

Original Research Article

An Analysis of Production and Consumption Pattern in India

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ABSTRACT

Keywords

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-The present study is based on secondary data collected from Government sources such as Agricultural Statistics at a Glance 2011 & 2016, National Sample Survey Reports (61st, 66th & 68th) for the period 1993-94 to 2011-12. The objective of the paper is to examine the production and consumption pattern among Indian people. The finding of present analysis revealed that there has been a clear transition from foodgrain consumption to non foodgrain food and animal product consumption. During the period 2000-01 to 2010-11 production of all principal crops has increased. The production of pulses and oilseeds increased mainly due to increase in the acreage under these crops at the expenses of coarse cereals, particularly jowar and bajra. The urbanization also leads to sedentary life-style, which results in relatively low energy requirement to maintain a given body weight than in the rural areas. The study has concluded that increased production of foodgrain (rice, wheat etc) and non foodgrain (pulses, oilseeds, sugarcane etc) alongwith combined increased in income and better education would result in enhancement in monthly per capita consumption of food items in both rural and urban India. It will directly improve nutritional status of the Indian population. Policies should be targeted towards promotion of production of both foodgrain and non foodgrain items across the country to increase the per capita availability of food and nonfood items and ultimately improve the nutritional outcome.

Introduction

Agriculture, as the backbone of Indian economy, plays the most crucial role in the socioeconomic sphere of the country. India is a country of about one billion people. More than 70 percent of India's population lives in rural areas where the main occupation is agriculture. Indian agriculture is characterized by small farm holdings. According to agricultural census 2011, the average farm size is only 1.15 hectares. Around 95.05 percent of farmers have land holdings smaller than 4 ha and they cultivate nearly 68.21 percent of the arable land. On the other hand, only 0.70 per cent of the

farmers has operational land holdings above 10 ha i.e. large holding and they utilize 10.59 percent of the total cultivated land. About 67 per cent of holdings fall under marginal category of land holding. A large number of agricultural items are produced in our country. Broadly, these can be classified into two groups – food grains crops and commercial crops. Around 66 percent of the total cultivated area is under food grain crops (cereals and pulses). Commercial agriculture not only catered to the domestic market but has also been one of the major earners of foreign exchange for the country.

The share of agriculture and allied sector in GDP has come down sharply from 52 per

cent in 1951-52 to 13.9 per cent in 2011-12, whereas, share in workforce remained high at 54.6 per cent, declining by merely 15 percent during the same period. It is not surprising, therefore, that the percentage of agricultural workers in the total workers in the country has come down from 58.2 per cent to 54.6 per cent during 2001 to 2011 (Census, 2011). With the development of alternative sources of employment in the rural areas, viz., agro industries, supportive infrastructure, etc., it is hoped that the share of population dependent on agriculture will definitely come down. The country has been facing a massive shortage of edible oils and pulses, which is currently being met through imports. As these crops are grown mainly in dry land areas, their continued low productivity and the adverse impact of import on their prices are detrimental to the interest of producers. The technology advantage in cereal cultivation has been further reinforced by strong policy support as the government of India provided remunerative and assured prices for rice and wheat, not only enjoyed productivity advantages but also assured stable economic returns, which raised their relative profitability (Verma *et al.*). Food security continues to be one of the critical policy objectives in India. While food availability has substantially increased in India over the past decades, mainly due to the productivity gains from 'green revolution', the challenge of providing adequate food and nutrition to each and every citizen of the country is far from being resolved (Swaminathan 2006). Keeping in view the above facts the present study has been designed at Indian context which addresses the following specific objectives.

To find out the trend of production as well as Compound Annual Growth Rate of principal food crops in India

To analyze the per capita availability of

important food grain and non-food grain items.

To find out the changes in monthly per capita consumption of food items in Rural and Urban India.

To learn the changes in average per capita calorie, protein and fat intake per day in Rural and Urban India and also tried to understand percentage share of different food groups among calorie consumption by the people.

Materials and Methods

The present study is based on secondary data collected from Government sources such as Agricultural Statistics at a Glance 2011 & 2016, National Sample Survey Reports (61st, 66th & 68th). Compound Annual Growth Rates (CAGR) of various crops were calculated with the help of formula

$$\text{CAGR} = (\text{EV}/\text{BV})^{(1/n)} - 1$$

Where,

EV=Ending Value

BV=Beginning Value

n=No. of Periods

Percentage changes over the different periods of crops were calculated to determine the relative status of food production in India. Besides, simple statistics such as percentage, average etc. were also used to meet the objectives.

Results and Discussion

Food Grain Production

India is continuously facing pressure on the demand side due to increased population growth, limited land availability, and several other production deterrents, which might also appear as obstacles for the supply of

food grains. Indian government policies and planning has always given considerable importance to production of food grains due to which India has been achieving the continued growth despite many constraints (Khatkar *et al.*, 2016). Many factors are responsible for the increased production, including the availability of quality and adequate amount of seeds and fertilizers on time and technologies advancement in the field of crop production.

The highest food grain production of 259.32 million tonnes was recorded in 2011–12. Out of the total food grains production, cereals accounted for 242.23 million tonnes and pulses 17.09 million tonnes. Table 1 revealed that the Production of rice and wheat was recorded at 105.5 and 86.53 million tonnes, respectively in 2014-15. It was estimated that the agriculture sector in India is likely to grow by above-trend at 4.1 per cent in FY 2016-17. The production under wheat has increased from 11 million tonnes in 1960-61 to 86.53 million tonnes in 2014–15 that is about eight times higher production than 1960-61. India is the second-largest producer and consumer of rice in the world and accounts for 22.3% of global production. Several programs run by the government such as National Food Security Mission (NFSM) launched during 2007–08 and Bringing Green Revolution in Eastern India (BGREI) during 1990-91 increased production of rice from 74.29 million tonnes to 105.48 million tonnes in 2014–15. After rice and wheat, maize is emerging as the third-most important crop in India. Its importance lies in the fact that it is used for human food as well as animal feed, and it is also widely used for the starch industry, oil production, baby corns, and so on. However, despite the production strength, Indian corn yields are significantly below the yields in major maize producing countries. There is immense scope for an increment in India's

maize production by increasing the area under hybrids, adoption of better genetics, and improved agronomic practices (Khatkar *et al.*, 2016). Maize is primarily a kharif crop (summer season's crop) with 85% of the area under cultivation and accounting for 9% of total food grain production. In India the CAGR (cumulative annual growth rate) of maize production has been positively significant over the years. Its production increased from 8.96 million tonnes in 1990-91 to 24.17 million tonnes in 2014–15. There was a decline in the production of maize during 2009–10 due to drought conditions in India.

The production of pulses and oilseeds increased mainly due to increase in the acreage under these crops at the expenses of coarse cereals, particularly jowar and bajra. Overall acreage under coarse cereals declined from 28.94 million hectares in Triennium Ending (T.E.) 2004-04 to 24.71 million hectares in T.E. 2014-15, indicating a drop of about 15 per cent. It may also be observed from the table that from 1960-61 to 1970-71 wheat production increased by 116.64 percent. During the same period pulses production declined by -6.93 percent while the production of rest crops increased. During the period 1980-81 to 1990-91, the production of all crops was found stable. However, during the period 2000-01 to 2010-11 production of all principal crops has increased.

Table 2 shows compound Annual Growth Rates (CGAR) of Production of Principal Crops in India for the period 1950-51 to 1970-71, 1970-71 to 1990-91, 1990-91 to 2010-11 and 2010-11 to 2014-15. The analysis of data shows that, from 1950-51 to 1970-71, production of all principal crops has increased. The production of rice increased at the rate of 3.66 per cent, wheat by 6.47 per cent, maize by 7.6 per cent and

total oilseeds by 3.17 per cent per annum. However, the production of coarse cereal was not found significant. During the period 1970-71 to 1990-91, CGAR of wheat production was comparatively high as compared to rest crops. Production of rice increased at the rate of 2.9 per cent per annum. It is worth noting that CGAR of maize was not found significant as it was about 1 per cent per annum. During this period CGRA of pulse production is also not found significant i.e. 0.94. From 1990-91 to 2010-11, negligible growth rate is observed for rice and wheat crops. During the period 2010-11 to 2014-15, negative CGAR is observed for wheat, total pulses and total oil seeds. The production of rice and maize increased at the rate of 2.39 per cent and 2.70 per cent, respectively from the period 2010-11 to 2014-15.

Per Capita Availability of Food Items

During the period of Green Revolution the production of cereals especially wheat and rice has increased many folds. It results in increase in per capita availability of rice and wheat i.e. 58 Kg and 24 kg per annum, respectively in the year, 1951. Table 3 depicted that per capita rice availability has increased from 73 kg in 1961 to 81 kg per annum in 1991 after that it has declined to 68.8 kg in 2009.

Whereas per capita availability of wheat increased from 28.9 kg in 1961 to 60 kg per annum in 1991 after that it declined to 56.5 kg in the year 2009. The per capita availability of pulses increased from 22.1 kg in the year 1951 to 25.2 kg in 1961. Further, it has declined and reached up to the level of 13.5 kg per capita per annum in 2009 which demands to boost pulse production in India so that per capita availability may reach up to the level of minimum 15 kg per annum to meet the

minimum requirement i.e. recommended dietary Allowance (RDA). Similarly, per capita availability of food grain has increased from 144 kg per capita per annum to 186.2 kg per capita per annum in 1991 which further declined to 162 kg per capita per annum in 2009. In India Green Revolution has resulted in improved production of almost all agricultural items. It may be observed from table 4 that the net per capita availability of edible oil increased from 3.2 kg in 1961 to 16.8 kg in 2009. However the per capita availability of vanaspati remains stagnant during the study period. Due to advancement in agricultural production per capita availability of sugar has drastically increased from 4.8 kg in 1961 to about 20 kg in the year 2009. By improvement in cotton production technology and increase in the uses of hybrid seeds, the production of cotton has increased in the recent decades. It results in increase in per capita availability of cloth from 15 meter to about 36 meter in 1961 and 2009, respectively. The per capita per annum availability of tea has been increased from 296 gm to 752 gm in 1961 and 2009, respectively. It is worth noting that per capita per annum availability of coffee has slightly increased during the period 1961 to 1981 after that it declined and further increased in the year 2005 and remain same in 2009. It may be due to the fact that increase in the production of coffee does not keep in pace with the population growth during the study period.

Food Consumption

Table 5 depicts group-wise food consumption trends in India during the period 1993-94 to 2011-12. The monthly per-capita consumption of cereals declined from about 13 to about 11 kg in the rural areas, whereas, decline in urban areas was marginal, from 10.6 to 9.28 kg/month during

the same period. Among the cereals highest per capita monthly consumption is of rice during the period 1993-94 whereas minimum is of maize i.e. 0.38 kg per month.

Table.1 Production of Principal Food Crops in India (Million Tones)

Crop	1960-61	1970-71	1980-81	1990-91	2000-01	2010-11	2014-15	%age Change 1960-61 to 1970-71	%age Change 1980-81 to 1990-91	%age Change 2000-01 to 2010-11
Rice	34.58	42.22	53.63	74.29	84.98	95.98	105.48	22.09	38.52	12.94
Wheat	11.00	23.83	36.31	55.14	69.68	86.87	86.53	116.64	57.86	24.67
Maize	4.08	7.49	6.96	8.96	12.04	21.73	24.17	83.58	28.74	80.48
Coarse Cereals	23.74	30.55	29.02	32.70	31.08	43.40	42.86	28.69	12.68	39.64
Total Cereals	69.32	96.60	118.96	162.13	185.74	226.25	234.87	39.36	36.29	21.81
Total Pulses	12.70	11.82	10.63	14.26	11.08	18.24	17.15	-6.93	34.15	64.62
Total foodgrains	82.02	108.42	129.59	176.39	196.81	244.49	252.02	32.19	36.11	24.23
Sugarcane	110.00	126.37	154.25	241.05	295.96	342.38	362.33	14.88	56.27	15.68
Total Oil Seeds	6.98	9.63	9.37	18.61	18.44	32.48	27.51	37.97	98.61	76.14

Source: Directorate of Economics and Statistics, Department of Agriculture and Cooperation.

Table.2 Compound Annual Growth Rates of Production of Principal Food Crops in India (%age)

Crop	1950-51 to 1970-71	1970-71 to 1990-91	1990-91 to 2010-11	2010-11 to 2014-15
Rice	3.66	2.9	0.01	2.39
Wheat	6.74	4.28	0.02	-0.09
Maize	7.60	0.9	4.53	2.70
Coarse Cereals	0.03	0.34	1.46	-0.47
Total Cereals	4.20	2.62	1.68	0.94
Total Pulses	1.72	0.94	1.24	-1.53
Total food grains	3.86	2.46	1.64	0.76
Sugarcane	4.06	3.28	1.77	1.42
Total Oil Seeds	3.17	3.35	2.82	-4.07

Source: Calculated by authors.

Table.3 Per Capita Availability of Important Food grains (Kg Per Annum)

Years	Rice	Wheat	Other Cereals	Total Cereals	Gram	Total pulses	Food grains
1951	58.0	24.0	40.0	122.0	8.2	22.1	144.1
1961	73.4	28.9	43.6	145.9	11.0	25.2	171.1
1971	70.3	37.8	44.3	152.4	7.3	18.7	171.1
1981	72.2	47.3	32.8	152.3	4.9	13.7	166.0
1991	80.9	60.0	29.2	171.0	4.9	15.2	186.2
2001	69.5	49.6	20.5	141.0	2.9	10.9	151.9
2005	64.7	56.3	21.7	142.7	3.9	11.5	154.2
2009	68.8	56.5	23.3	148.6	4.7	13.5	162.1

Source: Directorate Economics and Statistics, Department of Agriculture and Cooperation

Table.4 Per Capita Availability of Important Food Items of consumption (Per Annum)

Years	Edible Oils (Kg)	Vanaspati (Kg)	Sugar (Kg)	Total Cloths (meters)	Tea (gms)	Coffee (gms)
1960-61	3.2	0.8	4.8	15.0	296	80.0
1970-71	3.5	1.0	7.4	15.6	401	65.0
1980-81	3.8	1.2	7.3	17.3	511	79.0
1990-91	5.5	1.0	12.7	24.1	612	59.0
2000-01	8.2	1.3	15.8	30.7	631	58.0
2010-11	13.6	1.0	17.0	44.0	715	90.0
2013-14	16.8	0.8	19.5	36.2	744	100.0
2014-15(P)	18.3	0.8	20.3	40.6	752	100.0

Source: Economic Survey 2015-16

Table.5 Dynamics of monthly Per Capita Consumption of Food Items in India (in Kg)

	Years	Rice	Wheat	Jowar and Its product	Bajra and its product	Maize and Its Product	Total Cereals	Total Pulses	Total Edible Oil	Milk Liquid (Litre)	Sugar	Vegetables (Kg)	Egg (No.)	Fish (Kg)	Chicken (Kg)
Rural	1993-94	6.79	4.32	0.84	0.48	0.38	13.40	0.76	0.37	3.94	0.77	2.71	0.64	0.18	0.02
	2004-05	6.38	4.19	0.43	0.39	0.31	12.12	0.71	0.48	3.87	0.74	2.92	1.01	0.20	0.05
	2009-10	6.00	4.24	0.29	0.26	0.20	11.35	0.65	0.64	4.12	0.71	4.04	1.73	0.27	0.12
	2011-12	5.98	4.29	0.20	0.24	0.18	11.22	0.78	0.67	4.33	0.71	6.76	1.94	0.27	0.18
Urban	1993-94	5.13	4.44	0.39	0.13	0.03	10.60	0.86	0.56	4.89	0.96	2.91	1.48	0.20	0.03
	2004-05	4.71	4.36	0.22	0.11	0.03	9.94	0.82	0.66	5.11	0.87	3.17	1.72	0.20	0.09
	2009-10	4.52	4.08	0.18	0.09	0.02	9.37	0.79	0.82	5.36	0.82	4.12	2.67	0.24	0.18
	2011-12	4.49	4.01	0.13	0.08	0.014	9.28	0.90	0.85	5.42	0.82	6.84	3.18	0.25	0.24

Source: Compiled by authors from NSSO report (61st, 66th & 68th Round) on Household Consumption of Various Goods and Services in India

Table.6 Changes in Average per capita Calorie, Protein & Fat intake In Rural and Urban India

	Calorie (Kcal/day)		Protein (gm/day)		Fat (gm/day)	
	Rural	Urban	Rural	Urban	Rural	Urban
1972-73(27 th)	2266	2107	62.2	56.0	24.0	36.0
1983(30 th)	2221	2089	62.2	57.0	27.0	37.0
1993-94(50 th)	2153	2071	60.2	57.2	31.4	42.0
1999-2000(55 th)	2149	2156	59.1	58.5	36.1	49.6
2004-05(61 th)	2047	2020	57.0	57.0	35.5	47.5
2009-10 Sch 1(66 th)	2020	1946	55.0	53.5	38.3	47.9
2009-10 Sch 2(66 th)	2147	2123	59.3	58.8	43.1	53.0
2011-12 Sch1(68 th)	2099	2058	56.5	55.7	41.6	52.5
2011-12 Sch2(68 th)	2233	2206	60.7	60.3	46.1	58.0

Source: NSSO 68th Round, 2011-12

Table.7 Percentage Share of calorie consumption from food groups: 1993-94 to 2011-12

year	Cereals	Roots & Tubers	Sugar & Honey	pulses, nuts & oilseeds	veg. & fruits	meat, eggs & fish	milk & milk products	oils & fats	miscellaneous food, etc.
Rural									
1993-94	71.03	2.65	4.80	4.92	2.02	0.68	6.15	5.34	2.41
1999-2000	67.55	3.25	5.14	5.46	1.97	0.77	6.17	7.37	2.32
2004-05	67.54	2.95	4.78	4.98	2.23	0.76	6.42	7.36	2.98
2009-10	64.16	2.78	4.61	4.54	1.84	0.72	6.79	8.53	6.04
2011-12	61.10	3.01	4.90	5.20	1.85	0.82	7.07	9.01	7.04
Urban									
1993-94	58.53	2.54	6.21	6.05	3.26	1.02	8.00	8.79	5.60
1999-2000	55.05	2.90	6.15	6.86	2.94	1.12	8.23	11.24	5.52
2004-05	56.08	2.82	5.69	6.68	3.17	1.05	8.61	10.58	5.32
2009-10	55.01	2.59	5.66	5.94	2.62	1.00	9.37	11.92	5.87
2011-12	51.64	2.73	5.62	6.41	2.62	1.13	9.07	12.17	8.61

Source: 68th Round, Report No. 560(68/1.0/3)

It is notable that consumption of all types of cereals has been declined during the study period. The pulses consumption shows poor balance around 0.8 kg per month in rural and 0.9 kg per month in the urban areas. The notable changes were observed in consumption of edible oils i.e. 0.37 to 0.67 kg in rural area and 0.56 to 0.85 kg in urban area, vegetables (2.70 to 4.33 kg in rural and 2.9 to 4.3 kg in urban), eggs (0.6 to 1.9 in rural and 1.5 to 3.0 numbers in urban) and fish and meat (0.26 to 0.5 kg in rural and 0.34 to 0.57 kg in urban) during 1993-94 and 2011-12. In general, it was observed that monthly per-capita consumption of food commodities was higher in urban than rural areas for all the food groups, except cereals.

The per capita monthly consumption of milk is increased about 10 per cent during the year 2011-12 as compared to 1993-94. The monthly consumption of sugar has shown slight change during the study period. During the period 1993-94 to 2011-12, the consumption of all food commodities increased, except cereals. In particular, consumption of edible oils, vegetables, egg, fish and chicken has more than doubled and

was relatively stagnant for pulses. Among the cereals, consumers' preferences were more centered on rice and wheat and were drifting away from coarse cereals, whilst fish and chicken consumption has increased about 2-times i.e. 0.20 to 0.45 kg/month and 0.23 to 0.49 kg/ month in rural areas and in urban areas, respectively. It clearly indicates the changes in dietary pattern in India during the past two decades. It is to be noted that as compared to the recommended dietary allowance (kg/month/capita) (cereals: 13.8, pulses: 1.2, edible oils: 0.6, vegetables: 3.0, and milk: 4.5) as reported by National Institute of Nutrition (2010), the consumption of cereals and pulses was low, and of edible oils, vegetables and milk was high in India during 2011-12.

The Food and Agriculture Organization of the United Nations (FAOSTAT) analyzed the consumption patterns of countries across the world over a period of 50 years (1961-2011). According to that analysis in 2011 the average Indian had a daily calories intake of 2458. Their daily diet consisted of 34% produce (450g), 32% grains (416g), 18% eggs and dairy (235g), 10% sugar and fat

(129g), 2% meat (29g) and 4% as other (58g).

Nutritional Intake Trends

If each individual in a country is able to consume a minimum quantum and quality of various ingredients such as energy, fat, protein and other vitamins and micronutrients on a regular basis, could then the country be said to have achieved food and nutrition security (Nawani, 1994). The nutritional requirements of the population depend not only on the quantity of food, but the quality of food also. The trends in intake of calorie, fat, and protein are presented in Table 6 for the period 1972-73 to 2011-12. The data shows that from 1972-73 to 2011-12; the per-capita intake of calorie had decreased from 2266 to 2233 kcal per day in rural areas and from 2107 to 2206 kcal per day in urban areas. Intake of protein, the most important body building nutrient, in the Indian diet has registered a marginal decrease in rural areas from 62 to 60.7 g m per day, but it was found stagnant in urban areas (56 gm per day) during 2011-12 Sch 1 but it increased upto 60.3 gm per day in 2011-12 Sch 2. The fat intake shows an increasing trend (24 to 46 gm per day in rural and 36 to 58 gm per day in urban area) during the period 1972-73 to 2011-12 (Sch 2). In general, calorie consumption was higher in rural than urban areas throughout the study period. It is mainly because rural people engage themselves more in physical work as compared to people of urban areas. The sedentary life-style of people demands low energy requirement to maintain a given body weight in urban areas than in the rural areas. The present study shows that despite rapid economic growth during the past decades, India's average per capita calorie and protein intake has grown only modestly in rural areas, although the per capita fat consumption has registered a higher growth

in both rural and urban areas. (NCAER, 2014)

Percentage Share of Calorie Consumption

Intake of dietary energy per person continues to be the most widely used indicator of the level of nutrition of a population. Levels of calorie intake are used, in particular, as indicators of adequacy of nourishment of populations of the developing countries and of economically deprived or geographically isolated segments considered being at risk of undernourishment. Average dietary energy intake per person per day was 2233 Kcal for rural India and 2206 Kcal for urban India. Table 7 shows the percentage break-up of calorie intake over nine food groups – cereals, roots and tubers, sugar and honey, pulses, nuts and oilseeds, vegetables and fruits, meat, eggs and fish, milk and milk products, oils and fats, and miscellaneous food, food products and beverages – for rural and urban India for the period of five years 1993-94 to 2011-12. The share of energy intake contributed by cereals was about 61% for rural India and about 52% for urban India. The share of cereals in total calorie intake from the nine food groups has declined over the study period by nearly 10 percentage points in the rural areas and nearly 7 percentage points in the urban areas. The share of oils and fats has risen by about 3.5 percentage points in both rural and urban areas during the period 1993-94 to 2011-12. The share of milk and milk products has grown by about 1 percentage point in both rural and urban areas during the study period. The contributions of vegetables and fruits, as well as sugar and honey, appear to be falling over the study period, especially in urban India, while the contribution of meat, eggs and fish shows a slight rise in rural India. It may be observed from the table that decline of calories

consumption from cereals was mostly offset by increase from non-cereals sources.

The findings of present analysis inferred that there has been a clear transition from food grain consumption to non-food grain and animal product consumption. The study has observed that food consumption has diversified with higher consumption of vegetables, meat and fish etc. There is slight decline in consumption of cereals. Whereas, consumption of pulses has been found stagnant over the past two decades. The study has revealed that the rural people now are investing more on non-cereal items such as pulses milk and milk products, edible oils, meat, vegetables, fruits and fish. Thus, per capita per month demand for cereals has decreased and it is expected to decline more in near future. Hence, it calls for immense need for increased production of non-cereal items in the time of globalization of agriculture and allied sector.

The present study shows that despite rapid economic growth during the past decades, India's average per capita calorie and protein intake has grown only modestly in rural areas, although the per capita fat consumption has registered a higher growth in both rural and urban areas. The findings of the study revealed that decline of calories consumption from cereals was mostly offset by increase from non-cereals sources. Further, it pointed that increased production of foodgrain (rice, wheat etc.) and non foodgrain (pulses, oilseeds, sugarcane etc.) with a combined increased income and better education would result in enhancement in monthly per capita consumption of food items in both rural and urban India. It will directly improve nutritional status of the Indian population. Policies should be focused towards promotion of production of both foodgrain and non foodgrain items across the country to increase the per capita availability of food and improve the nutritional outcome.

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