2030	2050
	<b>Million tonnes</b>			
Cereals	159	199	225	243
Potatoes etc	25	37	46	58
Fruits & Vegetables	108	160	208	257
Vegetable oils	11	18	23	29
Sugar	29	40	47	54
Eggs	2	3	6	9
Chicken	1	4	10	18
Milk	66	104	146	196
Beef, mutton & pork	4	5	7	9

Source: FAO, Global Perspective Studies Unit, FAOSTAT, 2006

Note: The figure for cereals includes rice, milled equivalent

The figure for eggs is in million tonnes

The figure for cereal consumption in 1999-01 is the same as the GoI "net availability of cereals figure (e.g. Table 1.17, Econ. Survey 2006-07) except that FAO does not apply a uniform assumption that feed+seed+waste is 12.5% of gross production. Thus, for example, in 1999-01, the FAO figure, 159 million tonnes is higher than the GoI figure, 153 million tonnes.

**Table 17: Undernourishment in India**

	1999-2001	2015	2030	2050
DES (kcal/person/day)	2413	2706	2827	3020
Population (billions)	1.0	1.2	1.4	1.5
Undernourished (million, %)	221 (22)	156 (13)	128 (9)	70 (5)

Source: FAO, Global Perspective Studies Unit, FAOSTAT, 2006

Arable and permanent cropland area is projected to grow only slightly, from 170 million hectares in 1999-01 (of which 58 million were irrigated) to 181 million hectares in 2050 (of which 78 million are projected to be irrigated). Over the same period, cropping intensity in India is also projected to increase only slightly, from 101% to 104% in rainfed areas, from 127% to 129% in irrigated areas, and from 110% to 115% overall.

By contrast, cereal yields in rainfed areas in India are projected to rise more rapidly, from 1.4 tonnes per hectare in 1999-01 to 2.0 tonnes per hectare in 2050, while irrigated cereal yields are projected to increase from 3.5 to 4.6 tonnes per hectare and weighted average cereal yields are projected to increase from 2.4 to 3.7 tonnes per hectare over the same period.

Combining these trends results in projections of cereal production in India rising from 240 million tonnes (including rice as paddy) in 1999-01 to 357 million tonnes in 2050, of which 285 million tonnes is projected to come from irrigated areas (Table 18).

In aggregate terms, cereal production in India (including rice in milled equivalents) is projected to increase by 54% (or 0.9% per year) between 1999-01 and 2050. By contrast, production of potatoes, fruits and vegetables, vegetable oil, sugar and meat (except chicken) is projected to

more than double, production of milk to triple, and production of eggs and chicken to increase even more rapidly (Table 19).

**Table 18: Projected cereal area, yield and production, India**

	2000	2015	2030	2050
Rainfed area (million hectare)	54	47	40	36
Rainfed yield (tonnes/hectare)	1.4	1.6	1.8	2.0
Rainfed production (million metric tonnes)	77	76	73	72
Irrigated area (million hectare)	46	52	57	62
Irrigated yield (tonnes/hectare)	3.5	4.0	4.3	4.6
Irrigated production (million metric tonnes)	163	209	248	285
Total area (million hectare)	100	98	97	98
Total yield (tonnes/hectare)	2.4	2.9	3.3	3.7
Total production (million metric tonnes)	240	285	321	357

Source: *Global Perspectives Studies Unit, FAO, 2006.*

**Table 19: Food production by food group, million tonnes, India**

Food group	1999-2001	2015	2030	2050
Million tonnes				
Cereals	192	229	262	295
Potatoes etc	31	46	56	69
Fruits & Vegetables	120	175	227	279
Vegetable oils	7	10	13	17
Sugar	34	47	56	68
Eggs	2	4	7	10
Chicken	1	4	10	18
Milk	82	127	178	239
Beef, mutton & pork	4	5	7	9

Source: *FAO, Global Perspective Studies Unit, FAOSTAT, 2006*

Note: *The figure for cereals includes rice, milled equivalent.*

*The figure for eggs is in million tonnes*

By comparing these figures with those on projected food demand discussed earlier, we can see that food production is projected to exceed demand (for direct human consumption) in India through 2050 for all commodity groups except vegetable oils (Table 20). The balance is potentially available for use as livestock feed, seed, storage, industrial uses or export.

**Table 20: Food production less demand, by food group, million tonnes, India**

Food group	1999-2001	2015	2030	2050
Million tonnes				
Cereals	33	30	37	52
Potatoes etc	6	9	10	11
Fruits & Vegetables	12	15	19	22
Vegetable oils	-4	-8	-10	-12
Sugar	5	7	9	14
Eggs	0	1	1	1
Chicken	0	0	0	0
Milk	16	23	32	43
Beef, mutton & pork	0	0	0	0

Source: *FAO, Global Perspective Studies Unit, FAOSTAT, 2006*

Note: *The figure for cereals includes rice, milled equivalent.*

*The figure for eggs is in million tonnes.*

The realization of the above projections must overcome the challenges of natural resource degradation and depletion, climate change, increasing input costs and demand for biofuels, on-farm – non-farm employment integration, and market volatility. Soil health deterioration micro nutrient imbalance, fast receding water levels, water quality and arsenic pollution and poor water and nutrient use efficiencies must be corrected and reversed through knowledge-based participatory approaches.

India is yet to benefit from liberalization and globalization. Although share of trade in GDP Agriculture had increased from 5.6 per cent in 1991-94 to 10.3 per cent in 2003-04, and both import and export had increased, but the increase in imports was 159 per cent against only 51 per cent in exports (Table 21). Consequently, there was little gain in India's trade surplus, being US\$ 1.75 billion in 1990-94 and US\$ 1.78 billion in 2003-04 (Table 22).

As per the FAO projections, since India's production will exceed direct human consumption by sizeable margins for cereals, fruits and vegetables and milk, the country must enhance its competitiveness in these commodities for higher income to the farmers and for greater integration of Indian markets with the global market.

**Table 21: Share (per cent) of trade in GDP agriculture of India**

Trade	1991-94	1995-98	1999-2002	2003-04
Import	1.7	2.8	3.7	4.4
Export	3.9	5.7	5.2	5.9
Total trade	5.6	8.4	8.9	10.3

Source: Ramesh Chand, 2007.

**Table 22: Agriculture trade of India before and after WTO, US\$ million**

	1991-94 Before WTO	1995-98 Start of WTO	1999-2002 After WTO	2003-04
Export	3085	5557	5087	6781
Import	1336	2711	3699	5006
Net trade	1749	2846	1388	1776

Source: Ramesh Chand, 2007.

The expenditure on total food as percentage to total expenditure has declined from 66 percent in 1983 to 59 percent in 1999-2000 in rural areas, while in urban areas the decline was from 59 percent to 48 percent during the same period (NSS Rounds during 1980-2000). The expenditure on cereals as percentage to total food also declined by about 12 percentage points in both rural and urban areas during the same period. The expenditure on livestock and horticultural products had, however, increased substantially as the overall picture indicates a shift of expenditure from cereals to other items, marking an improvement in household food security. One of the most startling features is the decline in per capita calories consumption for the total population and there appears to be a convergence between rural and urban patterns of calorie consumption. Calorie protein as well as consumption of fat per capita per diem, have shown an increase in both rural as well as urban areas among the poorest quartile.

During 1991 to 2004, as mentioned earlier, the population growth rate of 1.7 per cent had outpaced foodgrains production growth rate of 1.5 per cent in several years, reducing the average per capita consumption of cereals and pulses from 540 gm/caput /day to 463 gm. The all time high foodgrains buffer stock of nearly 60 million tonnes in 2001/02 had shrunk to about 26 million tonnes in 2006/07 (Table 23). In order to rebuild the stocks, the country had imported about five million tonnes wheat in 2006/07. In general, the procurement of coarse grains has

been negligible, which needs to be increased particularly in the rainfed dryland areas where sorghum (*jowar*) and pearl millet (*bajara*) are major crops. Foodgrain production in 2006/07 was estimated at about 216 million tonnes, an all time high, and the target of 221.5 million tonnes fixed for 2007/08 is likely to be realised, particularly through the thrust provided under the National Food Security Mission. With the renewed efforts being made at different levels for increased food production and rural development as a whole, this upward trend is likely to continue.

**Table 23: Current stock of foodgrains (in million tonnes) in Central Pool, Food Corporation of India (FCI), 2006/07**

Food grains	With FCI	With State Agencies	Total
Rice	9.66	2.96	12.62
Wheat	7.10	6.20	13.30
Coarse grain	0.00	0.00	0.00
Total	16.76	9.16	25.92

Source : *Foodgrains Bulletin, June 2007, GOI, Ministry of Consumer Affairs (CA), Food and Public Distribution (PD).*

Procurement of foodgrains and buffer stock building are important means of food availability on which the distribution of foodgrains depends. As per the latest figure of the Department of Food and Public Distribution, as on January 1, 2008, the foodgrains stock position was 19.2 million tonnes against the minimum buffer norms of 20 million tonnes (Ministry of Consumer Affairs and Public Distribution, 2008). With nearly 300 million people being below poverty line (NSS 61<sup>st</sup> Round, 2007), the norms need to be revised and India should maintain a buffer of at least 35 million tonnes or even more if possible. This may now be possible with the occasional imports, recent and expected increase in foodgrains production and the enhanced MSP announced for wheat and rice. What is more important here from the point of view of national food security is to make additional efforts for procuring coarse grains as procurement of these nutritious grains has been negligible.

The Draft Approach Paper for the 11<sup>th</sup> Plan notes that the proportion of households below the poverty line was as high as 28% in 2004-05 as per the most recent NSS full sample round. The problem at hand is therefore of enormous dimensions. Besides, there are regional variations as well in the incidence of poverty. Across the nation, the poorest States are Orissa, followed by Bihar, Madhya Pradesh and Assam, which also have the highest concentration of undernutrition. Public sector foodgrains storages/stocking and distribution machinery should be strategically located and distributed in those areas where needed the most, also keeping in mind the cost of operation and timely distribution.

### Access

As mentioned earlier, food security is a function not only of availability of food, but also of the purchasing power of the people. It is therefore important that every household should either have capacity to produce adequate food for all the members, or have the purchasing power to acquire it. It has to be appreciated that a country may be food surplus, but all its citizens may not be enjoying food security, as some may have no purchasing power.

The slow or even negative progress (in terms of absolute number of undernourished) in India's food security, to a large extent, was related to the slow growth in already low income of farming households, increasing from Rs. 9,049 during 1969/70-1973/74 to Rs. 11,223 during the year 1999/00-2003/04 (Planning Commission, 2007). During 1970s per worker agriculture GDP

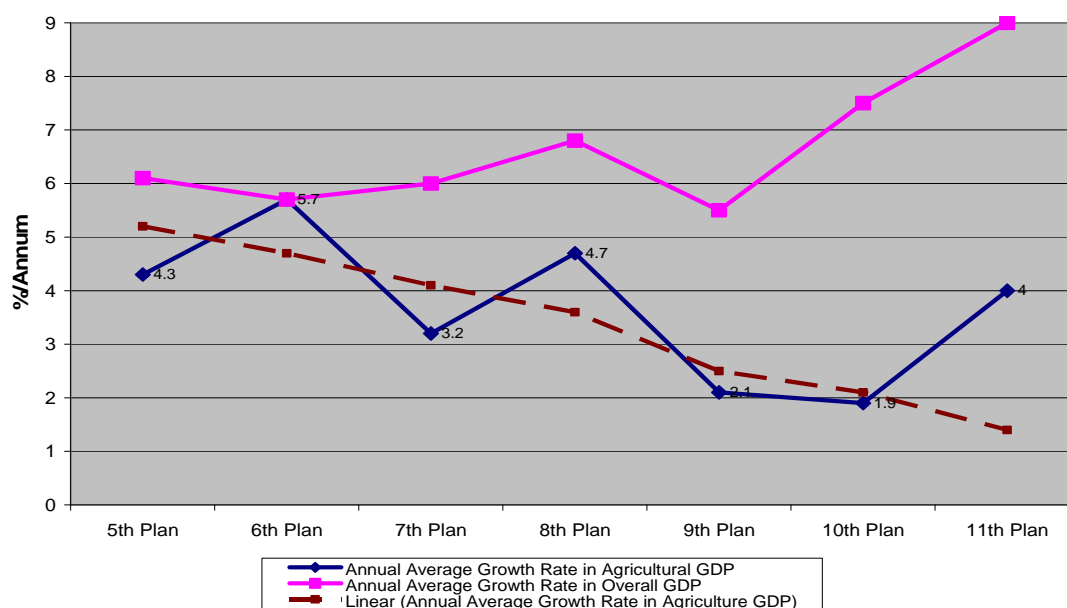
increased annually by 0.7%, accelerated to 1.2% during 1980s, but dropped to only 0.3% during the last decade (Table 24). The gaps in growth rates of GDP agriculture and non-agriculture have widened after mid 1990s, sharply decelerating in agriculture and accelerating in non-agriculture (Fig. 6), thus further widening the income disparity between agricultural workers and non agricultural workers, which has exacerbated food security of farmer-consumer and the proportion of marginal and sub-marginal farmers in the huddle of under-nourished rural people has increased in recent years.

**Table 24: Level of and growth in per worker agriculture GDP at 1993-94 prices**

Period	GDP agriculture per agriculture worker (Rs)	Growth rate in previous 10 years (%/year)
1969/70 to 1973/74	9049	-
1979/80 to 1983/84	9699	0.696
1989/90 to 1993/94	10902	1.176
1999/00 to 2003/04	11223	0.291

Source : Planning Commission, 2007

**Fig. 6. Trend of Agriculture & Overall GDP**



Source: FAO, 2007

The efficiency and coverage of food safety nets such as public distribution system also affect access to food. With the improvements being effected in the TPDS, the access of the needy to the safety net grains should improve. However, food security *per se* can not be assured unless the food in market is within the purchasing accessibility of all the people in a community. Going by the estimates of the Planning Commission, a total of 260.27 million people in both rural and urban areas can definitely be assumed to be unable to buy sufficient food to ensure their food and nutritional security.

### Utilization /Absorption

Food absorption in the body is a major problem in rural areas as well as in urban slums. In the words of Amartya Sen and Jean Dreze, 'the capability to be nourished depends crucially on other characteristics of a person that are influenced by such non-food factors as medical attention,

health services, basic education, sanitary arrangements, provision of clean water, eradication of infectious epidemics and so on'. This can be termed absorption food insecurity when the body is not in a position to absorb the nutrients from the food taken, due to factors mentioned above.

The situation on this front also needs improvement. According to Planning Commission, access to sanitation in rural India is limited to 25.9% and piped drinking water is available to 27.9% households. Urban slums house nearly 20 per cent of urban population but have highly inadequate sanitation and drinking water facilities. Access to basic facilities is generally unsatisfactory for people living in large numbers of small towns. Tuberculosis and Malaria are not uncommon and the situation is becoming uglier by increasing incidences of HIV/AIDS.

### Stability

As mentioned earlier, the stock position of foodgrains in the Central Pool stands at about 19 million tonnes, which is far short of the safe limit of 18% of the requirements. Further, fluctuations in cereal outputs, caused perhaps due to the climate change, have increased in the recent years and exacerbated the food insecurity situation (Table 25). A strong buffer stock is necessary also for obviating such production fluctuations. At the same time, we must avoid the danger of making import a habit, as the imports amount to importing unemployment, besides endangering national food sovereignty. As often stressed by Prof. Amartya Sen, the Bengal Famine of 1942-43 was more of the inaccess to food in the hands of private merchants. Thus, who controls the availability is also important.

**Table 25: Fluctuations in cereals output (million tonnes)**

Years/ Particulars	Cereals	Wheat	Rice
1999-00	196.4	76.4	89.7
2006-07	198.8	74.9	91.0
Average fluctuation per year	17.5	4.8	9.3
Range of fluctuations	3.6 to 35.9	0.9 to 6.7	0.8 to 21.5

Source : *Agricultural Statistics at a Glance, Several years and Agricultural Research Data Book, 2007*

There are very distinct contiguous agro-climatic regions in this country, each of them is characterized by a set of land, water, biodiversity, and climatic factors along with socio - economic environments of their own, such as North Eastern Himalayas or Coastal Regions and Islands. Each of the regions have their *in situ* integrated farming system (IFS) comprising of cropping patterns, horticultural crops, animal husbandry and fisheries systems. These should be nurtured to a production system that is climatically, environmentally, economically and socially most viable. This approach will encourage an *in situ* diversification that will reduce the element of risk and encourage eco-friendly livelihoods that will generate synergy in combination with various production programmes and diversify the food basket and dietary pattern for better nutrition. Biovillages, as demonstrated by the M. S. Swaminathan Research Foundation, should be widely promoted towards sustainable food security. The approach also provides opportunities for potential-based promotion of organic farming both for enhanced income and food security.

### Linkages with Millennium Development Goals (MDGs) and SAARC Development Goals (SDGs)

The United Nations Millennium Declaration adopted by the UN General Assembly in September 2000 reflected the World Food Summit (WFS) target by making hunger and extreme poverty reduction a primary development Goal. The Millennium Development Goals (MDGs) are widely accepted at national levels as the framework for development action and for measuring progress.

They are as a reference point for many countries for their food security and Poverty Reduction Strategies (PRS). The SAARC member countries are signatories to the Millennium Declaration and have affirmed their commitments to realize the MDGs targets and internalise them into their development frameworks, national policies and action plans. The explicit linkages of the PRS to the WFS and MDG targets, however, differ across the countries, depending on the country specificity.

Are we living up to the promise made at the WFS and the Millennium 2000? Data reveal that all South Asian countries are far off the track in meeting the MDG targets. As regards the MDG objective 1 of halving hunger and poverty by the year 2015, the region has made little progress (Table 26). Although the percentage of under nourished people in the region during the triennium ending 2003 had declined to 22 per cent from 26 per cent during the baseline triennium 1990-92, the number of hungry had increased by over 8 million during the same period (Table 26). There is slight improvement in India's position, which is not enough. India should redouble its efforts to achieve the goal relating to hunger and poverty. Many of the goals will need integrated attention. For example, MDG3 deals with gender equity and women empowerment. This is vital for achieving MDG1. Hence a gender audit procedure should be incorporated in all programmes and policies.

**Table 26. Prevalence of undernourishment and progress towards the MDG targets in SAARC and other developing countries.**

Region, sub-region, Country	Number undernourished (million)		Proportion of undernourished in total population (%)		Ratio current/ baseline prevalence of undernourished*
	1990-92	2001-03	1990-92	2001-03	
Developing world	823.1	820.2	20	17	0.8
Asia and the Pacific	569.7	524.0	20	16	0.8
South Asia	290.4	298.5	26	22	0.8
Bangladesh	39.2	43.1	35	30	0.9
India	214.8	212.1	25	20	0.8
Nepal	3.9	4.1	20	17	0.8
Pakistan	27.8	35.2	24	23	1.0
Sri Lanka	4.8	4.1	28	22	0.8
China	193.6	150.0	16	12	0.7
Malaysia	0.5	0.6	3	3	1.0

\*Ratio for MDG target = 0.5

Source : FAO, SOFI, 2006

The Thirteenth SAARC Summit in November 2005, endorsed by the 14<sup>th</sup> Summit, April 2007, listed 22 SAARC Development Goals (SDGs) for the period 2005-2010, as a comprehensive and realistic blue print setting out for the next five years in the areas of livelihood, health, education and environment. In line with the first MDG, eradication of extreme poverty and hunger, the first SDG is the "eradication of hunger and poverty" and the summit had recommended provision of adequate safety nets so that all kinds of hunger be effectively countered. It had also emphasised development of early warning systems including food insecurity mapping as a priority. The second SDG is halving the proportion of people in poverty (as defined by the national poverty lines) within the same period. Further to SDG1, the third SDG calls for adequate nutrition and dietary improvement for the poor. To achieve this goal, targets are to include specially nutritional awareness, nutritional provision for vulnerable groups e.g., school children, adolescent girls, pregnant women, and lactating mothers. Nutritional supplements such as vitamin A, targeted development of nutritionally relevant sectors e.g., homestead horticulture, poultry, dairy, and fisheries should be promoted.



## V Programmes and Activities of Different Sectors for Food Security

### Lessons Learnt from Past Initiatives

Many of the initiatives taken and safety nets provided by the main concerned Ministries of Government of India, specially the Ministry of Agriculture and Cooperation, Food and Public Distribution, Rural Development, and Ministry of Health and Family Welfare, have been effective in reducing food insecurity, but all have not been equally and uniformly successful. It was primarily the Ministry of Agriculture (ICAR, SAUs and DoA) which steered the Green Revolution and its impact on transforming the nation from a ship-to-mouth situation to a food self-sufficient, a food secure and even a foodgrain exporting nation. In fact, the Green Revolution has been heralded as the most striking science-led development in the Independent India. In addition, impressively high growths in livestock (milk) fishery and horticulture production, respectively christened as white, blue and golden revolutions, had complemented the Green Revolution process. The unprecedented successes of the Revolutions notwithstanding, the revolutions suffered from certain shortcomings as described in section 1.5. Redressal of these liabilities and limitations of the Green Revolution should comprise the main agenda of R&D systems and policy makers through the accent on eco-technologies towards ushering in the Evergreen Revolution.

While the Ministry of Agriculture has mostly been addressing the “availability” components of food security (also contributing to the “access” component through the increased yield and income of the farmer), the Ministry of Rural Development and Ministry of Food and Supply have been contributing mostly to the access (social safety nets and social engineering, drinking water and employment security) components. The Ministry of Health and Family Welfare has been addressing the absorption, fortification, child nutrition and other softer components of food security and nutritional adequacy.

The Right to Food calls on states to provide food directly or provide the means for its purchase to individuals who are unable for reasons beyond their control to provide enough food for themselves and their families. Social safety nets refer to cash or in-kind transfer programmes that seek to reduce poverty by redistributing wealth and/or protecting households against income shocks. Food safety nets aim to assure a minimum amount of food consumption and/or protect households against shock to food consumption. The various ongoing social safety net schemes towards enhancing household and individual level food security include: Sampoorna Gramin Rozgar Yojana, Mid-Day Meal Scheme, Food for Work Programme, National Food for Work Programme, Public Distribution System, Antyodaya Anna Yojana, Annapoorna and Integrated Child Development Services Schemes.

The Integrated Child Development Services (ICDS) Scheme, launched in 1975, is the most important nationwide nutritional programme with the following objectives : (i) to improve the nutritional and health status of pre school children in the age group of 0-6 years, (ii) to lay foundation of proper psychological development of the child, (iii) to reduce the incidence of mortality, morbidity, malnutrition and school drop outs, (iv) to achieve effective coordination of policy and implementation amongst the various department to promote child development and (v) to enhance the capability of the mother to look after the normal health and nutritional needs of the child through proper nutrition and health education. In addition, the Scheme envisages effective convergence of inter sectoral services in the *anganwadi* centers. This scheme covers all children below six years of age and pregnant women and lactating mothers, irrespective of their economic status.

The various social/food safety nets, though may literally not fulfill all the conditions, yet these are increasing the access to food by the low income group people. These schemes/measures are both in the kind and opportunity for capacity building. Together, but mostly through the PDS, the Central Government had been allocating nearly 90 million tonnes of food grains (primarily rice and wheat), but the off take has been hardly around 40 million tonnes on an average (Foodgrains Bulletins of Ministry of Consumer Affairs, Food and Public Distribution). Some of the states have been sluggish in taking advantage of the safety nets. For a viable food safety net system, it is imperative to reduce the cost of procurement and distribution of food commodities. Also, a decentralization of TPDS is required from an efficient and meaningful distribution of food items to the needy and deserving. A recent study by the National Council of Applied Economic Research (NACER) refers to source improvement in the functioning of the PDS, but finds that still serious governance problems exist. Suggestions, like introduction of food coupons, have been made to improve the delivery to the target group.

### **Ongoing Programmes and Activities**

As highlighted in the document “National Policy for Farmers”, Ministry of Agriculture & Cooperation, 2007, several significant initiatives have been taken in recent years by the Government of India to reverse the downward or stagnating trend in agricultural production, food security and farmers’ income and welfare (See Box 1). Some of the most important ones are briefly described below.

**Bharat Nirman :** It is a time bound action plan for development of rural infrastructure, particularly of irrigation, roads, rural housing, rural water supply, rural electrification, and rural telecommunication connectivity. It is a date bound programme of the Ministry of Rural Development

**National Rural Employment Guarantee Act (NREGA):** Sampoorna Grameen Rozgar Yojana (SGRY) was strengthened towards generation of supplementary wage employment and ensuring food security through creation of need based economic, social and community assets. The scheme is 100 per cent centrally sponsored. The programme has since been subsumed in The National Rural Employment Guarantee Act, enacted in September 2005, had come in force in 200 identified districts and had subsumed the National Food for Work Programme. The Act provides 100 days of work guarantee to every rural household where members are required to do unskilled manual work. It bestows a legal right and guarantee to rural population through an Act of Parliament and is not a scheme like the other wage employment programmes. The programme has now been extended to all districts of the country.

**Public Distribution System :** It is defined as the distribution of some essential commodities by the government *at subsidized rates* through ration shops, fair price shops and control shops numbering over 460,000 and spread across the country. This landmark system launched in context of the infamous famine of 1943, was altered several times to meet new demands. In order to focus on geographical areas of food scarcity and poverty a Revamped PDS was started in 1992 and that continued till 1997. The System again came under criticism for its failure to focus on the population below poverty line (BPL), its urban bias, limited coverage in States with high concentration of the rural poor, and lack of transparency and accountability in delivery. Consequently, in June 1997 the Government of India launched the Targeted Public Distribution System (TPDS) with focus on the poor. State Governments and UT administrations are required to formulate and implement effective arrangements for identification of eligible BPL families and issuance of ration cards to them in a transparent and accountable manner at the Fair Price Shop (FPS).

### **Box 1. Recent Initiatives**

- (i) Bharat Nirman;
- (ii) National Rural Employment Guarantee Programme;
- (iii) National Horticulture Mission;
- (iv) Expansion of Institutional Credit to Farmers;
- (v) Establishment of the National Bee Board;
- (vi) Establishment of the National Rainfed Area Authority;
- (vii) Establishment of the National Fisheries Development Board (NFBD);
- (viii) Watershed Development and Micro Irrigation Programmes;
- (ix) Reforms in Agricultural Marketing and Development of Market Infrastructure;
- (x) Revitalisation of Cooperative Sector;
- (xi) Agri-business Development through Venture Capital Participation by the Small Farmer Agri-business Consortium;
- (xii) Reform and Support for Agriculture Extension Services;
- (xiii) National Rural Health Mission;
- (xiv) National Food Security Mission;
- (xv) Rashtriya Krishi Vikas Yojana to incentivise the states to invest more in agriculture;
- (xvi) Integrated Food Law;
- (xvii) Legislative Framework for Warehousing Development and Regulation;
- (xviii) Protection of Plant Varieties and Farmers' Rights (PPVFR) Act, 2001;
- (xix) National Bamboo Mission and
- (xx) Knowledge Connectivity through Common Service Centres (CSC) and IT initiatives.

*Source : Ministry of Agriculture, September, 2007.*

**National Drinking Water Mission :** A Technology Mission on drinking water named "National Drinking Water Mission (NDWM) was launched in 1986, which subsequently was renamed as Rajiv Gandhi National Drinking Water Mission (RGNDWM) in 1991 with three key objectives : (i) safe drinking water to all villages, (ii) assisting local communities to maintain the sources of safe drinking water in good condition, and (iii) giving a special attention for water supply to scheduled castes and scheduled tribes. To achieve these objectives, an Accelerated Rural Water Supply Programme (ARWSP) is being implemented.

**Other Programmes:** Government of India's other Ministries and Departments that contribute to strengthen food security through their programmes and activities are : Ministry of Health and Family Welfare; Planning Commission of India; Ministry of Women and Child Development and activities of Food and Nutrition Board (FNB). FNB is primarily engaged in nutrition education and training activities, mass awareness campaigns, promotion of infant and young

child nutrition, and follow-up action on the instruments of the National Nutrition Policy. The relevant programmes of the Ministry of Health and Family Welfare include : National Iodine Deficiency Disorders Control programme; World Bank Assisted Capacity Building Project on Food; National Rural Health Mission (NRHM) (including nutrient deficiencies); and Pilot Programme for Control of Micronutrient Malnutrition. Coordination of the various programmes is done within each of the Ministries, and for overall coordination there are institutional arrangements at the level of Planning Commission and Cabinet Secretariat.

## **VI Issues and Challenges**

**Fighting Hunger and Poverty:** The issue of food security has been identified as a major objective to be pursued by the global community by the Rome Declaration on World Food Security and the World Food Summit Plan of Action in 1996. The Rome Declaration took into consideration the multifaceted character of food security and emphasised that “concerted national action, and effective international efforts” were needed to “supplement and reinforce national action.” The Plan of Action adopted by the World Food Summit proposed that “each nation must adopt a strategy consistent with its resources and capacities to achieve its individual goals and, at the same time, co-operate regionally and internationally in order to organise collective solutions to global issues of food security.”

**Accelerating Agricultural Production Growth Rate:** The stubbornly high incidences of undernutrition and poverty are ascribed to the decelerated production growth rates in recent years, and must be seen as the most important issue and foremost challenge before the nation. Often the system suffers from improper application of farm technology, deficiencies in the input supply chain, information and knowledge capacity with the farmers and huge yield and productivity gaps, investment apathy in agriculture sector, poor infrastructure, price volatility in agricultural commodities, collapse of extension services, and dearth of suitable and appropriate technology and support systems for women farmers and for small and marginal farms.

**Shrinking and Deteriorating Natural Resources:** The ever increasing pressure of human population (also livestock population) in the country is a major cause of shrinking as well as fast deterioration of the natural resources like land, water, biodiversity, genetic resources and forests. The problem is most serious and challenging in India and other SAARC countries than in any other part of the globe as this is one of the most densely populated regions where population is still increasing. While India accounts for a mere 2.4 per cent of the world land surface area of 135.79 million ha, it supports whopping 16.7 per cent of the global population. The population pressure on sharing of natural resources is bound to increase as India's projected total population in 2010 will be 1.19 billion, comprising 815 million rural people (68 per cent of the total population). (Selected Indicators of Food and Agricultural Development in the Asia Pacific Region, FAO, RAP, 2007).

Conservation of natural resources is a very important issue from the point of view of sustainability of food security. The fast shrinking and deteriorating natural resources like land, water, biodiversity, forests, and changing climate including global warming are threatening the sustainability of food and nutritional security. The major Challenge is the utilization of natural resources without any deterioration for a sustainably high production of food and other agricultural crops. Further, Indian agriculture is still largely weather dependent, hence is full of uncertainties. Because of this and other factors, new issues keep coming, and there are no standard solutions for them. Only way is to overcome them by experience, collective wisdom, and of course thorough appropriate research based technology application.

As regards water, the situation is precarious as all the known sources of fresh water, whether surface or ground water, are dwindling and drying. Himalayan glaciers that are a major source of water to Afghanistan, Bangladesh, Bhutan, India Nepal and Pakistan (more than 3/4th of SAARC region) are melting and fading away. Great rivers are at the verge of extinction, water in the remaining ones is highly polluted. Water reservoirs, big or small, in country side have silted and under greed or population push, ground water table has gone so deep that it is rendered useless for common man. Further, rainfall is indicating a receding trend in several parts of India and making the situation worse.

**Unstable Food Self-Sufficiency and Sub-optimal Buffer Stocking:** Given the huge and increasing India's population size, the high incidence of hunger and poverty, the heavy dependence on agriculture for livelihood security, the limited impact of the "trickle down" effect, the little or negative impact of the market forces and liberalization on the wellbeing of the majority poor, and the increasing agricultural unemployment, on one hand, and the international market price volatility, uncertainty of timely and cost effective availability of adequate quantities of biosafe and desired quality foodgrains in the international market, on the other hand, demand that India should largely remain food self-sufficient. Moreover, the upheavals that India's entry as an importer in the global grain market creates in the prices and the resultant hardship to the poorer and smaller importing countries also suggest that India should remain food self-sufficient. This approach will protect both its poor producers and consumers. However, for other crops, we may focus more on crops with comparative advantage and boost our export earnings which could help fund our imports, if needed.

Thus, the main challenge is to produce enough food within our resources not only for meeting current macro level per capita food requirement, but more essentially to ensure at micro level sufficient nutritious food for each household member. Alongwith, peoples purchasing power ought to be increased to enable them to buy the needed food from the market or the PDS. Moreover, sufficient food stock must be maintained as buffer for any contingency. Considering the recent uncertainties and controversies in buffer stocking, the size, irregularities and role of the PDS, which is generally dependent on food stocks held by the public sector, the prospect of the foodgrains futures markets and trend of international prices, a detailed policy on buffer stocking is called for.

**Continued High Dependence on Agriculture, Growing Rural-Urban Divide and Farmers' Indebtedness:** Agriculture is expected to be the engine of India's growth and prosperity contributing 18 per cent of the national GDP and 57 per cent of total employment and 73 per cent of India's total rural employment (various NCF Reports, 2005, 2006). Of the 77 per cent of India's population living on less than Rs. 20 a day, 85 per cent of them are from rural areas and most of them are marginal/submarginal farmers and landless agricultural workers. And, it is these people who comprise the bulk of the undernourished people in the country. Further, Nearly 85 per cent of Indian agriculture is conducted on small/marginal farms and about 50 per cent of the farmers are under debt and paradoxically most of them belong to agriculturally advanced States, Andhra Pradesh being 82 per cent indebted, while in Tamil Nadu and Punjab this percentage is 75 and 65, respectively. The worst part is that 84 per cent of farmer households spend (Rs. 2770/month) more than they earn (Rs. 2115). The input-risk-output imbalance has worsened for the farmers. The per capita income disparity between the farm and non-farm sectors has increased from 1:3 to 1:5 during the last 30 years (Agricultural Statistics at a Glance, 2006).

**Rainfed Areas and Resource-Poor Farmers Bypassed by the Green Revolution :** Green Revolution technologies are scale neutral but not resource neutral, since inputs are needed

for output. Hence they have generally bypassed the vast rainfed areas and resource-poor farmers. A large number of rainfed crops and cropping systems were not touched by the Green Revolution process.

**Technology Fatigue:** The faulty use of inputs in Green Revolution areas has not only reduced the production efficiency, but also caused environmental and economic losses. For instance, the excessive drawl of underground water for irrigation has resulted in drastic drop of water table and uncontrolled flooding of fields uncoupled with drainage has caused serious waterlogging and salinity problems. Likewise, unbalanced use of fertilizers has adversely impacted soil health and lowered fertilizer productivity. The problem of technological fatigue is further compounded with huge technology transfer gaps at various levels. The gaps between potential and realizable and between realizable and average realized yields in the country are generally around 50 to 100 percent, respectively.

**Inadequate Harnessing Of Cuttingedge Technologies:** Gene revolution and ICT revolution are sweeping the world, especially the fast expanding knowledge-rich and knowledge-based economies. The first Green Revolution in India has failed to connect itself with these revolutions. The powers of biotechnology and ICT have not been internalized in India's agricultural transformation process, although there are some "islands" of successes, viz Bt cotton hybrids and e-chaupal and sporadic Village Knowledge Centres. The national biotechnology policy is still in the making while area under "illegal" biotech varieties (Bt cotton hybrids) has been expanding (alongwith "legal" varieties). On the other hand, the conventional extension system has almost collapsed and there is limited involvement of the private sector in technology generation and transfer, other than that in hybrid varieties.

**Huge Post-Harvest losses:** On an average, post-harvest losses of the tune of 12 to 15 per cent occur, whereas in case of fruits and vegetables the average losses are about 30 per cent. Rural agroprocessing, strengthening market infrastructures and value addition are extremely limited.

**Climate Change and Mounting Risks:** Our farm and fisher families are being increasingly subjected to the fury of nature in the form of drought, unseasonal and heavy rains and floods, and climate change. Temperatures in the Ganga basin and similar other regions are expected to rise by 0.1° to 0.3°C by 2010, and by 1.0° to 3.5°C in next 90 years of this century (Perry, et. al., 2007). When this happens, it will shrink the Polar Regions, enhance the temperate climate Zone of the world, and alter the pattern of rainfall in different parts. India and other South Asian countries are expected to be most adversely affected. Mechanisms for risk mitigation are poor or absent. Hardly 10% of farmers are covered by crop insurance. Farm families are also not covered by health insurance (NCF Reports, 2005,2006).

**Declining Self-Reliance in the Post-WTO Era :** In the post-WTO era, both export and import of India have increased substantially. However, the increase in imports was relatively higher than that in export, thus bringing down the proportion of surplus to GDP from 3.2 percent in triennium ending (TE) 1995 to 2.7 percent in TE 2004, although there was a hump in the initial post-WTO years (Chand, 2007). This trend has adversely affected our self-reliance in agriculture. The value of export required to financing imports increased from 32 percent in the pre-WTO era to 57 percent in the post-WTO era. Huge imports of vegetable oils and of pulses have depressed domestic prices of these commodities and adversely impacted their domestic production and producers' income.

The high priority to achieve the MDGs notwithstanding, opening up of the economy and integration in global market implies dismantling of protective restrictions intended to safeguard

national interests, and enhancing our competitiveness. Food self-sufficiency, maintaining reasonable food prices, raising agricultural exports, and investments for upgrading production potential in a cost-effective and sustainable mode are overriding concerns and major issues. These have generated a stream of protective and incentive instruments (all bunched in AMS) which need adjustments under the liberalized regime and imply massive restructuring of the price structure. Agriculture is responding to these forces as well as to changing IPR regimes. The subsidies should, however, be rationalized to be more productive. There is a need to dovetail agri spending towards creating infrastructure strengthening research, helping farmers get a competitive edge and through direct income support, wherever required. Geographic indicator protection and Protection of Plant Variety and Farmers Rights (PPVFR) could offer new opportunities in the globalised world.

**Poor Farmer-Market Links:** High levels of food production in limited areas, with a widespread distribution system, have undoubtedly affected market prices in foodgrains. In the absence of price support systems in large parts of the country, increases in productivity have led to localized gluts, with local prices crashing, and thereby retarding the incentives to increase production. While this may not have had very much of an effect on the overall demanded-supply position, it has affected the pace of improvement in the livelihoods of people in non Green Revolution areas. Warehouse system, including in rural areas, and farmers linkage with futures markets could help farmers in realising optimum prices and also send signal for undertaking crop production.

**Agricultural Product Price Insecurity:** Higher prices when a farmer becomes a buyer and lower prices at the time he/she becomes a seller puts producers at disadvantaged positions. As long as there are resources, or entitlements in Sen's notion, to buy food from the market, food security would not constitute a major problem. But, the average income of a farmer is one-fifth of that of a non-farmer, his economic access to livelihood is inherently low.

**Investment Apathy in Agriculture:** Despite the centrality of agriculture in the national socio-economic, environmental and political milieu, investment, and capital formation in agriculture have steadily declined and has reached all time low in relative terms in recent years resulting in poor infrastructure and performance. In order to obviate low gross capital formation, a suitable climate ought to be created for private sector investment by ensuring the market and export reforms. The investment intensity in research at 0.34 per cent of agricultural (GDP) is only half of the overall average for all developing countries (0.6 per cent). Further, there is considerable inter state variability in the intensity of state funding ranging from 0.08 per cent in Uttar Pradesh to 1.4 per cent in Himachal Pradesh (NCF, 2006).

**Inadequate Institutional Support :** Rising capital intensity, particularly in the high-growth sectors of agriculture, has set in motion a new set of forces leading to biased knowledge, technological and market developments and thus exacerbating the problems of poor and small farmers. Declining growth in public investments and eroding institutional infrastructure are other disturbing features of the current trend. World agriculture, particularly trade, places high premium on quality, and public health, food safety and overall agricultural biosecurity concerns have become central themes of global regulatory negotiations.

The access to farm credit, insurance and subsidies on part of the marginal farmers and the poor is rather inequitable. The social plank and the human face of these provisions should guide their dispensation.

**Redefining the Role of the State:** Agricultural growth in recent years has thrown new sectors and regions into prominence. Livestock, fisheries, horticulture, specialty enterprises (spices, medicinal, aromatic, organic) and value-added products illustrate this trend. Fortunately, the ownership of livestock is more egalitarian. Enhancing small farm productivity, and increasing small farm income through crop-livestock integrated production systems and multiple livelihood opportunities through agroprocessing and biomass utilization, are essential both to meet food production targets and for reducing hunger, poverty and rural unemployment. Market-driven diversification in a global perspective has become the new paradigm driving future agricultural growth. The most profound shift pertains to rapid privatization in all domains - production, consumption, investment, technology, etc. and concomitant decline in State control. Alternative instruments and approaches are evolving to transform agriculture and a very important part of this 'learning' phase is a redefinition of the role of the State. Public goods, welfare imperatives, other regulatory needs, and other areas of market failure will continue to need government intervention. A matter of concern globally is shrinking investment in international public goods.

## **VII Future Vision, Major Policies, Strategies and Programmes of Food Security**

**Focus on Freeing India of Hunger:** Our vision must be focused on to free India from hunger, malnutrition and poverty. An all out effort is called for reinvigorating foodgrain production systems and for strengthening the access to and distribution of food to meet the present and future needs of increasing population not only on the national per capita basis, but to meet the demand of each and every individual. Realising that food insecurity is both a cause and consequence of poverty, particularly the increasing importance of economic access to food, income-generating of- and non-farm activities (employment) should be strongly promoted.

Stemming from the NCF's draft National Policy for Farmers, for the first time in the history of Indian agriculture, the Ministry of Agriculture brought out the National Policy for Farmers, September 2007. Several of the recent initiatives of the Government of India, such as the National Horticulture Mission, the national Rainfed Area Authority, National Food Security Mission and Rashtriya Krishi Vikas Yojana launched for increasing agricultural production and productivity "are in consonance with the intent, direction and measures suggested in the National policy for Farmers" (Hon'ble Agriculture Minister, 2007) (See Box 2).

A major policy goal of the National Policy for Farmers (NPF) 2007 is to foster community-centered food, water and energy security systems in rural India and to ensure nutrition security at the level of every child, woman and man. To achieve this goal, there are two main policy provisions in the NPF: Firstly, Creation of a national Social Security Scheme for ensuring livelihood security of small, marginal and landless farmers. Secondly, the Government will constitute a Cabinet Committee on Food Security to prepare and monitor a well-defined food security policy with own-grown foodgrains for eradicating rural poverty and malnutrition.

Notwithstanding the efforts needed to bring down the population growth rate, as suggested by the Planning Commission, attaining the food and agriculture production growth rate of about 4 per cent should be the goal. Growth in the agricultural sectors of developing countries reduces hunger more effectively than do urban and industrial growth (FAO, 2005). Accelerated agricultural growth will call for :



## **Box 2: Major Goals of the National Policy for Farmers**

- (i) To improve economic viability of farming by substantially increasing the net income of farmers and to ensure that agricultural progress is measured by advances made in this income.
- (ii) To protect and improve land, water, bio-diversity and genetic resources essential for sustained increase in the productivity, profitability and stability of major farming systems by creating an economic stake in conservation.
- (iii) To develop support services including provision for seeds, irrigation, power, machinery and implements, fertilizers and credit at affordable prices in adequate quantity for farmers.
- (iv) To strengthen the bio-security of crops, farm animals, fish and forest trees for safeguarding the livelihood and income security of farmer families and the health and trade security of the nation.
- (v) To provide appropriate price and trade policy mechanisms to enhance farmers' income.
- (vi) To provide for suitable risk management measures for adequate and timely compensation to farmers.
- (vii) To complete the unfinished agenda in land reforms and to initiate comprehensive asset and aquarian reforms.
- (viii) To mainstream the human and gender dimension in all farm policies and programmes.
- (ix) To pay explicit attention to sustainable rural livelihoods.
- (x) To foster community-centered food, water and energy security systems in rural India and to ensure nutrition security at the level of every child, woman and man.
- (xi) To introduce measures which can help attract and retain youths in farming and processing of farm products for higher value addition by making it intellectually stimulating and economically rewarding.
- (xii) To make India a global outsourcing hub in the production and supply of inputs needed for sustainable agriculture products and processes developed through biotechnology and Information and Communication Technology (ICT).
- (xiii) To restructure the agricultural curriculum and pedagogic methodologies for enabling every farm and home science graduate to become an entrepreneur and to make agricultural education gender sensitive.
- (xiv) To develop and introduce a social security system for farmers.
- (xv) To provide appropriate opportunities in adequate measure for non-farm employment for the farm households.

*Source: Ministry of Agriculture, September, 2007*

- Getting technology moving and ensuring access of farmers to this re-establishing a trained, retooled and dedicated cadre of extension workers, strengthening of agricultural research and technology development,

- Increasing investment, efficiency and systems support, rationalizing subsidy and ensuring timely flow of cost-effective quality inputs and credit, insurance and other institutional support systems,
- Augmenting the physical and economic connectivity of farm to market, post-harvest operations including the role of food processing industries, cautious diversification without jeopardizing food security and ultimately enhancing farmers' income and rural employment security.
- Promoting inclusiveness by enhancing access to land, water, credit, market, skills and technology on the part of the poor.

**Evolving Domestic Policies and Policy Actions:** Policies and strategies of food security have been evolving along with the evolution of the concept and definition of food security. Food being first in the hierarchy of humankind demand, Article 47 of the Indian Constitution states "The State shall regard raising the level of nutrition and standard of living of its people and improvement of public health among its primary duties". Since Independence, successive Five Year Plans have accordingly laid down policies and strategies for achieving these goals and realising the fundamental Human Rights to Food.

In the early years of Independence, at the first phase, the focus was on improving food production. Policies were geared to usher in and strengthen the Green Revolution which greatly accelerated domestic food production and helped outpace the high population growth rate and the country moved from chronic food shortage to self sufficiency in food production, built up substantial buffer stock and became a net exporter of foodgrains. Large scale famines and acute starvation were thus eliminated. The Green Revolution Policy underpinned synergy and congruence of modern technology, enhanced input supply and application, marketing and other socio-economic supports, farmers participation and political will. Minimum support prices (MSP) were fixed and provided for procuring and maintaining buffer stocks of rice and wheat to ensure food security.

After having attained macro or national level food security, in the second phase, the country faced a more difficult task of achieving household food security, especially of poor households and of reduction in chronic macro and micro-nutrient deficiencies, which are essentially poverty based. Accordingly, poverty line in the country was defined on the basis of ability of the household to purchase food to meet the energy requirement. Food security and poverty alleviation have thus for the last several years become almost synonymous policy thrusts. Income and employment securities coupled with social safety nets, including direct and indirect food subsidies, especially the Public Distribution Systems (PDS), have been the cornerstones of the food security policy, enabling poor to have access to food where none existed, and had thus helped reduce the chronic undernutrition rates in varying measures in the country.

**Adopting Layered and Holistic Approach :** India recognizes Right to Food and is striving to implement it and has launched massive food based schemes and substantial subsidies, full benefits of which are yet to be harnessed. A layered and holistic view of the problems by examining the policy ramifications at the national, regional, rural, urban, local and community levels are being emphasised. District plans and their effective implementation is a high priority. At the national level, agricultural policies on productivity, price management and credit are being modified and decentralized to boost productivity, improve market linkages, and promote extension services and local capacity building. Also, while focusing on productivity, agricultural policy is increasingly emphasising shift from isolated seed, water and fertilizer based technology to a more integrated ecological and environment-friendly stance.

**Releasing Pressure on Natural Resources:** As the first strategy, the immediate goal should be to release pressure on land and other natural resources by creating jobs for rural masses which are not so much land based. Another strategy to be acted upon together is to educate masses on population check more vigorously and to extend them substantial and worth while incentives to keep their family size within a limit. This is a tremendous task, but if done in a mission mode and business like manner through a joint partnership between public and private sectors as well as voluntary groups, tangible results are bound to be achieved.

**Strengthening Knowledge-led and Technology-based Alleviation of Food Insecurity:** India has a strong research, extension and agricultural education system under the umbrella of the Indian Council of Agricultural Research (ICAR), comprising 48 Institutes, 5 National Bureau, 12 Project Directorates, 32 National Research Centres, and 76 All India Coordinated Research Projects, producing new technologies, approaches and strategies, including socio-economic aspects, in crops, horticulture, livestock, fisheries, agro-forestry, natural resources, agricultural machines, tools and implements, post-harvest management, and cuttingedge technologies *viz.* biotechnology. Activities pertaining to conservation of plant genetic resources are fostered by the National Gene Banks *viz.* National Bureau of Plant Genetic Resources, National Bureau of Animal Genetic Resources (NBAGR), National Bureau of Fish Genetic Resources (NBFGR), and National Bureau of Agriculturally Important Micro-organism (NBAIM). For technology assessment and refinement a vast network of 558 Krishi Vigyan Kendras (KVKs) has been developed. Agricultural Education is promoted by ICAR through its institutes having deemed to be University Status. In addition, ICAR supports 42 States Agricultural Universities and 4 Agricultural Institutes of Central Universities.

The availability of natural resources like water and land per capita at national level is declining. A balanced, sustained and robust soil health is a must for achieving sustained food and nutritional security. Hence, more food has to be produced with lesser resources, and in this situation the only way is to increase the efficiency of production through modern management of improved technologies. Emerging technologies like information technology (IT) and computer application, super efficient and more accurate electronic equipment, geographic information system (GIS), geographic positioning system (GPS), and super fast transport and communication systems along with hybrid seeds, biotechnology, gene revolution, laser technology, efficient micro-irrigation systems, zero or reduced tillage technology, Site Specific Nutrient Management System including balanced soil and plant nutrition and health management based on soil test for macro and micronutrient tests are being used but these need to be synergized and monitored regularly. The technology integration and packaging system through participatory on-farm trials and refinements will need highly trained and motivated extension workers.

**Accelerating Production and Productivity, Specially of Small and Marginal Farms:** to arrest and reverse the trend of the past decade and to achieve an overall agricultural growth rate of 4 per cent and above. While the on-going miniaturization of farm sizes should be halted and reversed through promoting off- and non-farm rural employment, land reforms and land leasing and other measures, considering that nearly 50 per cent of the agricultural land is with small and marginal farmers, improving small farm productivity must be the most important single development strategy.

In stark contrast to the globally success story of steadily accelerating Indian overall economy since the 1980s, there is a sharp deceleration in growth with agricultural GDP dropping from 3.62 per cent rate during the period of 1984-85 to 1995-96 to less than two per cent in the following period of 1995-96 to 2004-05 (FAO Report, October 2007, prepared in consultation with MoA, IFPRI and MSSRF). Agriculture growth was 2.6 per cent during 2007-08.

Consequently, share of GDP Agriculture in the total national GDP has dropped to 18 per cent. But, rural sector still accounts for around two-thirds of the population (overwhelming majority of whom are below the poverty line and a larger proportion of them is undernourished) and over 50 per cent of the Indian population is directly dependent on agriculture for employment and livelihood security. This large gap between the share of agriculture in GDP and in the labour force explains the stagnating and low farmers' income and the fast widening rural-urban and farmer-nonfarmer divides and agrarian distresses.

Low yield areas should be mapped and location-specific causes of the productivity gaps and land factor productivity should be identified and specific land and water use decisions should be promoted by restructured and retooled State Land Use Boards to realize the yield and income potential. Crop diversification should be promoted in consonance with market opportunities, farmers' income and ecological sustainability.

The NPF goals echo the recommendations of the NCF. However, some of the major recommendations of the NCF for one or the other reason could not meet Government approval, which hopefully would be reconsidered at appropriate time towards achieving the goals. Several measures, programmes and actions are already in place but need reorientation and convergence and need ones are being created in the 11<sup>th</sup> Plan to achieve desired outcomes.

Considering that Indian soils are both hungry and thirsty, status of micronutrients, national network advanced soil testing laboratories should be established and soil test, particularly the balanced nutrient application is an urgency. Farmer-to-farmer learning by establishing farm school in each block, adopting location-specific integrated Farming Systems (IFS), ensuring timely availability of quality seeds, integrated and balanced nutrient application and management, and proper water management and efficient water use, including Million Well's Recharge Programme, mandatory water harvesting and water use efficiency deserve highest priority.

The slow down in "sunrise" sub-sectors where huge yield gaps and unexploited potential exist should be arrested and as suggested by the NCF, small farm estates for horticulture, cotton, poultry, aquaculture should be created to promote group farming and post-harvest management. Knowledge-based and market-led diversification and extension should be promoted by institutionalizing the Every Village a Knowledge Centre or Gyan Chaupal movement.

Productivity of livestock in India is low due to fodder, feed, healthcare, market and price constraints. Integrated crop-livestock-fish farming systems, cooperatives (Amul being world famous experience), SHGs, especially women SHGs for livestock and agriclinics operated by veterinary and farm science graduates and paravets, coupled with fodder and feed banks will immensely increase the productivity and income of livestock owners. Livestock insurance should particularly be accessible to smallholders. In view of the setback to poultry industry due to bird flu outbreaks during the past seven years, quarantine and testing facilities at all ports of entry should be established. Poultry rearing should be recognised as an agricultural activity and appropriate support should be extended to backyard poultry farmers to establish Small Holders' Poultry Estates.

The NCF had suggested the following steps for accelerating fisheries production.

- Introduce Integrated Coastal Zone Management and scientific fish rearing, harvesting and processing, including introducing Mother Ships, and develop suitable dynamic policies and governance, particularly for the management of Exclusive Economic Zone (EEZ)

extending to nearly 2 million sq km of sea surface, which amounts to two-thirds of the land surface available to India.

- Undertake and institutionalise well-planned Aquarian Reforms to provide landless labour families access to village ponds and other water bodies in the public domain for aquaculture, and clarify property and use rights.
- The National Fisheries Development Board (NFDB) should promote the Aquarian Reform and ensure congruence of ecology, economies, gender equity and employment generation and should help resolve the conflicts between aquaculturists and agriculturists as well as resolve problems of local population due to salt water entering into the aquifer and pollution caused by intensive systems of aquaculture, and settle conflicts related with sea weed farming and introduction of exotic carps and other alien invasive species.
- Establish Fish for All Training and Capacity Building Centres (decentralized) for comprehensive training of the capture/culture-consumption chain, quality, hygienic handling, and biosecurity (with due attention to needs of fisher women) to enable fisher families to take up additional income earning activities.
- Institutionalise Responsible Fisheries - ecosystem approaches, promote wider application of semi-intensive production systems, and strengthen research and extension for integration of aquaculture and other sub-sectors of agriculture and public-private partnership particularly in hatcheries and stocking programmes.

New policy options and actions should ensure that cuttingedge technologies are embedded in Integrated Farming System (IFS) and should promote backward-forward linkages, diversification of agriculture, farmer-market links, prevention of post-harvest losses and value addition so as to provide additional stimulus, new base and new hope for solving complex agricultural problems and enhancing farmers' income and livelihood security. But the main part of the strategy here is to internalize these modern and efficient technologies into the systems of food production and to orient them for resource poor small and marginal farm holders. This also calls for revamping of the extension services, timely and cost-effective supply of quality inputs and need-based livelihood supports. Unless the last farmer is served well by the technology, both saving of farming and sustainability of food production will remain threatened. Policy shifts are needed to support multidisciplinary (involving also social scientists) and participatory research and technology transfer with focus on enhancing productivity of the majority small and marginal farmers and fishers.

It would be highly strategic to adopt community based approaches which stress on community development and involve processes that need to be universalized. The community (particularly rural people) will need to be closely mobilized towards a process of change, for which they should be made integral part of the planning process. It would be necessary to develop a set of minimum basic indicators/ nutrition and development related indicators which would help to assess the community's priority needs and 'worker's committed involvement' in the programme. At the community level, every effort must be made to empower women and people through income generation schemes, innovative nutrition education, emphasis on small family norms, removal of gender bias, promoting equity in the household (for provision of all resources which impinge on nutrition and development), hygiene and sanitation concerns and simple, yet rational thinking.

At the rural level, distribution and procurement of grains must be effectively decentralized locally. Further, maintenance of local grain storage facilities, remunerative disposal of excess

production, provision of consumer credit and subsequent achievement of stability in price and supply, are recommended. Establishment of grain, seed, and fodder banks that address local situations could complement broader measures to enhance productivity and sustainability of cropping systems. Information empowerment of local bodies and institutions as well as individuals, strengthening food programmes, and making the rural health infrastructure more responsive to hunger and nutritional emergencies, would be necessary components of a rural campaign against hunger.

In the urban scenario, the provision of basic amenities in slum areas, improved health, hygiene and sanitation practices, strengthened public distribution systems, and food based livelihood generation programmes are the need of the hour. High unemployment in slums and small towns is the root cause of food insecurity in urban India. On the lines of the National Rural Employment Guarantee Scheme, the NCF had suggested launching of a National Urban Employment Guarantee Programme and use the scheme for activities like sanitation, pollution control, wastes recycling etc. Further, a life cycle approach must be adopted as a cross-cutting element in all food-based interventions in order to ensure sustainability and success.

Agriculture is getting feminised (73 per cent women as compared to 52 per cent men). Therefore, it is very essential to adopt strategies to generate rural employment for women and for their empowerment. Skill acquisition and workforce participation are integral to women's empowerment and equality. Women's ability should be improved to enable them to exercise control over the means of production. We should take steps to give the Panchayats control over instruments of poverty amelioration like the PDS, giving women or women's cooperatives ownership and management of the PDS shops. Moreover, the 'Social Audit' by the Gram Sabhas and the villagers' committees can go a long way in tackling the negative social forces in the way of eliminating hunger and malnutrition.

State and Central Governments, SAUs, KVKs, ICAR Institutes, ATMAs, NGOs, private sector, farmers, women groups, small farmers' estates, cooperatives, panchayati raj institutions and other grassroot rural and community-based institutions must work in a participatory and interactive mode through adopting watershed-based approach which provides multiple entry points and synergistically converges efforts of the various partners. Panchayati Raj Institutions should be suitably strengthened to bring the necessary convergence at grassroot level.

Establish regional diagnostic centres equipped with modern facilities for seed testing, soil and plant analysis, and diagnosis of insect pests and diseases of crops, animals and fishes. These centres should be capable to address the farmers' problems of the region in all agricultural, horticultural, animal husbandry, poultry, fishery, post-harvest management and marketing subsectors. Also they should have the backward links with districts development programmes and forward links with SAUs and ICAR institutes in the region. There has to be a strong team of specialists including socio-economists placed at the centres. Selected KVKs and ATMAs with due strengthening could perform this role. Some of the KVKs should strategically be earmarked primarily for catering to the needs of women farmers.

**Integrating Resource Management for Sustained and Enhanced Productivity:** Soil test is the basis of balanced nutrition. This requires proper investment, training, and education to farmers. Major cause of declining TFPs is imbalanced soil fertility management. Thousands of well-equipped and well-functioning soil testing laboratories should be established and strategically located throughout the country (in which the private sector, agriclincs and entrepreneurs can be effectively partnered) and each farmer should be issued a soil health card. Farmers, should be oriented and convinced to get their soils tested on regular basis and manage

their soil fertility through integrated nutrient application. Technologies like zero/reduced tillage are both time and cost saving in popular intensive cropping systems e.g., rice-wheat or maize-wheat rotation or potato plus maize (intercropped) and other diversified systems should be adopted extensively.

Water is the most scarce natural resource and despite a viable national water policy being in place, water continues to be the most misused commodity. A country wide campaign is required to conserve water and to optimise its use as per resources. Other policy measures for water conservation and efficient use should include : (i) restoring water bodies around the country including village ponds, implementing the Million Well Re-Charge programme and promoting mandatory rain water harvesting in rural as well as in urban India and managing water bodies and reservoirs to be managed by stakeholders and water users with the participation of Gram Panchayats and other local democratic bodies and self help groups (SHGs) including women representatives; (ii) withdrawing and not repeating all populist orders like free electric supply to farmers by various State Governments, that are encouraging excessive pumping of ground water and its wastage; (iii) regulating and rationalizing the city water supply, and recycling the city waste water to save the rivers from silting and pollution, thus increasing fresh water supply for domestic agricultural, and industrial uses and educating public at large continuously, making schools as base on importance of water and its rational use, and impose penalty on the offenders (Nearly Rs. 800 crores have gone down the drains under the Clean Ganges Campaign, but Ganga remains polluted as ever and is “dying” at places); (iv) extending the technologies for dryland farming to the small and marginal farmers and the recently established National Rainfed Area Authority can have as its mandate for the launching of second green revolution in dry farming areas beginning with pulses and oilseeds; and (v) on the basis of carbon credits, there can be water credits with each water user, be that a farmer, industrialist, or household, and he or she can earn credits or be punished accordingly.

Bulk of the allocations to agriculture in the past Plans has gone to irrigation, which had significantly contributed to the Green Revolution process, but due to low water use efficiency at the farm level and losses in conveyance from source to the field, the overall pay off has been unsatisfactory. Misuse of water has resulted in widespread waterlogging and salinization. Several of the irrigation projects were delayed, but lately the Accelerated completion of Irrigation Projects, microirrigation and participatory water management have been emphasised. India has been a leader in agro-ecological zoning and watershed-based integrated land and water use. Recent reviews of watershed programmes have revealed that the programmes had generally ignored the social, humanware and equity concerns and had suggested to adopt watershed plus plus approach.

Biodiversity, besides providing diversified food and nutrition resources has direct implications on natural resources conservation, regional and global ecologies, and sustainability of agricultural production systems. Fortunately, India has been endowed with one of the richest biodiversity reserves in the Himalayas, river vally basins, costal areas, including off shore islands, and rain forests. But the pace and manner of development is presenting an imminent threat to the multiplicity of biodiversity. As a part of strategy to save and conserve, inter-twinning of biodiversity conservation should be an integral part of the large river valley projects, rail road construction, industrial and urban expansion, mining projects, and special economic zones (SEZs). Any further loss of biodiversity will have an adverse effect on the conservation and up-keep of land and water resources, which have a direct bearing on food production, productivity and food security.

India is committed to conserve not only its own biodiversity, but to play its role globally as the country has ratified the International Convention on Biodiversity (CBD) and is a party to the Convention. Also since India has created world class facility in germplasm conservation, storage, multiplication and distribution, it should be prepared to share this facility and expertise with other SAARC countries, if needed. A national biosecurity umbrella encompassing food safety, environmental safety and human and livestock health and SPS and other risk management and regulatory provisions particularly under TRIPS is being created. Such an approach is needed also in other South Asian countries, which could ultimately be linked to establish a regional biosecurity umbrella.

Forests and the benefits they provide in the form of food, income, and watershed protection, have an important and often critical role in enabling people around the world to secure a stable and adequate food supply. Forests food resources are important to the most food insecure people because to them the forest food is most accessible and nutritious. Tropical forests which form an important component of SAARC countries, India, Sri Lanka, and Maldives, present a range of uncultivated foods like fruits, grains, seeds, leaves, roots, and tubers of food value, fish and a range of wild animals, as well as feed and fodder for animals. Need, however, is to check the deforestation and their degradation through increasing the awareness, educating the masses, and strict implementation of laws and policies. Rights of forest tribes, as detailed in the forest and tribal bill recently passed by the Parliament, should be protected.

Enhanced sustainability is a must for obviating instability in food availability and only a safe environment can sustain high productivity. Sustainable agriculture in safer environment is essential to save the environmental parameters in atmosphere, lithosphere, and hydrosphere while conducting agricultural operations. This is to be achieved through adoption of an eco-technology approach encompassing Integrated Crop Management (ICM) inclusive of Integrated Nutrient Management (INM), Integrated Water Management (IWM), and Integrated Pest Management (IPM) - all grouped under "Green Agriculture". In addition to being eco-friendly, the technology should be cost effective and suited to the resource poor farmers, encompassing the three E concerns for food security: Economics, Ecology and Equity. The paradigm shifts towards integrated farming system and eco-technologies are being increasingly operationalised in the Indian programmes.

**Minimising Post Harvest Losses:** Priority should be given to enhance value, quality and safety along the food chain by modernizing various operations including processing, packaging, transportation, storage and marketing through the value chain system. It must be emphasised that unsafe food is not food, hence is of little or of negative value for food security programmes, let alone the nonmarketability of the product. A literacy campaign for all involved in production-processing-distribution-consumption chain on quality and food and health safety should be, launched and intensified. University curricula, extension and farmers' trainings should be revamped accordingly.

**Promoting Integrated Rural Employment:** Employment security in rural areas should be enhanced for improving household and individual level food security. On-farm and off-farm job opportunities are needed to promote on-farm jobs with capacity building process through training, farm credit, adoption of suitable Integrated Farming Systems (IFS), biovillage approach and post-harvest technologies, including rural agro-processing. The small and marginal farm households should be empowered to enhance on-farm activities and create more jobs and income for their family members. For off-farm job opportunities, intervention by both public and private sectors will be necessary. This will also augment agro-rural infrastructural facilities. Congruent



attention of all macro level stakeholders, e.g., farming community including their elected bodies, bankers, private and public sectors, investors, and economic policy makers will be needed.

Small Farmer's Agribusiness Consortium of the Ministry of Agriculture could proactively develop agribusiness of projects and arrange venture capital flow for development of agribusinesses in the country in association with commercial banks. Rural India will have to take a plunge in the main stream of globalisation and compete globally for gaining leadership to generate wealth and job opportunities in order to remove hunger and alleviate poverty. Agri Marts, Agriclincs, Contract farming (farmer-friendly), Agri Parks, Special Agri Zones etc. could all become instruments of farmer-market-rural employment linkage design and strategy. Government should play a facilitating role to empower farmers to come on grips with market mechanism and provide support in form of direct subsidies to the relatively deprived ones.

### **Targeting the Food Insecure and Vulnerable People and Strengthening Social Safetynets:**

Realising that undernutrition and deficiency of vital elements have adverse health consequences, especially in children and pregnant and lactating women, policies to initiate targeted nutritional interventions in forms of Integrated Child Development Services Scheme (ICDS), Mid Day Meal and Fortification have been helpful in reducing undernutrition, although at a slower rate and in patches. The X<sup>th</sup> Plan had a paradigm shift from household food security to nutrition security for the family and the individual. There was also a shift from untargeted food supplementation to screening of all the persons from vulnerable groups, identification of those with various grades of under nutrition and targeting the vulnerable people. Another important paradigm shift is to emphasise livelihood security which encompasses not only food and income security but also education and health security.

A National Nutrition Mission was launched to implement the National Nutrition Policy to strengthen existing programmes to promote nutrition education and research leading to focused and comprehensive intervention aimed at improving the nutritional and health status of the individuals. This in turn was expected to enable the country to achieve substantial reduction in macro and micronutrient deficiencies. The Mission was required to :

- Coordinate and monitor implementation of the National Nutrition Policy.
- Strengthen existing programmes such as ICDS, research and development.
- Provide nutrition education and effectively adopt the Information Education Communication (IEC) strategies.

The PDS system should implement all the reforms recommended by various review and evaluation committees of the programme. The system should be diversified by including coarse grains and some durable horticultural produces including potatoes in addition to wheat and rice. Subsidised price of food items in the programme should be essentially affordable by the BPL households. As suggested by the NCF, the PDS system should be decentralized and state governments, PRIs and SHGs should play more proactive role in the process. Women SHGs supported by micro-credit could operate the PDSs, wherever possible. Food coupons coupled with market mechanism could help meet the food requirements.

The delivery of ongoing nutrition support programmes should be restructured on a life cycle basis and involve appropriate supplementation programmes. Infants (0-2 years) - the most vulnerable and critical groups, not being reached by ICDS, and other groups not being attended to by ongoing programmes, should either be included in restructured ongoing programmes or catered to by new supplementary programmes.

Eradicate hidden hunger and institutionalise community food security system by taking the following actions:

- Introduce a food cum fortification approach for eliminating iron, iodine, zinc and Vitamin A deficiencies and accord priority to overcoming chronic and hidden hunger in pregnant women, and in children in the 0-2 age group. Dietary diversification supported through food basket and PDS diversification will be useful particularly for micronutrients enrichment. For instance, as compared to rice, *ragi* is 34 times richer in calcium, five times in iron and 2 times each in phosphorus and minerals.
- Promote the organization of Community Grain and Water Banks by local communities with the Gram Sabhas providing social oversight, and promote the concept, “store food grains and drinking water in every village”(NCF Report, 2006).
- Pay particular attention to safe drinking water, primary health care and nutrition education.

## **VIII South Asian Solidarity for Food Security**

Reducing the number of undernourished, hungry and poor people on a sustained basis must be the foremost issue and challenge of SAARC countries, all of which except Maldives are classified as low-income countries. Agriculture is still one of the dominant sectors of these economies and the main source of income and employment for the rural population. The overall food production in most South Asian countries had outpaced the population growth rate and the average food consumption had increased by 15 per cent during the past three decades or so. But, in recent years, the production growth has considerably decelerated and stagnated in most countries, adversely impacting food and nutritional security.

Inadequate purchasing power is the main cause of hunger at household and individual levels. Considering that 60 per cent of the region’s work force is still dependent on agriculture, and GDP Agriculture growth has generally decelerated or stagnated in the recent decade, productivity of agriculture sector as well as non-farm employment and rural development must be accelerated particularly for improving household and individual level food security. Individual SAARC countries as well as the region as a whole should aim to achieve comfortable levels of food self-sufficiency. Some of the countries would, however, have to opt for regular imports, which could be met through intra-regional trade. In this context, the Agreement on establishment of a SAARC Food Bank is a formidable step.

In addition, SAARC countries face the following common issues and challenges related to one or the other component of food security:

- (i) Sustaining and accelerating growth in agricultural productivity; reducing the gap between marginal and favoured areas and bridging huge yield gaps, technology fatigue and collapse of extension services;
- (ii) High vulnerability to natural and man-made disasters causing serious fluctuations in production, and serious implication of climate change and sea level rise;
- (iii) Breaking the persistent unholy alliance of hunger, poverty and environmental and natural resource degradation as the three are causes and consequences of each other;
- (iv) Enhancing productivity, profitability and income of the overwhelmingly large proportion of small, marginal, sub-marginal and landless farmers through developing,

transferring and providing appropriate technologies, inputs and services and improving input use efficiency;

- (v) Linking farmers with markets, strengthening post-harvest management, agroprocessing, value addition, enhancing food availability for the poor through market, trade and distribution reforms, safety nets and integrated on-farm – non-farm employment and income;
- (vi) Formulating and implementing appropriate policies, strategies, institutions and services for sustained food security

Biosecurity concerns are yet another set of common issues. Significance of plant quarantine has increased in view of the Globalisation and Liberalisation in International Trade including with SAARC countries on plants and plant material in the wake of Sanitary and Phytosanitary (SPS) Agreement under WTO. Notwithstanding the advantages of SPS and TBT, SAARC countries have the following concerns: First, the region may be in a disadvantaged position as several countries in the region have inadequate facilities, expertise and resources to implement food safety requirements demanded by the developed country markets. Second, these countries are at the receiving end in terms of both food exports and imports. They have no control over food being exported by developed countries to their markets while at the time of exporting they must meet all the standards set by developed countries. This makes it difficult for SAARC countries to effectively use agricultural trade to their advantage. There is evidence to believe that developed countries frequently raise SPS standards as a way of blocking imports from third countries, which is bound to impact livelihood security.

The South Asian countries have a potential to engage in mutually beneficial agriculture trade. However, the trade potential is currently limited due to the negative list that these countries maintain under SAFTA. As the countries develop mutual trust and the list is shortened, it may serve the purpose of making relatively cheap food available to people.

Each of the SAARC countries have their Acts and Regulations regarding marketing and inspection of food quality and safety. But these need harmonization. India has a comprehensive infrastructure for the purpose, including food quality testing and Agmark laboratories. Further, International Standards formed by Codex/ International Standards Organisation (ISO) are also considered so that our products can compete in the international market. India's Agricultural and Processed Food Products Export Department Agency (APEDA) and the National Institute of Agricultural Marketing (NIAM) are major institutions assisting the country in strengthening domestic and international trade. The country has recently reformed its Agriculture Produce Marketing Committee Act (APMC Act) to remove restrictions on internal movement/marketing of agriculture produces towards creating a "Common Indian Market". These Acts, Regulations, and Institutions established in India can assist the SAARC countries to set up a common protocol for their own use. In order to resolve the issue of harmonization of the enabling mechanisms and regulations, the concerned Rules and Acts of SAARC countries should be reviewed and updated to ensure desired regional uniformity consistent with national needs. The following priority collaborative programmes deserve priority attention.

**An Inter-connected South Asia :** The 14<sup>th</sup> SAARC Summit held in New Delhi on April 3-4, 2007 envisioned an interconnected South Asia where there is a free flow of goods, services, people and ideas resulting in an inclusive, plural and rapidly developing region. SAARC Heads of State/Government identified Food Security, Energy Security, Water Security and Environmental Security which SAARC should move ahead on urgent basis with concrete and tangible projects which would positively impact on the life of the peoples.

**Promote and ensure inclusiveness:** All the countries in South Asia are continuing with the economic reforms and policies of liberalisation for the last about 15 years and at times have benefited at macro level looking at their GDP and economic growth rates. But, this excellent growth in national economies ranging between 6 and 9 per cent per annum is hardly percolating down to the micro level of low income strata. Food and nutritional insecurity, hunger and poverty, as mentioned earlier, are still haunting South Asian population. The “trickle down” and “market magics” have generally worked only partially. Mindsets at various levels must, therefore, change to emphasise pro-poor, pro-farmer, pro-women and pro-nature policies and help redesign and reprioritize the institutional, services and infrastructural supports particularly in the areas of rural credit, livelihood support (targeted subsidies), extension and input delivery, social safety nets, agricultural insurance, pricing, marketing and trade supports and overall investment and capital formation in agriculture and allied areas. The policy makers, academia and administrators in SAARC countries must think beyond the Food Bank and exchange experiences in the various elements of food security and undertake joint studies and researches towards policy advocacy for concrete collaborative actions for national and regional project formulations and implementation. The 14<sup>th</sup> SAARC Summit had reiterated its commitment towards project-based cooperation to strengthen collective efforts in the region.

**SAARC Food Bank:** The SAARC Food Bank has been set up as a supplement to national efforts to manage emergencies and food shortages. It will commence with a reserve of 241,580 tonnes of foodgrains, with India’s share being 1,53,200 tonnes, although under emergency situations in recent years India has provided substantial food aid to affected South Asian countries to the tune of even 0.5 to 1.0 million tonnes of foodgrains. So far only three countries, namely, Bangladesh, India and Sri Lanka have ratified the Agreement. The remaining countries are urged to hasten the process so as to operationalise this concrete step. India, projected to emerge as a food surplus country, could provide anchor support to the Bank (as done by Thailand for the ASEAN Food Security Reserve).

**Coordinating price policies, the border trade and harmonizing the trade policies in view of the changed international environment (WTO/AoA, SAFTA, EC, ASEAN, and others):** Due to the long porous frontiers among the SAARC countries, any effort to isolate the agricultural economies of these countries will lead only to distortions and defeat the intent of policies. The example of Nepal’s fertilizer price policy is illustrative. Both India and Nepal will gain if they have a common understanding of fertilizer prices. If the fertilizer prices in these countries are not coordinated, the result will be large-scale smuggling from the country where the prices are low to the country where prices are high. Policing such activities will be difficult. What is true in the context of India and Nepal also applies to other countries sharing common borders. Machinery for regular and comprehensive consultation, even *ad hoc* and limited discussions would be of mutual benefit.

The above approach applies also to trade policy. For a variety of reasons, namely, diversity and complementarity of their nation’s agricultural sector, analogous stages of development, the similar growth strategies pursued by SAARC countries, these nations can mutually benefit by promoting trade among themselves on preferential basis. In this respect, SAARC is lagging behind other regional groups. To start with, SAARC countries should legitimize, in fact encourage, the border trade, which is largely informal and brisk. “This could well be a cautious first step in the direction of better economic coordination”.

**Sharing the experiences on poverty alleviation and food security:** The size of these problems is so large that they have over-taken the resources, and it may not be, therefore, wise for any

country to go alone in solving these problems. There is lot of scope of joint efforts on the front of food security and poverty alleviation. MDGs and SDGs present an excellent opportunity for the regional countries to come together and join hands, resources, and strategy for a common cause and common programme. The Food Insecurity and Vulnerability Information Mapping System (FIVIMS), initiated by FAO in the early 1990s, has been adopted in India and food insecurity maps have been prepared (MSSRF and UNFPA) and are being used for need-based planning and programming. Grassroot institutions and community-based implementation of food security programmes could be highly effective even in remote areas and such experiences should be shared by other countries (See Box 3).

### **Box 3. Grass-root Institutions and Communities Must Lead the Food Security Movement – A Success Story from Chhatisgarh**

Panchayati Raj Institutions (PRIs) and rural communities must play a leading role in fighting food and nutrition insecurity as ably demonstrated in Chhatisgarh, where with the support of CARE INDIA, nutrition security has been placed squarely on the agenda of the Gram Sabhas. Community volunteers called Mitanin at hamlet level are selected by the PRIs who are responsible for providing and coordinating health and nutrition support to bring about more appropriate health seeking behaviour, and to address exclusion of women, and neglect of the girl child.

Community level monitoring of the initiative is achieved through Nigrani Samitis and Gram Sabhas, and transparency and public accountability are brought on the agenda. Bahu Saas Pati Sammelan and Samanwaya Mela routinely organised through the Gram Panchayats has been a unique innovation. It provides a platform for focused attention upon infirmities in supplies, services and implementation of centrally sponsored as well as state led schemes across at least three Departments: Panchayati Raj, Health and Women and Child. Health and Nutrition Day (HND), on one day in a month, is organised where residents from all segments, including the vulnerable and the marginalized, tribal and non-tribal are encouraged on every HND to avail of supplementary nutrition, immunization, ante-natal care, and counseling on safe motherhood practices.

It is encouraging to note that the Change Agents are becoming change leaders. About 10,000 Change Agents (members of mahila mandals, mitanins and community volunteers) have been elected into PRIs and have influenced the agenda in favour of nutrition and women. The movement had a substantial impact in achieving higher reductions in malnutrition and infant mortality in comparison with other states. Human resource mobilization and capacity building has been the key to success in Chhatisgarh.

**Mutual learning and exchange of research based agricultural technology and policy for sustainably higher food production:** Countries in the SAARC region can benefit mutually by exchanging their technologies, research notes and learning by each other's rich experience in the field of agricultural production, post-harvest management and distribution. These countries can also train each others scientists and selected farmers in their fields of specialization. India has a lot to give and gain and so also other member states. The conservation tillage, SRI and other such technologies are pan South Asian in coverage. Their adoption, adaptation and impact

should be critically analysed in different countries and through SAARC Workshops the elements of success (or otherwise) should be shared throughout the region. This is a typical win-win situation for all the regional countries. Such an arrangement is feasible because of similar nature of problems and possible actions. Each cooperating country should have in place an effective enabling and regulatory (IPR and biosafety) mechanism, which must be harmonized regionally to facilitate need-based adoption of the new technologies in the region. The Asia Pacific Association of Agricultural Research Institutions (APAARI) can play an important role in forging further links and in documenting sharing success stories.

The National Agricultural Research System (NARS) in some of the SAARC countries are fairly well developed and are of international standards. Each of these countries have their research and technology databases, and the process of research information exchange should be institutionalized to the advantage of agricultural scientists to avoid wasteful duplications and help them to sharpen their focus. Moreover, the available technologies, through agreed technology sharing arrangements, should be shared among interested countries and, following local assessment, refinement and fine tuning, should be adopted by the intended users and the impact should be monitored and made known to the partners. Given its high capacity in the ICT sector, India must play a lead role in institutionalizing the process of information sharing.

The various policy challenges, described earlier, call for collaborative research, policy advocacy, development strategies and programmes involving active and full time participation of researchers, policy makers, development agents and civil society organisations. Only high quality, collaborative and participatory research will enable effective communication of their policy recommendations to decision makers who in turn must clearly communicate their demands to the researchers for finding solutions and the various partners must keep in close touch with each other. Policy analysis, monitoring and programme impact evaluation should be undertaken jointly by all collaborators. The needed capacity for these activities should be created at national and regional levels and should be dynamically updated to respond to new needs and developments.

FAO has in the last decade provided and continues to provide assistance to food security programmes in SAARC countries. Its SPFS is operational in Afghanistan, Bangladesh, India, Maldives, Nepal, Pakistan and Sri Lanka. FAO's Asia FIVIMS project backed up by the FAO Global Information and Early Warning System (GIEWS) is proving helpful in mapping vulnerable and prone to food insecurity areas in several South Asian countries and the information could be pooled at the regional level for further directing the regional level effort in fighting hunger. Other FAO initiatives in the region relate to the control and prevention of the highly pathogenic avian influenza (HPAI) and IPM. The effectiveness of these initiatives should be assessed and the effort should be converged to improve regional food security and to provide base for further programmes and activities. Bird flue is a major regional challenge and all member countries must participate in effectively managing this menace.

It is important for SAARC countries to develop still deeper, viable and fruitful partnership with the United Nations (UN) agencies like FAO, WFP, UNICEF, WHO and others, and also the Consultative Group on International Agricultural Research (CGIAR). Four of the CGIAR Institutes, namely, the International Crop Research Institute for Semi-Arid Tropics (ICRISAT), the International Water Management Institute (IWMI), the International Centre for Agricultural Research in Dry Areas (ICARDA), and the International Rice Research Institute (IRRI) are located in Asia. All these Institutes along with other headquartered out side Asia like the International Maize and Wheat Improvement Centre (CIMMYT) and International Food Policy Research Institute (IFPRI) which also have strong presence and programmes in Asia, are

working to ensure food security of the developing world. SAARC should strengthen its relationship with these institutions for a multilateral development of food security related programmes.

**Regional umbrella on biosecurity:** Food safety, biosafety, health safety, gene safety and environmental safety have become major issues in international trade. International movement of living materials and genetic resources, transgenics and biotechnologically (genetically engineered) designed plants, animals, fish, micro-organisms, and products derived from them are being increasingly put collectively as biosecurity concerns. FAO and several member nations, such as India, are promoting and establishing national and international biosecurity umbrellas, which must be seen as an important element of food security, let alone the non-tariff restrictions often applied irrationally against developing country's products. SAARC countries should take advantage of the Indian and FAO initiatives and establish a SAARC Biosecurity Umbrella.

The High Biosecurity Laboratory of India for prevention of entry and spread of new animal diseases, located at Bhopal (managed by the Indian Veterinary Research Institute) can be used as a regional facility for monitoring of new pests and diseases, risk assessment, development of new diagnostics and vaccines and for training and skill and human resources development. Likewise, the National Phytotron Facility at the Indian Agricultural Research Institute, New Delhi, could be used by other countries for testing their crop transgenics and for training in the fields of biosafety. In fact, several African countries, primarily through FAO support, have regularly been availing this facility.

## REFERENCES

- Chand R., 2007. Demand for Foodgrains, Economic and Political Weekly, December 29
- Chand R., 2007. International Trade, Food Security, and Response to the WTO in South Asian Countries in (eds) Acharya, S.S. *et al*, p262-283
- FAO, 2007. FAOSTATs DATABASE, FAO, Rome
- FAO, 2006, Global Perspective Studies Unit, FAO, Rome
- FAO, 2006. State of Food Insecurity in the World, FAO, Rome
- FAO, 2006. World Agriculture : Towards 2030/2050. Interim Report. FAO, Rome
- FAO Report, October, 2007, Accelerating Agricultural Growth in India – a report prepared by FAO in consultation with Ministry of Agriculture, GoI, International Food Policy Research Institute and M.S. Swaminathan Research Foundation
- FAO, 2007. Selected Indicators of Food and Agricultural Development in Asia-Pacific region, FAO/RAP, Bangkok
- GoI, 2006. National Commission on Farmers, Ministry of Agriculture, New Delhi (Five Volumes of the Report “ Serving Farmers and Saving Farming” and a draft “National Policy for Farmers” were submitted by the Commission to the Ministry of Agriculture during 2004 to 2006)
- GoI, August, 2007. National Food Security Mission, Operational Guidelines, Department of Agriculture and Cooperation, Ministry of Agriculture, pp24
- GoI, August, 2007. Rashtriya Krishi Vikas Yojana (RKVY), Guidelines for National Agriculture Development Programme (NADP), Department of Agriculture and Cooperation, Ministry of Agriculture, pp21

- GoI, 2007. National Policy for Farmers, Department of Agriculture and Cooperation, Ministry of Agriculture, pp24
- GoI, 2007. Report of the Steering Committee on Agriculture and Allied Sectors, Planning Commission, New Delhi
- GoI, 2007. Reports of Eleven Working Groups on Agriculture for Preparation of the 11<sup>th</sup> Plan, Planning Commission, New Delhi
- GoI, 2007. Agricultural Statistics At A Glance 2006. Directorate of Economics & Statistics, Department of Agriculture and Cooperation, Ministry of Agriculture, New Delhi
- GoI, 2007. Foodgrains Bulletin June 2007. Ministry of Consumer Affairs, Food & Public Distribution, Department of Food & Public Distribution, New Delhi.
- GoI, 2007. 61<sup>st</sup> Round, NSS Report, Ministry of Statistics and Programme Implementation, Government of India, New Delhi
- Kumar, P., 1998. Food Demand and supply Projections for India, Agricultural Economics Policy Paper 98-01, Division of Agricultural Economics, IARI, New Delhi
- World Bank, 2008, World Development Report – Agriculture for Development, Washington, DC., pp365