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Changing Trend of Population Growth and Agricultural Production in India: A Critical Analysis

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Abstract

India has been truly called the Country of Villages where 69 percent of population live in villages and are directly dependent on agriculture with one-third of its geographical area has dry cropping pattern; one-third is under wet agriculture, 21 percent in forestry and rest under either wasteland or pastoral activity. However, Agriculture and allied sectors like forestry and fisheries accounted for 17.32% of the GDP of India in 2016-17. The economic contribution of agriculture to India's GDP is steadily declining with the country's broad-based economic growth. Still, agriculture is demographically the broadest economic sector and plays a significant role in the overall socio-economic fabric of India. This pattern of changing scenario shows that there is a close relationship between population growth and agricultural production. India's food situation is highly debated. It has witnessed High economic growth in last one decade, and High total production of food grains at the national level. During 1950-2011, production of food grains increased at an average annual rate of 2.5% compared to the growing population which averaged 2.1% during this period. Post liberalization and privatization period (1990-2011), the rate of growth of food grains production decelerated to 1.2%, lower than the annual rate of growth of population at 1.9%. The country experienced high economic growth and high total production of food grains at the national level. But India has 29% of the 872.9 million undernourished people (FAO), 49% of the world's underweight children (WHO), 34% of the world's stunted children (WHO), 46% undernourished children (WHO). India is ranked 97, way below neighboring countries like China and Pakistan, in 2016 global hunger index by the international food policy research institute. India has 456 million people of the population living below the new international poverty line (i.e., earning less than \$1.25 per day). The country has achieved food security at the national level, but that has not percolated down to the level of individual household & has not resulted in nutritional security. The country has got trapped in malnutrition & other social evils which have led the poor health conditions and food insecurity to the greater masses of the country.

India is a rural agrarian economy with largest cultivable tract under cropping, one-third of its geographical area has dry cropping pattern; one-third is under wet agriculture, 21 percent in forestry and rest under either wasteland or pastoral activity. However, Agriculture and allied sectors like forestry and fisheries accounted for 17.32% of the GDP of India in 2016-17. The economic contribution of agriculture to India's GDP is steadily declining with the country's broad-based economic growth. Still, agriculture is demographically the broadest economic sector and plays a significant role in the overall socio-economic fabric of India. This pattern of changing scenario shows that there is a close relationship between population and agricultural production. Thomas Malthus and his followers believed that food supply can only grow slowly and that the supply of food is the main factor governing the rate of population growth. Population growth is therefore seen as the result of previous changes in agricultural productivity. Changes in the availability of arable land, agricultural innovation, invention or other changes that increase agricultural production will lead to population increase.

Boserup (1965) tried to explain the problem from the opposite way. She sets out to show that the primary stimulus to develop agriculture and increase productivity is population growth. On the other hand, The classical economists were misled because they were writing at the time of the expansion of agriculture in the Americas by European settlers. They made a distinction between two different ways to raise agricultural output expansion into new land by creating new fields, and more intensive cultivation. But primitive agriculture does not make use of permanent fields; it shifts cultivation from plot to plot, allowing a fallow period in order to give the land time to regenerate.

With the growth in population, land fragmentation, as well as the cultivation of marginal lands, takes place; these things lead to the economic non-viability. This kind of situation leads to the selling of land by small farmers to the big farmers leads to the unequal land distribution. The landless workers then join the wage employment and divide the society into two classes: land owners and landless workers.

Since there is inequality, the question of food security arises. Thus conferences and seminars were held throughout the world to address issues related to it. However, The first world food conference was held in 1974 which addresses the issues related the lacked food supply 7 physical access to food. Then after various issues related to food production were discussed.

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Objectives:

I) To analyze the population growth and agricultural production in India.

II) To analyze the changing scenario between population growth and agricultural production in India.

III) TO analyze the trends in agricultural growth in India.

Database: The data has been collected from the following sources:

I) Census of India.

II) Ministry of Agriculture.

Methodology: Different methods have been used to analyze the population growth and agricultural production in India. The following formulae have been used to compute the Annual growth rate of population and agriculture.:-

Annual Growth Rate=

$$[(P_t - P_o) / P_o * 100] * 1/t$$

Where,

P_t= population of the current year.

P_o=population of the base year.

T=time period.

Besides this various tables were used to analyze the situation.

Analysis:

India's Scenario: India's food situation is highly debated. it has witnessed High economic growth in last one decade, and High total production of food grains at the national level. During 1950-2011, production of food grains increased at an average annual rate of 2.5% compared to the growing population which averaged 2.1% during this period. Post liberalization and privatization period (1990-2011), the rate of growth of food grains production decelerated to 1.2%, lower than the annual rate of growth of population at 1.9%.the country experienced high economic growth and high total production of food grains at the national level. But India has 29% of the 872.9 million undernourished people(FAO), 49% of the world's underweight children(WHO), 34% of the world's stunted children(WHO), 46% undernourished children(WHO). India is ranked 97, way below neighboring countries like China and Pakistan, in 2016 global hunger index by the international food policy research institute. India has 456 million people of the population living below the new international poverty line(i.e., earning less than \$1.25 per day). The country has achieved food security at the national level, but that has not percolated down to the level of individual household & has not resulted in nutritional security. The country has got trapped in malnutrition & other social evils which have led the poor health conditions and food insecurity to the greater masses of the country.

The growth of population is the main cause of food insecurity in India. The food policy of the country goes with some options. Before green revolution, India was the net importer of food grains because the growth of population was very high. The agriculture was of subsistence level. Production was very low at snail's pace while the population was growing rapidly thus create various problems related to the food security of the population. The

Bengal famine of 1943 struck the Bengal province of pre-partition British India following the Japanese occupation of Burma. Estimates are that between 1.5 and 4 million people died of starvation, malnutrition, and disease, out of Bengal's 60.3 million population, half of them dying from disease after food became available in December 1943. As in previous Bengal famines, the highest mortality was not in previously very poor groups, but among artisans and small traders whose income vanished when people spent all they had on food and did not employ cobblers, carpenters, etc.

The food situation in India was tight from the beginning of the Second World War with a series of crop failures and localized famines which were dealt with successfully under the Indian Famine Codes. In Bengal in 1940-41, there was a small scale famine although quick action by the authorities prevented widespread loss of life. Food prices increased throughout India, and the Central Government was forced to undertake meetings with local government officials and release regulations of price controls.

The proximate cause of the famine was a reduction in supply, with some increase in demand. The winter 1942 'aman' rice crop which was already expected to be poor or indifferent was hit by a cyclone and three tidal waves in October. 450 square miles were swept by tidal waves, 400 square miles affected by floods and 3200 square miles damaged by the wind and torrential rain. Reserve stocks in the hands of cultivators, consumers and dealers were destroyed. This killed 14,500 people and 190,000 cattle. A fungus causing the disease known as "brown spot," hit the weakened crop and this was reported to have had an even greater effect on yield than the cyclone. The fungus *Helminthosporium oryzae*, destroyed 50% to 90% of some rice varieties. It was argued that the normal carryover stocks did not exist in Bengal because 1941 was a short year and people started eating the December 1941 crop as soon as it was harvested (as they certainly did when the December 1943 crop was harvested). As a result, the good December 1941 crop did not mean the normal surplus stocks were carried over into 1943. In other years and in other provinces there had been several good or average crops between bad years and stocks had built up. Bengal famine of 1943.

Bengal had been a food importer for the last decade. Calcutta was normally supplied by Burma. The British Empire had suffered a disastrous defeat at Singapore in 1942 against the Japanese military, which then proceeded to invade Burma in the same year. Burma was the world's largest exporter of rice in the inter-war period. By 1940 15% of India's rice overall came from Burma, while in Bengal the proportion was slightly higher given the province's proximity to Burma. After the Japanese occupation of Burma in March 1942, Bengal and the other parts of India and Ceylon normally supplied by Burma had to find food elsewhere. However, there were poor crops and famine situations in Cochin, Trivandrum, and Bombay on the West coast and Madras, Orissa, and Bengal in the East. It fell on the few surplus Provinces, mainly the Punjab, to supply the rest of India and Ceylon.

India as a whole probably had a deficit but exported small quantities to meet the urgent needs of the British-Indian Army abroad, and those of Ceylon. Bengal's food needs rose at

the same time from the influx of refugees from Burma. The enormous expansion of the Indian Army probably did not increase total food demand in India, but it did mean significantly more local demand in Bengal (up to 200,000 tons grain imported, as well as an unknown quantity of grain and a lot of fresh food bought in Bengal). However, the effects of army consumption in causing the famine was clearly limited, as the army, mainly wheat-eaters, consumed very little extra in relation to India's supplies, and the army in Bengal was supplied externally'.

However, before green revolution, India was a net importer of 10.3 million tonnes of food grains. While in 1972 the country turned into the net exporter of food grains. During 1967-72 the production of wheat was doubled. Throughout 1980's & 90's, imports rarely exceed a couple of million tonnes of food grains. This is the period during which rate of growth of population was 2.1 while the growth of food grain production was 2.8 per annum. But after 1990's economic liberalization came in which resulted in a decline in public investment in agriculture. Thus, agriculture started declining, and it declined to such extent where population growth is 1.8 and agricultural growth is recorded between 1.2 to 1.3, thus pushing the country into food deficient state.

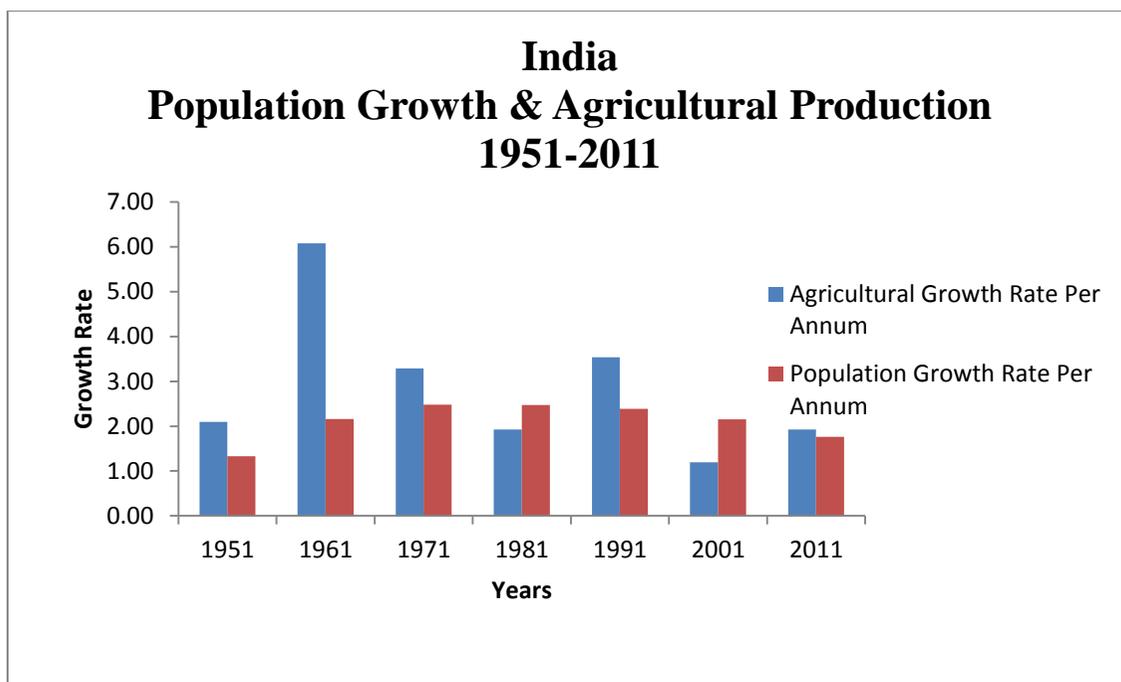
The relation between Agricultural Production and Population Growth: India has nearly 68% of the population living in rural areas. Nearly three-quarter of India's families depends on rural incomes. The majority of India's poor (770 million people) are found in rural areas. Thus, India's food security depends on producing cereal crops. The relation between population and agricultural growth is very interesting. Before green revolution, India was the net importer of food grains because the growth of population was very high. The agriculture was of subsistence level. Production was very low at snail's pace while the population was growing rapidly thus create various problems related to the food security of the population. The Bengal famine of 1943 struck the Bengal province of pre-partition British India following the Japanese occupation of Burma. Estimates are that between 1.5 and 4 million people died of starvation, malnutrition, and disease, out of Bengal's 60.3 million population, half of them dying from disease after food became available in December 1943. As in previous Bengal famines, the highest mortality was not in previously very poor groups, but among artisans and small traders whose income vanished when people spent all they had on food and did not employ cobblers, carpenters, etc.

The data of the population growth and agricultural production also shows that there is a great variation in the growth rate. After independence, both has not increased or decreased at the same rate but with varying level.

India
Population Growth Rate and Agricultural Growth Rate (1951-2011)

Year	Agricultural Growth Rate Per Annum	Population Growth Rate Per Annum
1951	2.10	1.33
1961	6.08	2.16
1971	3.29	2.48
1981	1.93	2.47
1991	3.54	2.39
2001	1.19	2.15
2011	1.93	1.76

Source:-Census of India, & Ministry of agriculture.



The above data shows that the population and agriculture grow at varying rate. Since the data shows that growth rate of agriculture is high as compared to the population so the country should have access to food production, as well as everybody, should have access to food in the country, but this is just theoretical. Practically it is not the case. During 1950-2011, production of food grains increased at an average annual rate of 2.5% compared to the growing population which averaged 2.1% during this period. Post liberalization and

privatization period (1990-2011), the rate of growth of food grains production decelerated to 1.2%, lower than the annual rate of growth of population at 1.9%. the country experienced high economic growth and high total production of food grains at the national level. But India has 29% of the 872.9 million undernourished people(FAO), 49% of the world's underweight children(WHO), 34% of the world's stunted children(WHO), 46% undernourished children(WHO). India is ranked 67, way below neighboring countries like China and Pakistan, in 2010 global hunger index by the international food policy research institute. India has 456 million people of the population living below the new international poverty line(i.e., earning less than \$1.25 per day). The country has achieved food security at the national level, but that has not percolated down to the level of individual household & has not resulted in nutritional security. The country has got trapped in malnutrition & other social evils which have led the poor health conditions and food insecurity to the greater masses of the country.

Malnutrition is nothing new for many Indians. According to the International Food Policy Research Institute's 2011 Global Hunger Index, the upshot of this perennial problem is that about 60 million children in India are underweight and malnourished, while 21 percent of the population as a whole generation is malnourished. Unfortunately, this problem is unlikely to change anytime soon, with the recent introduction of the National Food Security Bill threatening to continue market inefficiencies in the food supply and extend the problem of malnutrition far into the future.

The analysis shows that that from 1941-51, the population and agricultural growth were 1.33 & 2.10 respectively. While in 1951-61, it was 2.16 & 6.08 respectively. Afterward, the difference between them narrows down. while during 2001-11, the growth rate of population and agriculture was 1.76 & 1.93.

Population & Agricultural Workers: India is basically an agricultural country where about 69% of the population still lives in rural areas. These people are mainly dependent on agriculture.

Population & Agricultural Worker's

(In millions)

Sl. No	Year	Total Population	Annual Compound Growth Rate (%)	Rural Population	Cultivators	Workers Agriculture Labourers	Other Workers	Total
1	1951	361.1	1.25	298.6	69.9	27.3	42.8	140
				82.70%	49.90%	19.50%	30.60%	100.00%
2	1961	439.2	1.96	360.3	99.6	31.5	57.6	188.7
				82.00%	52.80%	16.70%	30.50%	100.00%
3	1971	548.2	2.22	439	78.2	47.5	54.7	180.4
				80.10%	43.40%	26.30%	30.30%	100.00%
4	1981	683.3	2.2	523.9	92.5	55.5	96.6	244.6
				76.70%	37.80%	22.70%	39.50%	100.00%
5	1991	846.3	2.14	628.7	110.7	74.6	128.8	314.1

				74.30%	35.20%	23.80%	41.00%	100
6	2001	1,028.70	1.95	742.6(72.2)	127.3(54.4)	106.8(45.6)	-	234.1
7	2011	1,210.20	1.64	833.1(68.8)	-	-	-	-

Source: Census of India.

The above table shows the rural population of the country. In 1951 about 83% of the population lived in rural areas which have come to 69% in 2011.

Trends in Food Supply and Demand

Trends in Food Production

Over the Five Year Plans, between 1950-51 and 2010-11, India's total food grains production, quadrupled from about 50 million tonnes to over 200 million tonnes. Between 1962-63 and 2011-12, food grains production increased from about 82 million tonnes to 230 million tonnes, primarily due to the increase in cereals production, particularly rice and wheat, from 70 million tonnes to 194 million tonnes (Table 3). 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 3: Production of main food commodities, 1962/63 to 2011/12.

Table 4: Production of main food commodities, 1962/63 to 2006/07. Commodity group	TE 1962/63	TE 1972/73	TE 1982/83	TE 1992/93	TE 2003/04	TE 2011/12
Food grains (Million tonnes)	81.6	103.5	130.8	174.8	199.7	253
Cereals (Million tonnes)	69.6	92.6	119.5	161.7	186.5	237.6
Pulses (Million tonnes)	12.0	10.9	11.3	13.0	13.2	17.2
Oilseeds (Million tonnes)	7.2	8.6	10.5	19.1	20.3	30.5
Sugarcane (Million tonnes)	101.9	121.6	176.7	241.0	293.5	347.8
Potato (Million tonnes)	2.9	4.7	9.9	15.6	24.2	39
Milk (Million tonnes)	20.2	23.0	34.0	55.8	87.7	127
Eggs (Billion nos)	3.2	6.6	10.8	21.7	40.8	65.4
Fish (Lakh tonnes)	12.2	18.3	24.1	41.2	61.8	86.6

Source: Agricultural Statistics at a Glance, 2012 and Agricultural Research Data Book, 2012

Per capita production of food grains increased from 183 Kg during the early 1970s to 207 Kg by the mid-1990s (Table 4), even as the country's population increased by more than 50 percent. After the mid-1990s, food grain 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 food grain security" (Chand, 2007).

Table 5: Per capita production of food grains (1971 to 2012) (in kg) Period

	Food grains
1971-75	183
1976-80	190
1981-85	196
1986-90	198
1991-95	207
1996-2000	205
2001-05	189
2011-12	257.44

Source: Economic Survey, GoI, New Delhi.

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 2010-11 (Table 7). It is heartening to note that about 70 to 75 percent 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 spillover 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, 1962-2012

Commodity group	TE 1962/63	TE 1972/73	TE 1982/83	TE 1992/93	TE 2003/04	TE 2006/07	TE 2011/12
Foodgrains	698	848	1030	1406	1671	1684	1993
Cereals	750	924	1150	1599	1915	1936	2390
Pulses	499	500	492	562	598	588	649
Oilseeds	493	520	580	761	904	986	1280
Sugarcane	42961	48902	56251	65129	66477	65376	68090
Potato	7362	9520	13247	15507	18574	17490	21930

Source: Agricultural Statistics at a Glance, 2012 and Agricultural Research Data Book, 2012.

From cereals production growth rate of about 3 percent during the Green Revolution decades, 1965-1995, the growth rate has declined to 1.54 percent during 1994/95-2005/06 (Table 8) and was lower than the population growth rate (1.7 percent) 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 (percent) 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 the Eastern States is replacing part of wheat acreage, and *Kharif* (rainy season) maize replacing part of rice acreage in the Southern States have triggered a new crop diversification pattern which may substantially augment the food and feed supplies. On the other hand, despite the high potential, production and consumption of *Jowar* (sorghum) and its products have dropped by over 40% between 1993-94 and 2004-05 (61st 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.

Trends in Food Consumption: A mid-term review of the XIth Plan (2007-2012) 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 the 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 2010, 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 regularly updated to enable disaggregated location- specific and need to be 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 unfavorable 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 2010 show that over the last three decades there has been a decline in cereal and pulse intake. Improvement in per capita intake of milk over the 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 an 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.

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.

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 were 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 under-nutrition. Thirty-six percent females and 34% males suffer from Chronic Energy Deficiency. Nearly 22% of all children born in the country whose birth weight was reported to 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 deities 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 is 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 a substantial reduction in the severe grades of undernutrition and health hazards associated with it without a massive increase in the cost through effective implementation of strategies for prevention, early detection, and management of macro and micronutrient undernutrition. The targets were, however not met, but the Planning Commission (Approach Paper, 11th Plan) felt that desired results could be attained provided that :

- I) Optimum use is made of available infrastructure and trained manpower to undertake intensive persistent nutrition education to improve knowledge, attitudes, and practices.
- II) There is focused attention on the universal screening of vulnerable groups of the population at risk for early identification of those with nutritional problems.
- III) Convergence of health, nutrition, and family welfare services is assured to ensure effective implementation of health and nutritional interventions.
- IV) Intensive monitoring of improvement and mid-course corrections is institutionalized 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 are 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 globalized 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 9).

Table 9: Proposed, growth rates for different sub - sectors of agriculture during XIth Plan

Sub-sector	Output share %
Crops	46
Food grains	26
Oilseeds	6
Other crops	14
Horticulture	21
Livestock	25
Fisheries	4

Source: Planning Commission, 2007

Indian Agriculture: Issues and Prospects: While there are a number of factors responsible for the present state of agriculture in India, the following seven issues merit attention on priority:

1. Declining Productivity and Increased Variability: Indian agricultural production, of late, has been characterized by sharp variations due to unpredictable nature of monsoon. For instance, food grains production in the country varied between 174.19 million tonnes in 2002-03 (the lowest in the last 12 years) and 212.20 million tonnes in 2003-04, (the peak production attained so far). Similar variations can be observed in the production of non-food grains as well. It turns out that the variability of agricultural production in the 1980s was as much as five times the average variability recorded in the overall GDP during 1992-93 to 2002-03. Such wide variations in agricultural production underline the rain dependence of the Indian agriculture, thereby underscoring the need for improving the irrigation facilities. In 1998-99 only 39.2 per cent of the gross cropped area in the country was under irrigation.

2. The decline in Capital Formation: During the 1990s, a steady downturn in investment rates was experienced by the agricultural sector, mainly in public investment. The ratio of public sector capital formation in agriculture to Gross Public Sector Capital Formation declined from 17.7 percent in 1980-81 to only 4.1 per cent in 2000-01. Although the private sector capital formation in agriculture has been on the rise during the past decade, it has not been able to meet the shortfall on account of the corresponding decline in public investment. The inadequacy of new capital formation has slowed the pace and pattern of technological change in agriculture with adverse effects on productivity. In order to rejuvenate agricultural growth, the declining trend in public investment needs to be corrected.

3. Inadequate Credit Delivery: Although the ratio of agricultural credit to agricultural GDP has increased from 5.4 percent in the 1970s to 8.7 percent in 2001-02, it may be noted that agricultural credit as a proportion of total credit has declined from 20.5 per cent to 10.5 per cent during the same period indicating lower deployment of credit in agriculture. Moreover, the extent of credit deployed from out of deposits mobilized in rural areas has gone down fast as reflected in the Credit-Deposit ratio which declined from 65 percent in the mid-1980s to around 42 per cent now.

4. The decline in credit to small borrowers: Besides the overall decline in agricultural credit, what is even more worrisome is the decline in the number of small loans (of up to Rupees 25,000). These are essentially informal sector loans which slipped from a peak of 62.55 million in March 1992 to 37.22 million in March 2002. Their share in total bank credit also declined from 25 percent to only 6 percent during the same period. Thus, it seems that brunt of the credit squeeze in agriculture is being faced by small farmers.

5. Sub-Optimal Use of Inputs and Adoption of Technology The imperative of stabilizing and augmenting agricultural yields is also evident from the fact that there is less scope for increasing area under cultivation of various crops. Further, apart from the decline in land-holding size, there is increasing cost of production and depletion of ground water. Increase in agricultural production would therefore have to emanate from improvements in productivity from the existing cultivated area through use of location-specific high yielding varieties, balanced fertilizer doses, effective transfer of technology and timely supply of all inputs. There is also an urgent need to increase the availability of farm electricity power to boost productivity.

6. Unsatisfactory Spread of New Technology: One of the main reasons for the low levels of yield in Indian agriculture has been the unsatisfactory spread of new technological practices, including the adoption of High Yielding Varieties (HYV) of seeds and usage of fertilizers, inadequate spread of farm management techniques and other practices such as soil conservation and crop rotation.

7. Low availability of farm electricity power: The availability of farm electricity power in the country continues to be low. During 2000-01, it was as low as 1.35 kilowatt/hectare in India as compared with some of the developed nations, such as Japan (8.75 kw/ha), Italy (3.01 kw/ha), France (2.65 kw/ha), the United Kingdom (2.5 kw/ha), and Germany (2.35 kw/ha).

8. Distortionary Pricing and Subsidies: The Minimum Support Price (MSP) mechanism was put in place to provide assured incomes to producers. However, during the 1990s, substantial increases in MSPs of rice and wheat have significantly distorted the incentives provided to these crops at the cost of other crops. At the same time, power subsidy provided for irrigation has further tilted the incentives against rain-dependent crops like pulses and oilseeds. These distortions have obstructed efforts aimed at diversification of crops.

9. Untapped Exports Potential In recent period India has emerged as a leading producer of many agricultural products in the world. India is now the largest producer of coconut, areca nut, cashew nut, ginger, turmeric, black pepper, and the second largest producer of fruits and vegetables. This progress on the domestic front has, however, not been translated into

enhanced exports of these commodities. Exports of agricultural products generally displayed a relatively lower rate of growth except for a brief period in the mid-1990s. While exports of traditional commodities such as tea, coffee, rice, spices and oil meal have decelerated, sharp expansion was observed in exports of high-value and processed agricultural products such as fruits and vegetables, processed fruits, juices, and meat and meat preparation. In order to realize the huge potential of exports which has so far been untapped, particularly in respect of processed foods, it is imperative that domestic controls are removed expeditiously, and adequate rural infrastructure is in place which would ensure efficient warehousing, processing, packaging, storage and related research. It is now agreed that Indian agriculture has vast business potential, especially in the food processing sector, in view of the substantial production of fruits and vegetables and milk and other animal food products in the country. However, tapping this business potential in food processing industry requires that Indian food exports should comply the codex alimentary norms.

10. Employment Absorptive Capacity Nearly 60 percent of the population in India is dependent on agricultural income. This is clearly symptomatic of the failure of other sectors, *i.e.*, industry and services in absorbing the surplus labor from agriculture. This problem is likely to be even more important in future. The demographic profile of India is currently under a transition. It is expected that the working-age population as a proportion of the total population would double during the next three decades. This, in turn, would imply a growing proportion of population dependent on agricultural income which would have to be absorbed through the creation of adequate employment opportunities within the agricultural sector. The decline in agriculture in the labour force has not kept pace with its decline in the economy. This stickiness has been attributed to low labour mobility and slow growth.

Status of Agriculture in India: In 2011-12, India achieved a record food grain production of 230 million tonnes, posting a growth of 10 to 12 million tonnes in excess of the previous fiscal. With an added two to three million tonnes during the Rabi season, it would touch 230 million tonnes a landmark in food grain production. The Agri-biotech sector in India is growing at a whopping 30 per cent since the last five years, and it is likely to sustain the growth in the future as well. The food processing sector, which contributes 9 percent to the GDP, is presently growing at 13.5 per cent against 6.5 per cent in 2003-04 and is going to be an important driver of the Indian economy.

India is the largest producer of coconuts, mangoes, bananas, milk and dairy products, cashew nuts, pulses, ginger, turmeric and black pepper. It is also the second largest producer of rice, wheat, sugar, cotton, fruits, and vegetables.

Agricultural production is likely to increase significantly during the fiscal year 2009. Centre for Monitoring Indian Economy (CMIE) has projected a growth of 3.2 percent during the fiscal year 2009, for the GDP of agriculture and allied sectors. The allied sectors comprising livestock, forestry, and logging, and fishing are likely to see a growth of 4.8 percent during the fiscal year 2009.

India's exports of agricultural and processed food products posted a 38 per cent increase in the 2007-08 fiscal, bolstered by an increase in shipments of coarse cereals like maize, Jowar and barley.

Export figures for agricultural products touched US\$ 6.59 billion in 2007-08, against US\$ 4.79 billion in the previous fiscal.

Acreage under horticulture which includes fruits, vegetables, spices, floriculture, and plantations was around 20 million hectares in 2006-07- India is the second largest producer of both fruits and vegetables in the world, and the National Horticulture Mission (NHM) AIMS at doubling horticulture production by 2012.

India is the largest producer of milk in the world and is likely to become the second largest dairy products producer in the coming years.

It is the second largest producer of fruits and vegetables.

It is home to the largest number of livestock in the world.

It is the third largest producer of food grains.

With above 9500 spices from medicinal and aromatic plants, India is truly a treasure trove of spices, accounting for 25-30 percent of the world's production.

India is the largest producer-consumer and exporter of spices, with major spices produced being black pepper, cardamom (small & large), ginger, garlic, turmeric, chili, etc.

Conclusion: Agriculture makes the highest contribution to India's GDP. Agriculture contributes almost about 18 percent to the country's GDP. It has been seen in the last few years that the input of the agriculture sector has been declining, but it is still the biggest contributor. Agriculture occupies a prominent position in Indian policy-making not only because of its contribution to GDP but also because of the large proportion of the population that is dependent on the sector for its livelihood. The growth in population and wealth has stimulated demand to the extent that domestic production has not always been able to keep up and there is increasing speculation that the Indian economy may be overheating leading to inflation. The downside of the increased import demand and the current commodity boom is that India's food import bill will rise sharply. However, it is clear that India's agricultural sector has made huge strides in developing its potential. The green revolution massively increased the production of vital food grains and introduced technological innovations into agriculture. This progress is manifested in India's net trade position. Where once India had to depend on imports to feed its people since 1990 it is a net exporter of agri-food products. Its agriculture is large and diverse, and its sheer size means that even slight changes in its trade have significant effects on world agricultural markets.

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