

Prices, Agriculture and Food Management

05 CHAPTER

Weakening of global commodity prices continued in 2015-16. Prices of crude oil, metals and even cereals declined across the globe notwithstanding a few short spells of rebound. The significant decline in the price of the Indian basket of crude oil, through direct and second round effects, contributed partly to the decline in general inflation for the second successive year. Headline inflation, based on the consumer price index (combined) series, dipped to 4.9 per cent during April-January 2015-16 as against 5.9 per cent in 2014-15. The astute food supply management policy of the government has been successful in containing food inflation despite the below-average monsoon this year and the resultant sporadic spurts in the prices of pulses and a few other essential commodities in the second half of the year. Consumer price index-based core inflation (non-food non-fuel) also remained range bound, inching up marginally from 4.2 per cent in March 2015 to 4.7 per cent in January 2016. The easing of inflationary pressures paved the way for reduction in policy repo rates by 125 basis points during 2015 by the Reserve Bank of India.

The declining growth in agriculture owing to two consecutive drought years, and with decline in production and area sown of major crops, agriculture sector needs a transformation to ensure sustainable livelihoods for the farmers and food security for the population. The transformation in agriculture has to be steered by raising productivity in agriculture, by investing in efficient irrigation technologies, and efficient use of all inputs.

“Few scientists think of agriculture as the chief, or the model science. Many indeed do not consider it a science at all. Yet it was the first science - the mother of all sciences; it remains the science which makes human life possible; and it may be that, before the century is over, the success or failure of science as a whole will be judged by the success or failure of agriculture.” --T.W. Schultz

OVERALL TRENDS IN INFLATION

5.2 Persistent and elevated levels of inflation, in particular food inflation, were a major concern of the government during the period 2010-11 to 2013-14. During this high-inflation phase, average wholesale price index (WPI) inflation was 8.0 per cent and

average inflation based on the consumer price index for industrial workers [CPI (IW)] was way above comfort level at 9.7 per cent. CPI (IW)-based food inflation touched double digits and likewise WPI-based food inflation rose to a high of 9.3 per cent during the same period. The rising trend reversed from

Table 5.1: Headline inflation based on different indices (in per cent)

	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16* (Apr-Dec)
WPI	9.6	8.9	7.4	6.0	2.0	-3.0
CPI (combined)	-	-	10.2	9.5	5.9	4.8
CPI (IW)	10.4	8.4	10.4	9.7	6.3	5.6
CPI (AL)	10.0	8.2	10.0	11.6	6.6	4.2
CPI (RL)	10.0	8.3	10.2	11.5	6.9	4.4

Source: Department of Industrial Policy and Promotion (DIPP) for WPI, Central Statistics Office (CSO) for CPI (combined) and Labour Bureau for CPI(IW), CPI (AL) and CPI (RL).

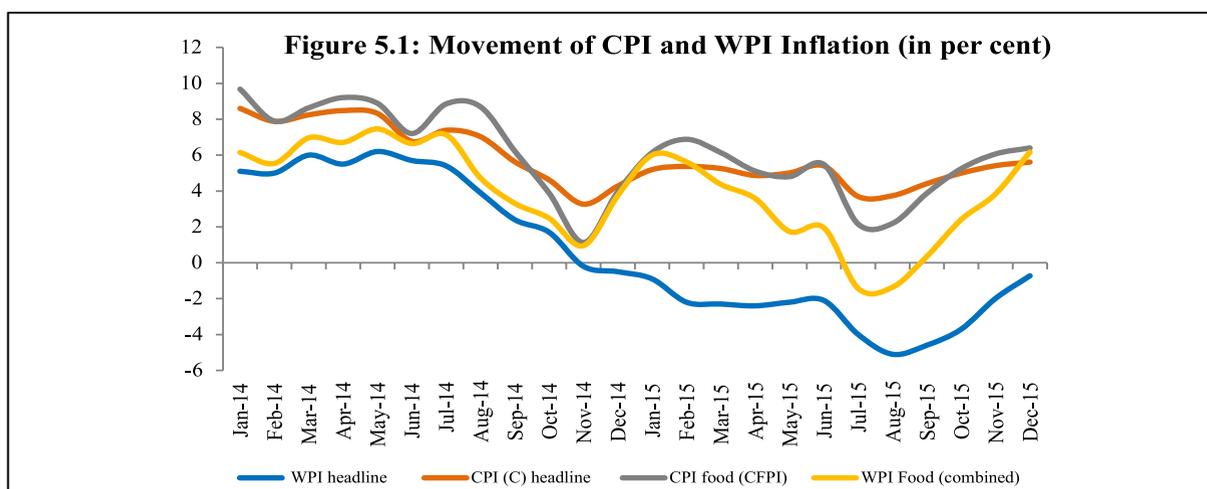
Notes: *WPI and CPI (Combined) figures are provisional; AL stands for agricultural labourers and RL stands for rural labourers.

2014-15 onwards and the economy has been experiencing sustained moderation in general inflation ever since. A comparative picture of inflation based on the major series of the price indices for the last five years is given in Table 5.1.

5.3 The new monthly CPI (combined), with base 2012=100, is now taken as the measure of headline inflation and is tracked by the Reserve Bank of India (RBI) to anchor its monetary policy. Headline inflation declined from 5.9 per cent in 2014-15 to 4.8 per cent in April-December 2015-16. It has, however, been ticking upwards lately and has touched 5.6 per cent in December 2015 owing to build up in food group inflation and adverse base effect. There has been upward pressure at wholesale and retail level in the prices of pulses, edible oils, onions, etc. Figure 5.1

shows the comparative trends of CPI and WPI inflation from January 2014 onwards.

5.4 Within the various subgroups of the CPI (combined), the decline in inflation was broad based and mainly driven by the decline in the inflation in food articles and items under non-food non-fuel category. The decline in CPI core inflation was largely on account of decline in the inflation of housing (rent), transport, communication, education and other services. Inflation measured for the fuel and light subgroup increased from 4.2 per cent in 2014-15 to 5.5 per cent in April-December 2015-16 (Table 5.2), partly due to rise in the price of firewood and dung cakes and partly on account of the low weight of diesel in the CPI fuel basket. Figure 5.2 shows the point contributions of the various groups to CPI inflation.



Source: DIPP and CSO

Table 5.2: Inflation in CPI (Combined) Broad Groups (in per cent)

	Weights	Weights	2012-13	2013-14	2014-15	2015-16 (Apr-Dec) P
Base	2010	2012	2010	2010	2012	2012
Headline	100.0	100.0	10.2	9.5	5.9	4.8
Food and beverages	47.6	45.9	11.9	11.2	6.5	4.9
Fuel and light	9.5	6.8	8.5	7.4	4.2	5.5
Non-food non-fuel (core)	42.9	47.3	8.8	8.1	5.6	4.5
Food (CFPI*)	42.7	39.1	12.2	11.3	6.4	4.6

Source: CSO

Notes: * Consumer Food Price Index; P: Provisional

5.5 The largest impact of the decline in crude oil prices during 2014-15 and 2015-16 has been on the WPI basket (Box 5.1). The WPI inflation for the fuel and power subgroup, which had been hovering in double digits during the period 2012-13 and 2013-14, fell sharply to - 0.9 per cent in 2014-15 and

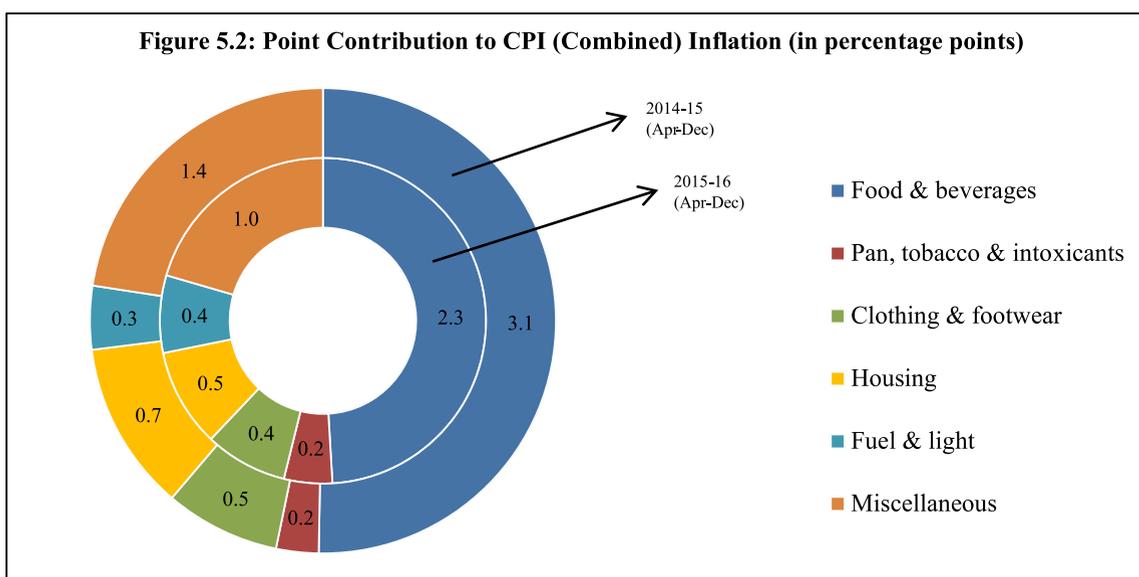
further to - 12.6 per cent in April-December 2015-16. The decline in global commodity prices has resulted in a drop in the WPI-based core inflation from 2.9 per cent in 2013-14 to 2.4 per cent in 2014-15 and further to - 1.5 per cent in April-December 2015 (Table 5.3).

Table 5.3: Inflation in WPI Broad Groups (in per cent) (Base:2004-05)

	Weights	2012-13	2013-14	2014-15	2015-16 (Apr-Dec)P
Headline	100.0	7.4	6.0	2.0	-3.0
Primary articles	20.1	9.8	9.8	3.0	-0.5
Fuel and power	14.9	10.3	10.2	-0.9	-12.6
Manufactured products	65.0	5.4	3.0	2.4	-1.3
Non-food manufactured (core)	55.0	4.9	2.9	2.4	-1.5
All food	24.3	9.3	9.4	4.9	1.9

Source: Office of Economic Adviser, DIPP.

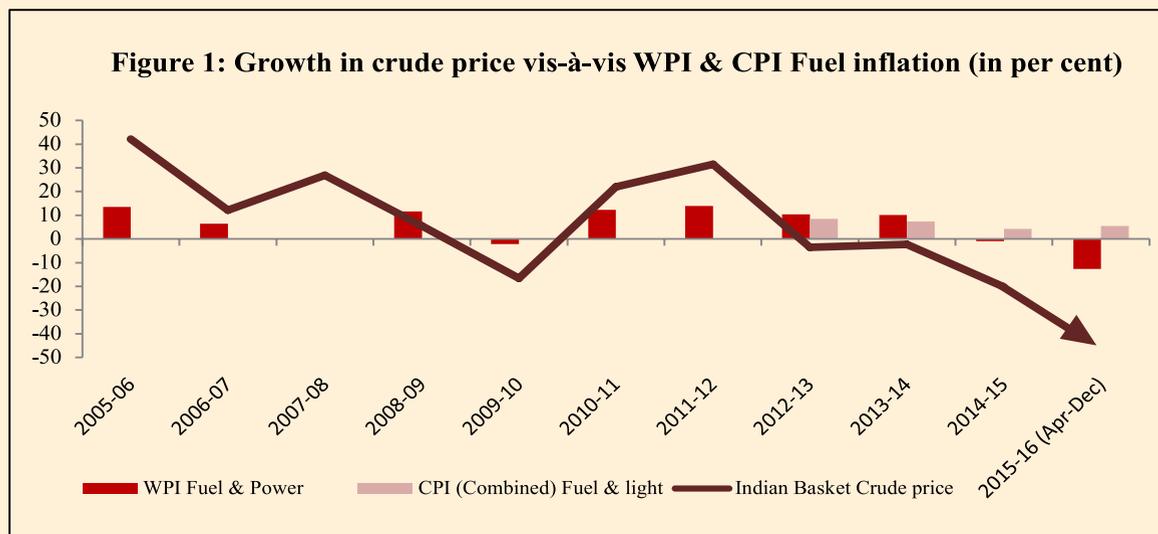
Note: P: Provisional.



Source: CSO

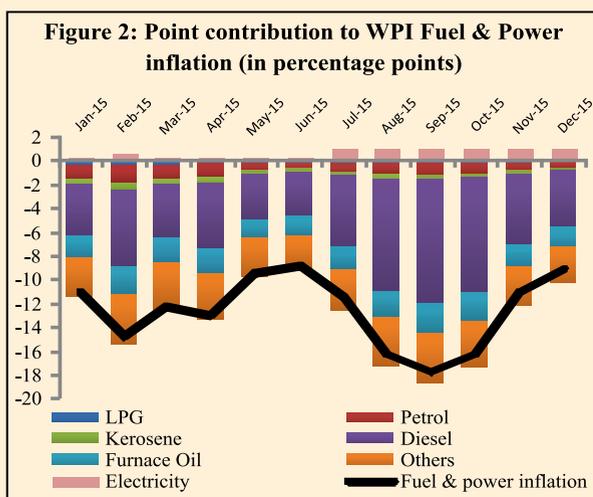
Box 5. 1: Impact of Fall in Crude Price on Inflation

Since India is dependent on import of crude oil to meet about 80 per cent of its crude requirement, global fluctuation in crude oil prices has significant impact on domestic inflation. Price of the Indian basket of crude oil declined by 46 per cent in April-December 2015. Earlier the decline in crude oil prices had helped India deregulate diesel prices. Deregulation has reduced the subsidy burden, thereby helping reduce fiscal deficit. Post deregulation, decline in diesel prices has resulted in reduction in overall inflation.

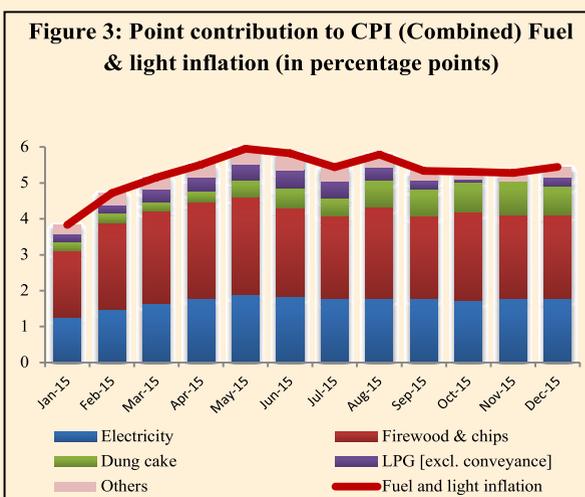


Source: M/o Petroleum & Natural Gas, DIPP and CSO

Although fall in crude prices has impacted WPI fuel and power inflation significantly, the impact on CPI fuel & light is minimal. This is mainly due to difference in the commodities and their weights included in the CPI and WPI fuel baskets. Diesel and petrol whose prices are directly linked to global crude prices constitute around 40 per cent of the WPI fuel & power basket. The decline in the prices of these products played a major role in pulling down WPI fuel and power inflation into negative territory (Figure 2). Petroleum products have negligible weight in CPI fuel & light group. The main contributors to CPI fuel & light inflation in the current year were three items namely firewood & chips, electricity and dung cake which form around 70 per cent of the CPI (combined) fuel & light basket. (Figure 3).



Source: DIPP



Source: CSO

- Note: 1. Others in CPI (combined) fuel & light include kerosene, coke, coal, charcoal and other fuel.
- 2. Others in WPI fuel & power include coal, ATF, naptha, bitumen and lubricants.

Food Inflation

5.6 The consumer food price index (CFPI) basket comprises various categories such as cereals, pulses, vegetables, fruit, milk and eggs, meat and fish. Food inflation remained high during 2010-11 to 2013-14. Supply-side constraints have been causing inflationary spurts from time to time, in particular in pulses, edible oils and vegetables. With deft and astute food management by the government, there has been significant moderation in wholesale and retail food inflation since 2014-15.

5.7 CFPI-based inflation averaged 11.8 per cent during 2012-13 to 2013-14 and thereafter declined sharply to 6.4 per cent in 2014-15 and further eased to 4.6 per cent in April-December 2015-16. Cereal inflation declined significantly from 13.2 per cent in 2013-14 to 5.2 per cent in 2014-15 and 1.7 per cent in 2015-16 (Table 5.4). The prices of most protein-based food commodities such as egg, meat, fish, milk too eased significantly during April-December 2015-16. The only exception was the pulses and products category, with an average price rise of 29.6 per cent during the

current year. The spike in pulse prices was mainly due to shortfall in production of tur and gram. In order to avoid further spikes in prices of pulses, the government has decided to build a buffer by procuring tur and urad and has initiated action to ensure timely imports. The prices of potato and onion were volatile during 2014-15 and 2015-16, yet overall inflation in vegetables remained low.

5.8 Both WPI-based food inflation and the CPI-based food inflation have been moving in tandem. In comparison with the CPI, the WPI series assigns less weight (24.3 per cent) to food items (food articles and food products) in its basket. Inflation in WPI food articles, which was ruling high at 12.8 per cent in 2013-14 declined significantly to 6.1 per cent in 2014-15 and further to 3.0 per cent in April-December 2015-16 (Table 5.5).

5.9 The decline in food articles inflation during 2015-16 so far was mainly on account of a fall in the prices of cereals, vegetables, fruits, milk, egg, fish and meat. However, a spike in the prices of pulses on account of low domestic production kept foodgrain prices high. On the other hand, inflation in

Table 5.4: Inflation in CPI (Combined) Food Groups (in per cent)

	Weights	Weights	2012-13	2013-14	2014-15	2015-16 (Apr-Dec) P
Base	2010	2012	2010	2010	2012	2012
Food (CFPI)	42.7	39.1	12.2	11.3	6.4	4.6
Cereals and products	14.6	9.7	10.5	13.2	5.2	1.7
Meat and fish	2.9	3.6	12.2	12.1	6.3	5.9
Egg*	-	0.4	-	-	3.2	1.2
Milk and products	7.7	6.6	10.4	8.7	10.3	5.7
Oils and fats	3.9	3.6	16.6	1.8	2.4	3.9
Fruits	1.9	2.9	7.5	11.2	13.9	2.3
Vegetables	5.4	6.0	20.6	26.0	3.4	1.0
Pulses and products	2.7	2.4	12.3	4.2	7.9	29.6
Sugar and confectionery	1.9	1.4	12.5	-0.7	-0.4	-9.5
Spices	1.7	2.5	3.1	7.2	8.6	9.5

Source: CSO.

Notes: P: Provisional; *Egg, which was part of the subgroup 'egg, fish and meat' in the 2010 series, has been treated as a separate subgroup in the 2012 series.

Table 5.5: Inflation in WPI Food Groups (in per cent) (Base:2004-05)

	Weights	2012-13	2013-14	2014-15	2015-16 (Apr-Dec)P
All food	24.3	9.3	9.4	4.9	1.9
Food articles	14.3	9.9	12.8	6.1	3.0
Foodgrains	4.1	14.6	9.1	4.0	6.7
Cereals	3.4	13.4	12.8	3.6	-0.3
Pulses	0.7	19.6	-5.5	5.9	39.5
Vegetables	1.7	17.2	40.2	-6.1	-4.3
Fruits	2.1	1.3	7.5	19.0	1.1
Milk	3.2	7.2	6.0	10.0	3.7
Egg, meat & fish	2.4	14.1	12.8	2.4	0.9
Condiments & spices	0.6	-11.8	17.2	21.7	14.8
Food products	10.0	8.1	3.2	2.4	-0.4
Sugar	1.7	11.3	-2.4	-0.3	-13.2
Edible Oils	3.0	9.1	-0.8	-1.3	2.6

Source: Office of Economic Adviser, DIPP.

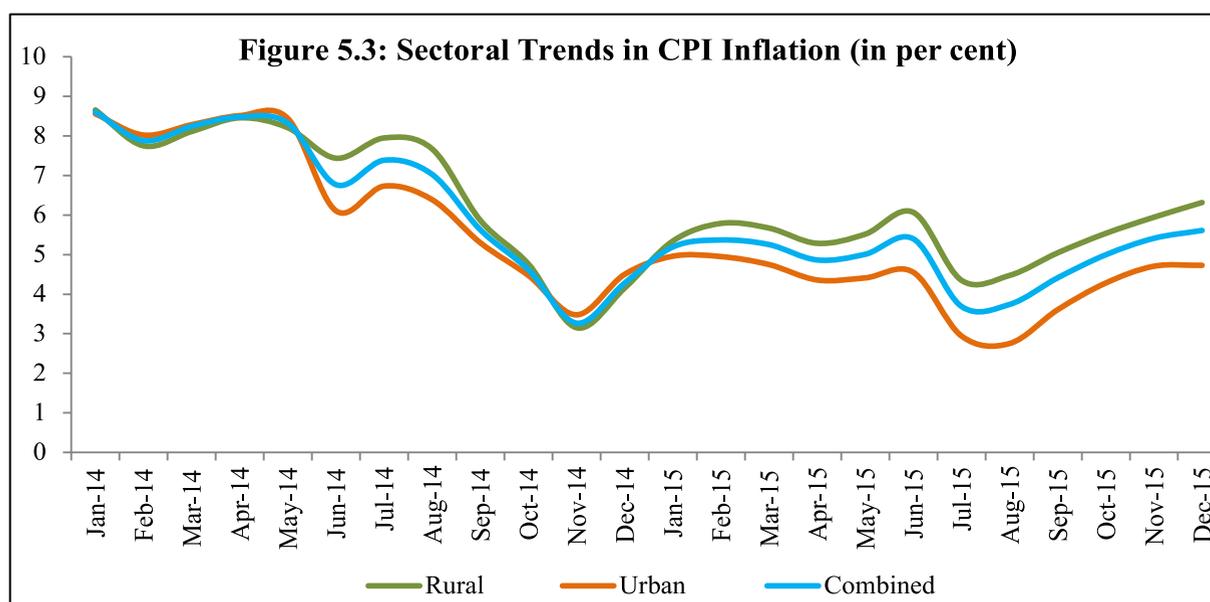
Note: P : Provisional.

manufactured food products, which was low at 3.2 per cent in 2013-14, moderated even further to -0.4 per cent in April-December 2015-16.

Urban and Rural Sector Inflation

5.10 The general inflation measured separately for the urban and rural segments of the CPI have been widening in recent months

(Figure 5.3). The urban CPI basket has been experiencing lower inflation as compared to the rural consumer expenditure-based basket. The global commodity prices meltdown has pulled down prices of fuel products and other tradeables and has benefited urban consumers. Headline inflation for the urban sector stood at 4.7 per cent in December 2015, whereas

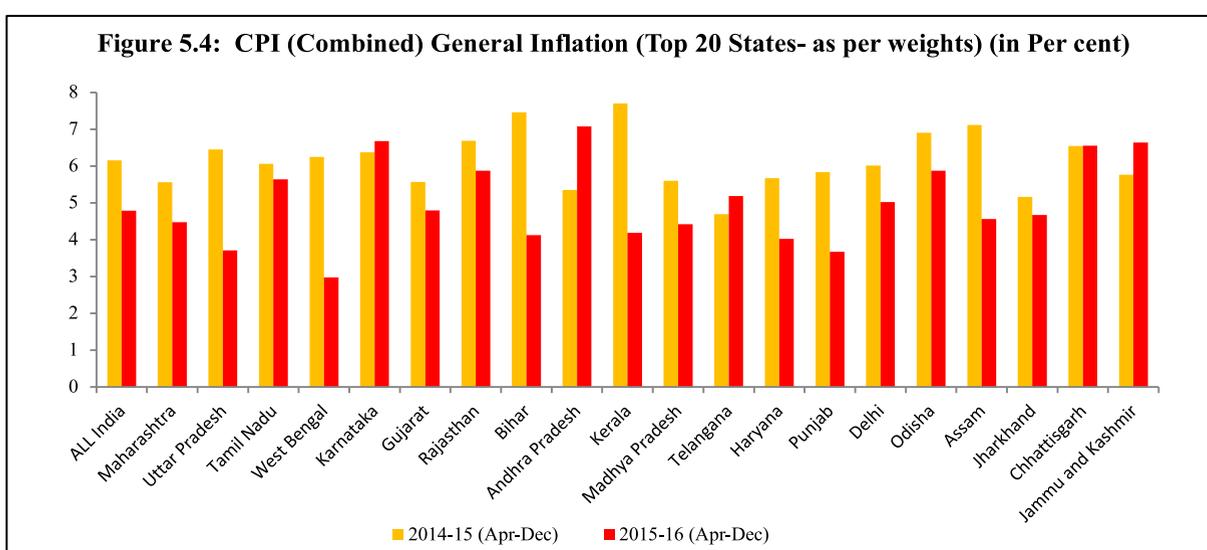


Source: CSO

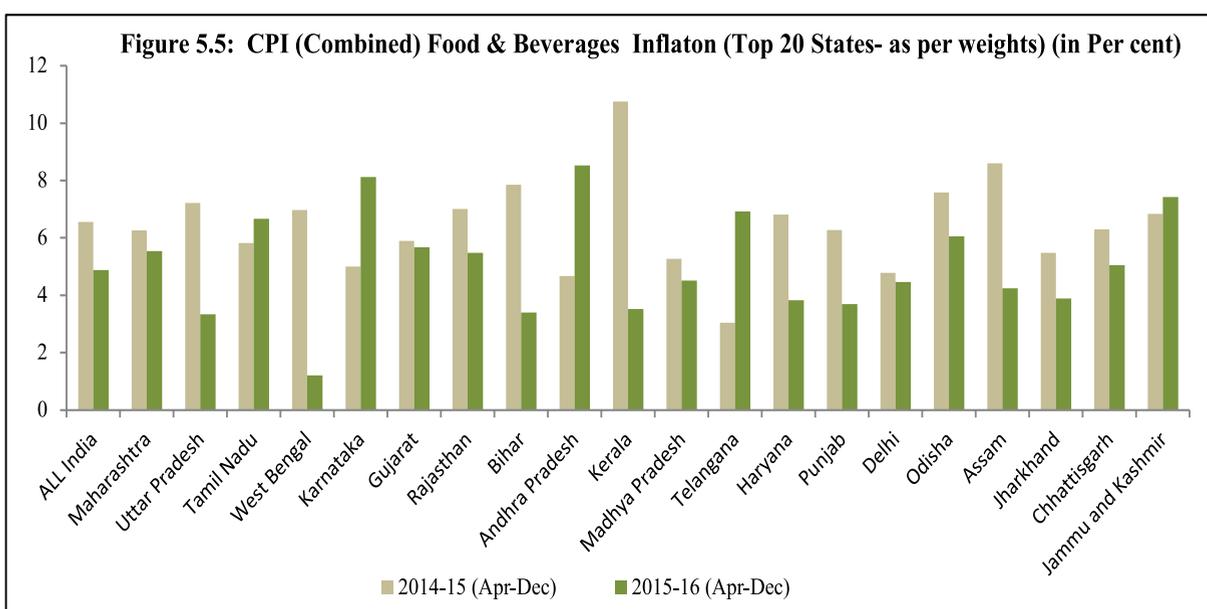
the corresponding figure for the rural sector was 6.3 per cent. The gap between rural and urban inflation in India has increased from the beginning of the year 2015. The difference is partly owing to variation in the weights of items in the two baskets. The rural basket of the CPI assigns significantly larger weights to cereals, vegetables, meat and fish and pulses. Prices of these commodities have been experiencing volatility due to supply-side constraints and lack of a seamless common market for agri-products in the country.

State-wise Inflationary Trend

5.11 State-wise analysis of inflation shows that CPI-based general and food inflation has declined during the current year in most of the states (Figures 5.4 and 5.5). Yet there are exceptions. Karnataka, Andhra Pradesh, Telangana and Jammu and Kashmir experienced higher inflation during April-December 2015 as compared to the corresponding period of the previous year. The reason for rising inflation in these states has been higher food inflation. West Bengal has experienced the lowest inflation during



Source: CSO



Source: CSO

the current year so far. Food inflation follows a similar trend. In all 15 out of the top 20 states (in terms of weights) witnessed lower food inflation in April-December 2015.

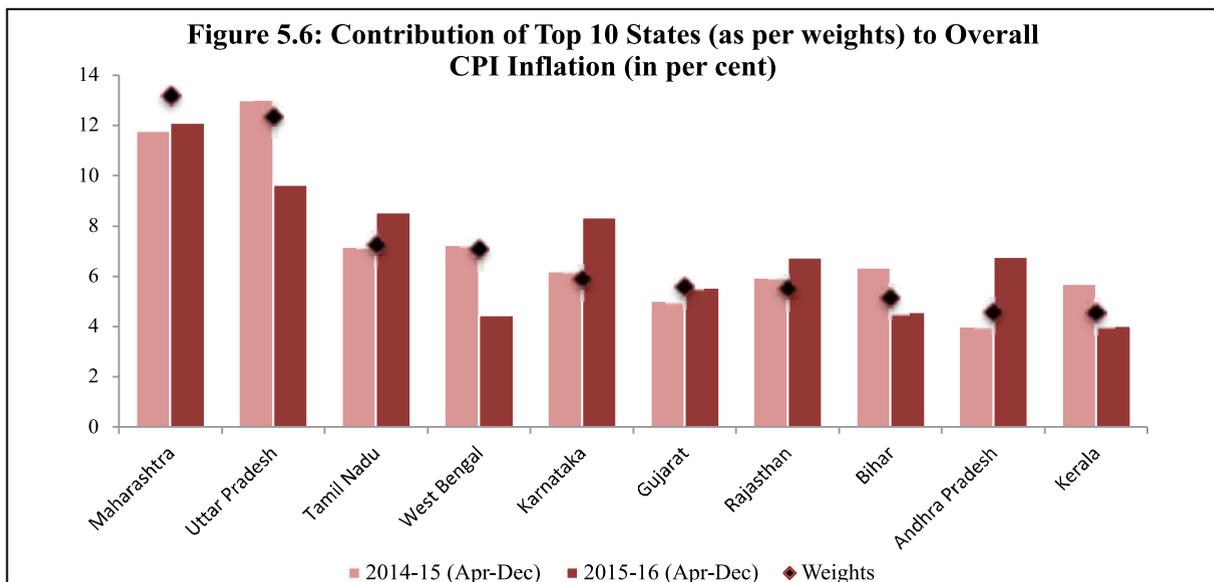
5.12 The top ten states [as per weights in CPI (combined)], with a combined weight of 71 per cent, have been the main contributors to CPI inflation in the current year. Among the top ten states, the contribution of four, Tamil Nadu, Karnataka, Rajasthan and Andhra Pradesh, was higher than their respective weights in the CPI (combined) basket. The contribution of Uttar Pradesh, West Bengal, Bihar and Kerala to overall inflation has been lower during the current year in comparison to the previous year (Figure 5.6).

Wedge between CPI and WPI

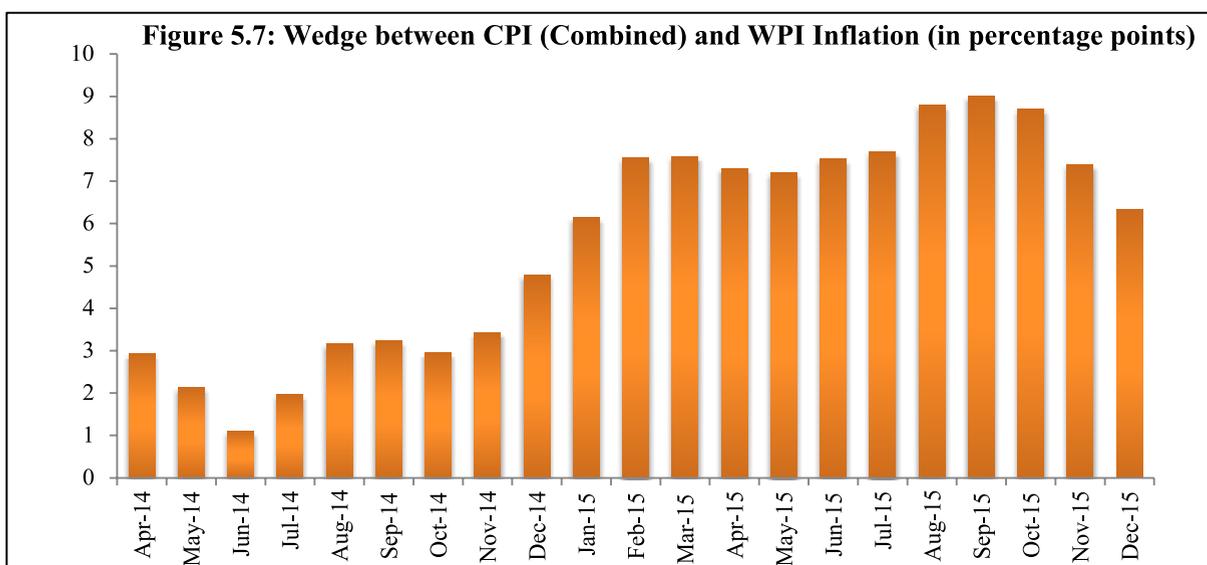
5.13 The widening gap in the inflation based on CPI and WPI series is often a cause for concern for users not conversant with the scope, structure and purpose of these indices. The wedge between CPI- and WPI-based inflation during the current financial year has been significantly wide. While WPI-based inflation continues to be in the negative zone for fourteen months in a row from November 2014 to December 2015, CPI-based inflation averaged 4.8 per cent during the same period.

The gap between the two inflation estimates was as high as 9 per cent in September 2015 (Figure 5.7).

5.14 The WPI series mainly tracks the movement of producer and bulk transaction prices and its weights are based on the value of output in different sectors of the economy. The series is akin to producer price indices compiled in other countries. The CPI basket is based on consumer expenditure estimates and tracks inflation at retail level or the prices consumers pay. The base years of the two series are eight years apart as WPI base revision is long overdue. The weighting diagrams of the two series vary significantly. The weight of total food items in the WPI is 24.3 per cent as compared to 45.9 per cent in the CPI series. The weakness in global commodity prices, in particular crude prices, during the last one and half years has been the cause of decline in the WPI. Tradable commodities have 55 per cent weight and fuel and power products about 15 per cent in the basket. On the other hand, the CPI basket consists of commodities as well as services like health and education which are not included in the WPI basket. The CPI has negligible crude price pass through owing to negligible weight of petroleum products.



Source: CSO



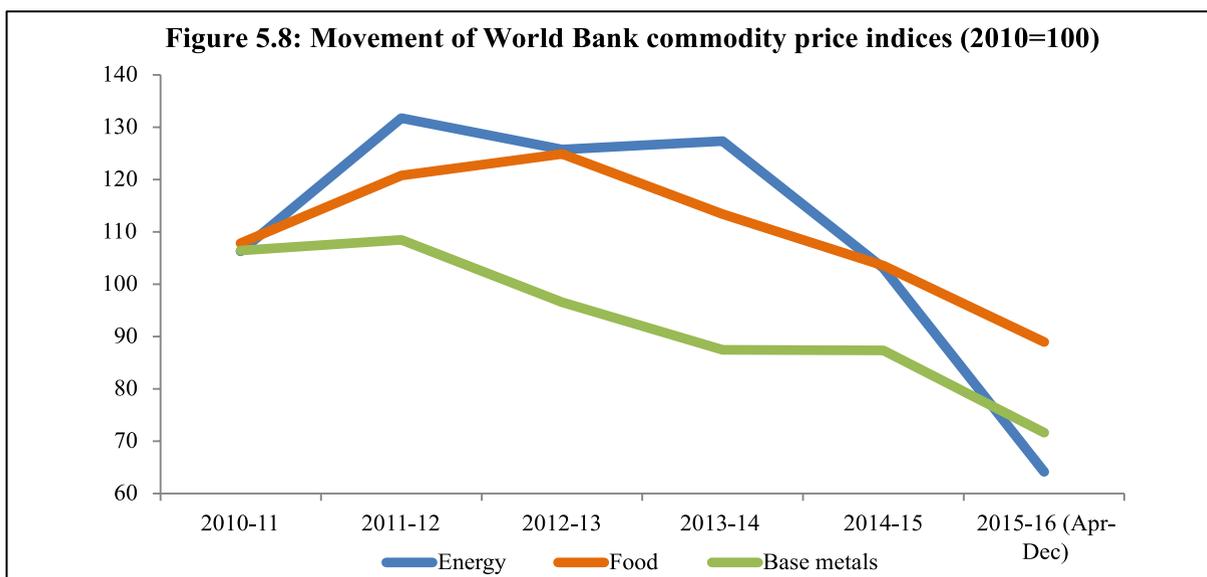
Source: DIPP, CSO

Global inflation and commodity prices

5.15 Global inflation, as per International Monetary Fund (IMF), fell to 3.5 per cent in 2014 from 3.9 per cent in the previous year, mirroring the steep slide in commodity prices. Inflation in emerging market and developing economies (EMDEs), excluding Venezuela and Ukraine, is estimated to decline from 4.5 per cent in 2014 to 4.2 per cent in 2015. In 2016, inflation is projected to rise in advanced economies, but in EMDEs, it is expected to decline.

5.16 The global commodity prices outlook

remains weak. The World Bank energy index fell around 44 per cent in April-December 2015 when compared to the prevailing prices for the similar period in the previous year. Food prices fell around 16 per cent in the current year mainly on account of oils & meals and grains. Base metal prices declined by 20 per cent in April-December 2015. The fall in prices of steel, iron ore and coal has been substantial. The United States Department of Agriculture (USDA) has forecast lower world wheat and rice prices by 16.5 per cent and 0.8 per cent respectively during 2015-16.



Source: World Bank

Outlook

5.17 Continued uncertainty over the outlook for China, expected spurt in Iranian crude supply and moderation in demand from the rest of the world are likely to keep crude prices subdued in the near future. Prospects of lower oil prices over the medium term are likely to dampen inflation expectations. The outlook for the other key commodities too remains subdued in the near future and shall be the key factor in keeping India's inflation range bound. High rural wages, higher levels of minimum support prices (MSP) and rise in input costs have been instrumental in raising inflation in the past few years. At present, growth of all these drivers has slowed down considerably. Yet, as experienced in the second half of the year, recurrence and rebound in the prices of some essential food items may again lead to an uptick in inflation. The latest available rabi sowing estimates have projected a shortfall in average sown area, in particular of pulses and oilseeds. As prices of these commodities are highly sensitive to supply shocks, continued deft supply management is needed in the near future.

AGRICULTURE AND FOOD MANAGEMENT

Overview of Agriculture

5.18 Agriculture and allied activities remain the major source of livelihood for nearly half of the Indian population. The share of agriculture in employment was 48.9 per cent of the workforce [National Sample Survey Office (NSSO), 2011-12] while its share in the Gross Domestic Product (GDP) was 17.4 per cent in 2014-15 (First Revised Estimates) at constant (2011-12) prices.

5.19 The Twelfth Five Year Plan (2012-13 to 2016-17) had envisaged a growth target of 4 per cent for agriculture and allied sectors, necessary for the Indian economy to grow at over 8 per cent. During the last three years, the growth rates in agriculture have been fluctuating at 1.5 per cent in 2012-13, 4.2 per cent in 2013-14, and (-) 0.2 per cent in 2014-15 (Table 5.6). According to the CSO (Central Statistics Office) estimates released on 8 February 2016, the growth in the 'agriculture, forestry and fishing' sector is estimated at 1.1 per cent in 2015-16. The estimates of GDP for the second quarter (July-September) of 2015-16, 'agriculture, forestry and fishing'

Table 5.6: Agriculture Sector: Key Indicators (per cent change at 2011-12 prices)

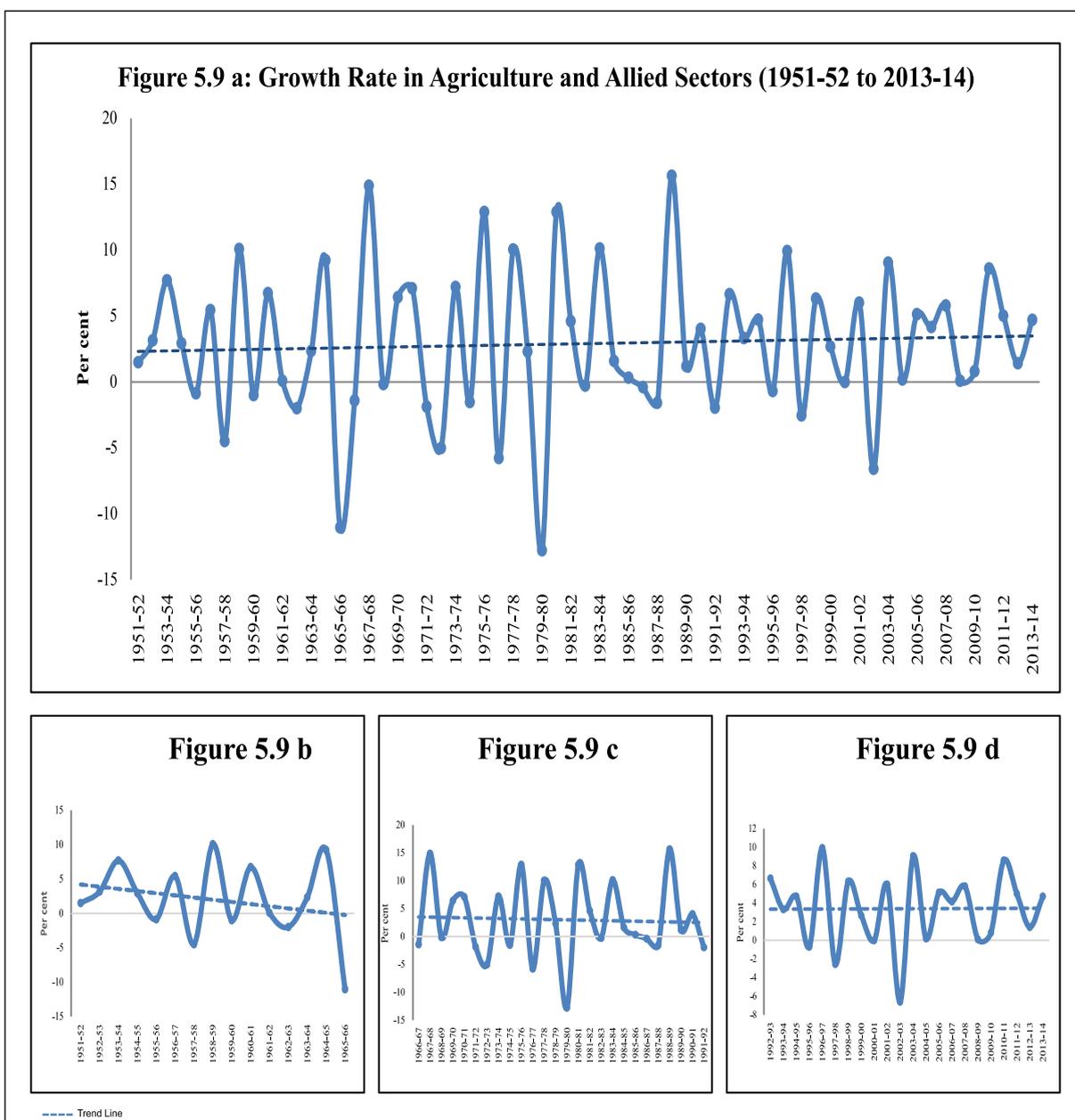
Sl.No.	Item	2011-12	2012-13*	2013-14*	2014-15@
1	Growth in GDP in Agriculture & allied sectors (at constant 2011-12 prices)	5.0#	1.5	4.2	-0.2
	Share of Agriculture & allied Sectors in total GVA (at current 2011-12 prices)	18.5	18.2	18.3	17.4
	Share of Crops	12.1	11.8	11.9	10.9
	Share of Livestock	4.0	4.1	4.1	4.4
	Share of Forestry and logging	1.5	1.5	1.4	1.2
	Share of Fishing	0.8	0.9	0.9	0.9
2	Share of Agriculture & allied Sectors in total Gross Capital Formation (GCF) (at current 2011-12 prices)	8.6	7.8	8.6	7.7
	Share of Crops	7.3	6.6	7.3	6.4
	Share of Livestock	0.8	0.8	0.8	0.8
	Share of Forestry and logging	0.1	0.1	0.1	0.1
	Share of Fishing	0.4	0.4	0.5	0.5
3	GCF in Agriculture & allied sectors as per cent to GVA of the sector (at current 2011-12 prices)	18.3	16.3	17.0	15.8

Source: CSO.

Notes: # at 2004-05 prices; * Second RE (New Series), @ First RE; GVA is Gross Value Added.

sector also reported a growth well below the 4 per cent target, at 2.2 per cent. The shortfall in growth in agriculture is explained by the fact that 60 per cent of agriculture in India is rainfall dependent and there have been two consecutive drought years in 2013-14 and 2014-15. Moreover, there are issues of expansion in irrigation and its efficiency,

growth of capital formation in the sector has been declining and there is volatility in the markets, especially of prices, altering and distorting cropping patterns of some crops. This suggests that for the agriculture sector to achieve a target of 4 per cent, a significantly different approach has to be followed.



Source: CSO.

5.20 The growth in the agriculture and allied sectors since 1992-93 (Figure 5.9d) suggests a very marginal upward trend, accompanied

by large volatility reflected in sharp peaks and troughs.

AREA, PRODUCTION AND YIELD

5.21 As per the Second Advance Estimates for 2015-16, foodgrains production during 2015-16, estimated at 253.16 million tonnes, is expected to be higher by 1.14 million tonnes over the production of 252.02 million tonnes during 2014-15. The area, production and yield of different crops is given in Table 5.7. The acreage under several crops declined substantially in 2014-15 compared to 2013-14 as per the Fourth AE (Advance Estimates). The largest decline in the areas of gram and groundnut of around 20 and 15 per cent respectively, resulted in a decline in

production of gram and groundnut by 27 per cent and 32 per cent in 2014-15 compared to 2013-14. It appears that the shift away from gram and groundnut has been in regions of relatively higher productivity, since the respective declines in output are much larger than the declines in the acreage. The percentage change in the yield of crops in 2014-15 over the previous year shows an increase in yield of only two crops, jowar and bajra. With scanty moisture and precipitation, there has been delayed sowing, which is reflected in a decline in percentage change in area sown of the majority of crops, as per 4th AE (Table 5.7).

Table 5.7: Area, Production and Yield (2014-15*)

Group/ Commodity	Area (million ha)	Percentage change in area	Production (million tonnes)	Percentage change in production	Yield (kg/ha)	Percentage change in yield
Foodgrains ^a	122.1	-3.1	252.7	-4.6	2070	-1.5
Rice	43.9	-0.2	104.8	-1.6	2390	-1.4
Wheat	31.0	-0.7	88.9	-7.3	2872	-6.6
Jowar	5.3	-9.0	5.1	-6.3	953	3.0
Maize	9.3	-1.8	23.7	-2.8	2557	-1.0
Bajra	7.1	-9.7	9.1	-1.4	1272	9.3
Pulses	23.1	-8.4	17.2	-10.8	744	-2.6
Gram	8.2	-19.9	7.2	-27.4	875	-9.4
Tur	3.7	-4.9	2.8	-15.5	750	-11.6
Oilseeds	25.7	-9.8	26.7	-18.9	1037	-10.0
Groundnut	4.7	-15.2	6.6	-32.2	1400	-20.0
Rapeseed and Mustard	5.8	-13.6	6.3	-20.7	1089	-8.3
Cotton ^b	13.1	11.8	35.5	-3.3	461	-13.3
Sugarcane	5.1	2.0	359.3	2.7	70 [#]	0.0

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

Notes: *Fourth AE; [#] tonnes/ha; ^a : Includes cereals and pulses; ^b : Million Bales of 170 kg.

Table 5.8: Average Yields of Major Crops in India (kg/ha)

Crop	Average yield 1970-71	Average yield 1980-81	Average yield 1990-91	Average yield 2000-01	Average yield 2010-11	Average yield 2013-14	Average yield 2014-15*
Rice	1123	1336	1740	1901	2239	2416	2390
Wheat	1307	1630	2281	2708	2989	3145	2872
Pulses	524	473	578	544	691	764	744
Oilseeds	579	532	771	810	1193	1168	1037
Sugarcane (tonnes/ha)	48	58	65	69	70	71	70
Tea	1182	1491	1794	1673	1712	2170	2170
Cotton	106	152	225	190	499	510	461

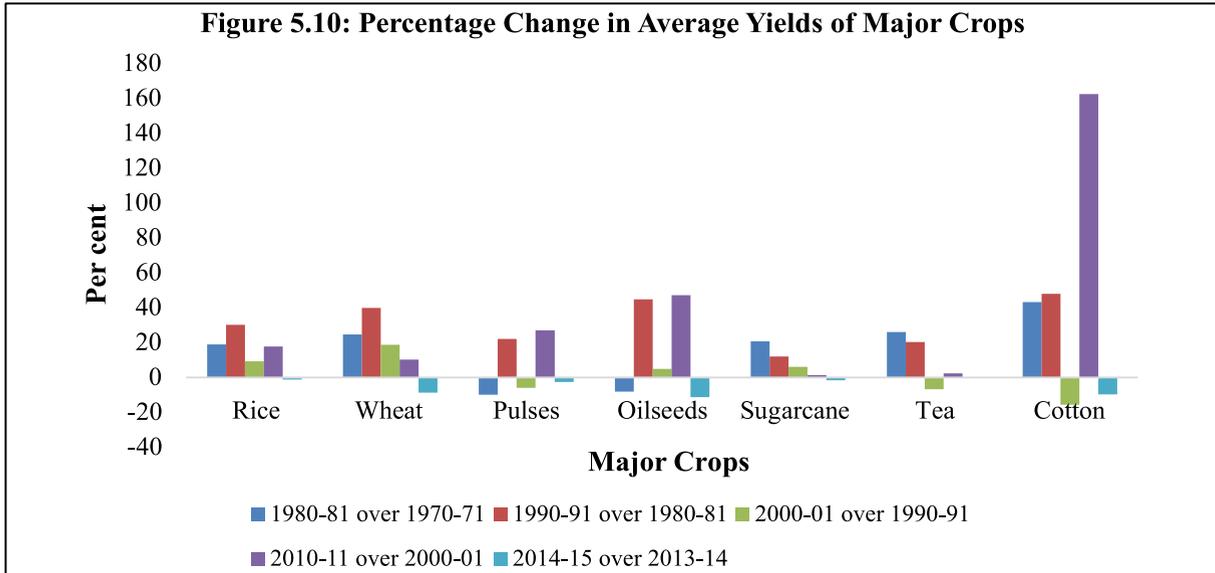
Source: Directorate of Economics & Statistics, Department of Agriculture, Cooperation and Farmers Welfare.

Note: * Fourth AE.

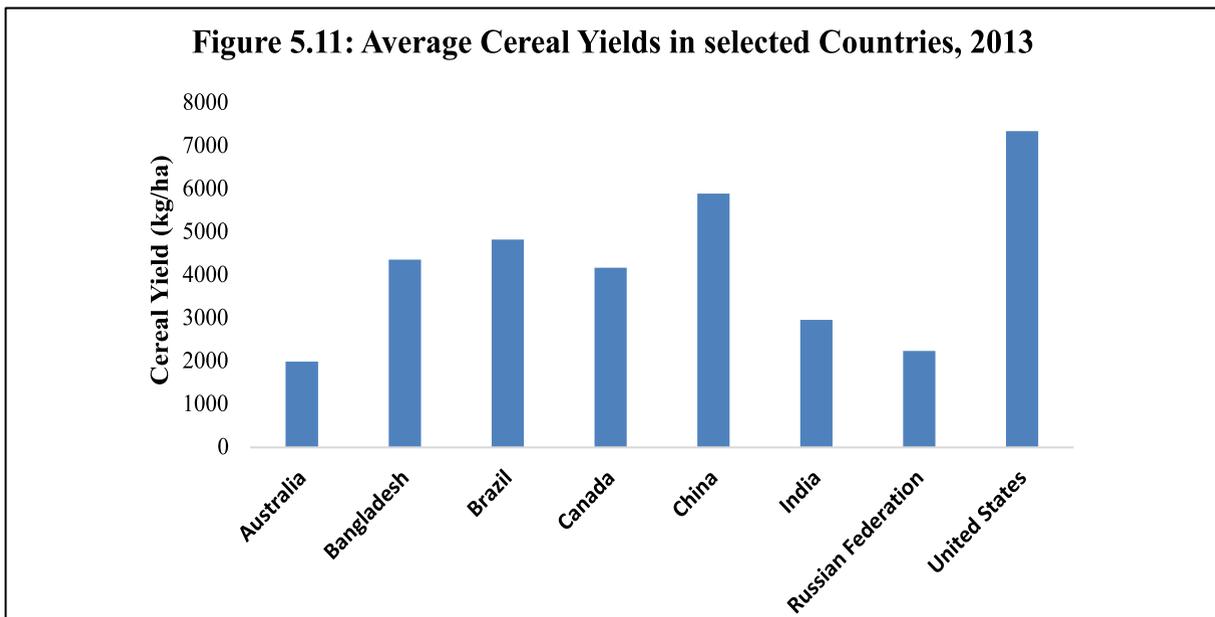
5.22 The average yields of major crops have shown impressive growth over the decades from 1970-71 to 1990-91 (Table 5.8).

5.23 The percentage change in average yields has been fluctuating as can be seen in Figure 5.10. The average yield of pulses registered negative growth rate over the

period 1980-81 over 1970-71 and 2000-01 over 1990-91. The introduction of Bt cotton resulted in a spurt in yield of cotton during the period 2010-11 over 2000-01. From 2010-11, the percentage changes in average yields of rice, wheat, pulses, oilseeds and cotton are also showing declining trends, which is a cause for concern.



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



Source: World Bank, 2015 and FAOSTAT, 2015.

Notes: Cereal yield, measured as kg per ha of harvested land, includes wheat, rice, maize, barley, oats, rye, millet, sorghum, buckwheat, and mixed grains. Production data on cereals relates to crops harvested for dry grain only. Cereal crops harvested for hay or harvested green for food, feed, or silage and those used for grazing are excluded. The Food and Agriculture Organization (FAO) allocates production data to the calendar year in which the bulk of the harvest took place. Most of a crop harvested near the end of a year will be used in the following year.

5.24 International comparisons suggest that India has significantly lower crop yields than a number of other countries (Figure 5.11). China has an average cereal yield of above 5800 kg per ha while India has less than 3000 kg per ha. USA has the largest average cereal yield of more than 7000 kg per ha.

5.25 Given the low yields in agriculture and limited scope for increasing acreage under cultivation, India has to enhance productivity in agriculture by investing in key inputs, so as to ensure food security for the growing population. Therefore, the pathway to improved productivity in agriculture in India needs to be guided by expansion in the share of irrigated areas, investments to improve efficiency in water use, suitable pricing of water, mechanization of operations of agriculture to lower costs and reduce wastage, and seed development for improved varieties to increase yields, debate and address the concerns about introduction of genetically modified seeds in a time frame of three to six months, efficient use of fertilizers and pesticides through improved practices, market driven pricing of fertilizers with no restriction on imports, shift to direct benefit transfer of fertilizer and other agriculture subsidy, distinguish and target subsidy to the farmer and that (subsidy) to inefficient operations of agriculture inputs, credit access to farmers for investments at rates that the financial institutions pay for their deposits,

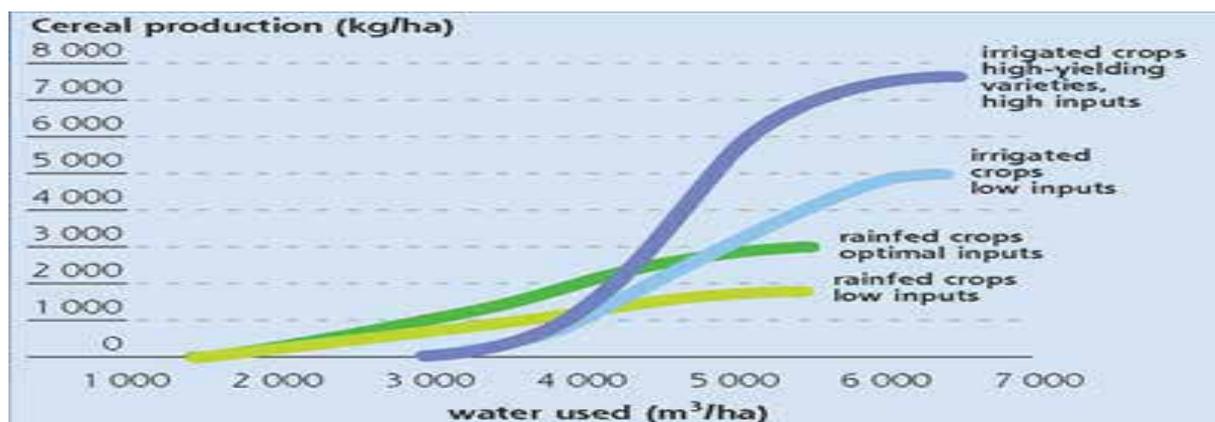
ring-fencing of agriculture related operations of banks from Non-Performing Assets (NPA) to non-agricultural operations, replacement of intermediation of agricultural finance with direct benefit transfers, and development of real time information system to back an improved timely agricultural advisory services.

PATHWAYS TO PRODUCTIVITY IN AGRICULTURE

i. Irrigation

5.26 To raise the productivity of agriculture in India there is need to expand the acreage under irrigation along with adoption of appropriate technologies for efficient utilization of water through suitable pricing. First, adoption of irrigation technologies which improve efficiency in the use of water is imperative in a scenario where flood irrigation has resulted in wastage of water. Second, focus on efficient irrigation technologies is important with increasing water shortages owing to climate change and indiscriminate wastage of water in agriculture and other uses. Having '*more crop per drop*' through efficient irrigation technologies should be the motto to improve productivity in agriculture which can ensure food and water security in the future. The significance of irrigation can be seen in Figure 5.12 which compares the yield per crop under rain fed and irrigated agriculture.

Figure 5.12: Comparative Yields of Cereals under Rainfed and Irrigated farming

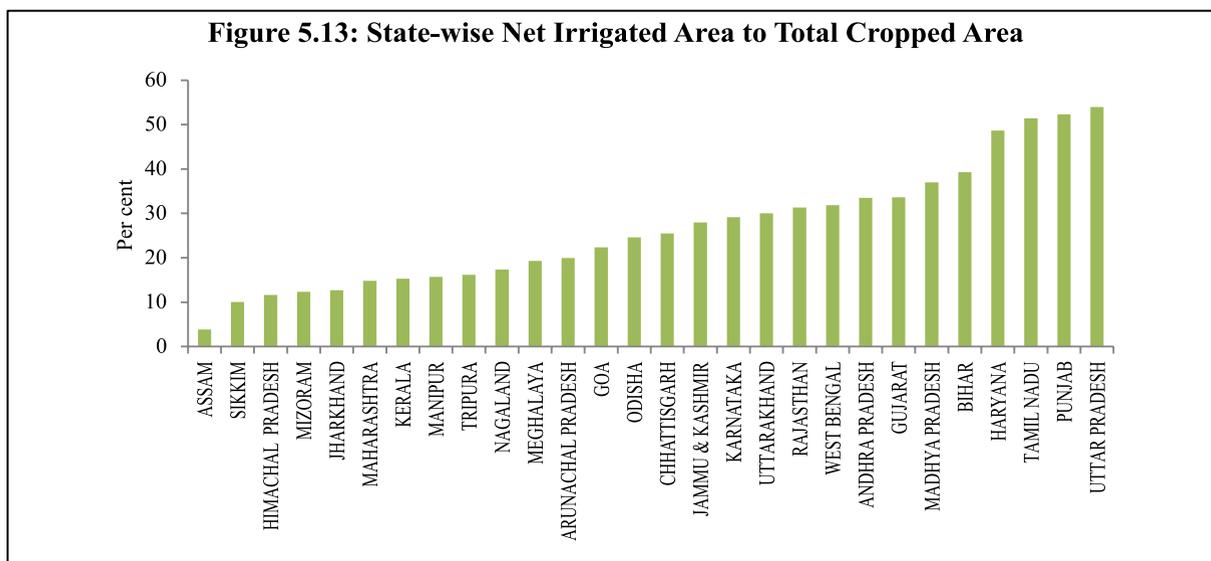


Source: FAO, 2002

Net Irrigated Area to Total cropped area in India

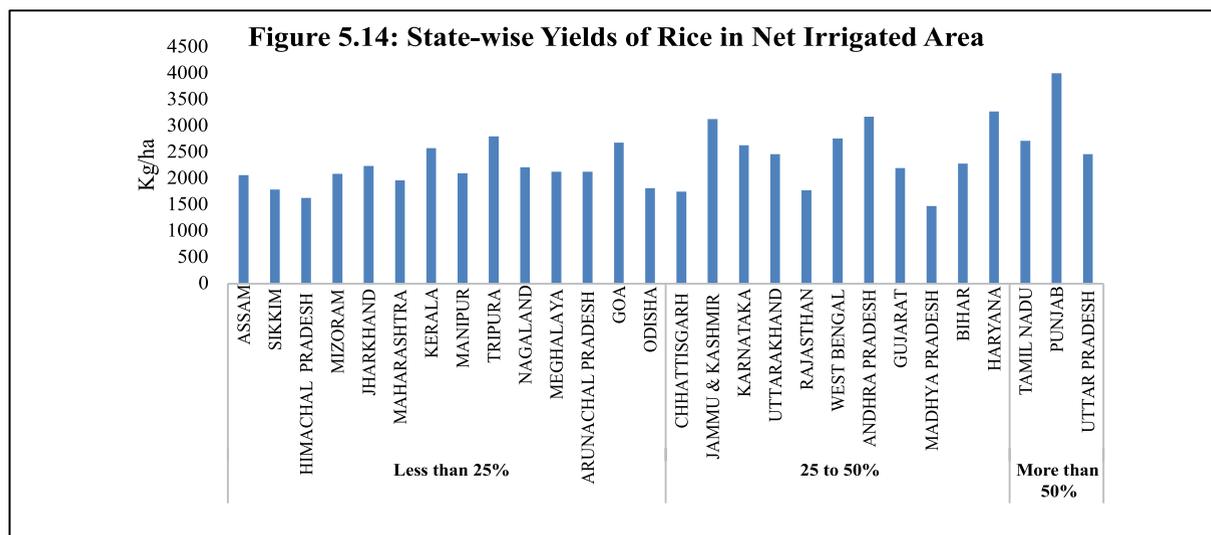
5.27 As per the latest available data on irrigation, the all India percentage distribution of net irrigated area to total cropped area during 2012-13 was 33.9 per cent. The state wise percentage distribution of irrigated area to total cropped area is shown in Figure

5.13. There is regional disparity in irrigated farming, with net irrigated area to total cropped area at more than 50 per cent in the states of Punjab, Tamil Nadu and Uttar Pradesh, while it is at less than 50 per cent in the remaining states (Figure 5.14). There is need and scope for increasing the coverage of irrigated area across the country to increase productivity in agriculture.



Source: Directorate of Economics and Statistics.

Note: Net irrigated area is gross irrigated area minus area irrigated more than once.



Source: Directorate of Economics and Statistics.

5.28 The utilization of irrigation potential created in India during the Plan periods is given in Table 5.9. The total Ultimate Irrigation Potential (UIP) of India is about 140 million hectares (Mha). There is substantial

gap between Irrigation Potential Created (IPC) and the Irrigation Potential Utilized (IPU) during the Five Year Plan periods. There is perceptible decline in the ratio of IPU to IPC due to lack of proper operation

and maintenance, incomplete distribution system, non-completion of command area development, changes in cropping pattern and diversion of irrigated land for other purposes.

Table 5.9: IPC and IPU during the Plan Periods

Plan Period	Irrigation Potential Created (IPC) (Mha)	Irrigation Potential Utilized (IPU) (Mha)	Ratio of Utilized to Created
VII Plan	11.31	9.77	0.86
Annual Plan	4.56	4.27	0.94
VIII Plan	5.17	4.36	0.84
IX Plan	7.69	3.79	0.49
X Plan	8.82	6.23	0.71
XI Plan	9.5	2.71	0.29

Source: Ministry for Water Resources, River Development and Ganga Rejuvenation and Twelfth Five Year Plan, Vol.I.

5.29 There is need to arrest the declining trend in efficient utilization of irrigation potential and also reverse it in the next two-three years. A larger share of funds available under the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)/ other employment generating schemes need to be deployed for creating and maintenance of community assets including de-silting and repair of tanks and other water bodies that are used for irrigation.

Efficiency in Irrigation

5.30 Achieving efficiency in the use of irrigation systems will be the main determinant of agricultural productivity. The conventional systems of irrigation have become non-viable in many parts of India due to increasing shortages of water, wastage of water through over irrigation, and concerns of salination of soil as per Task Force on Agriculture (NITI Aayog, 2015). The introduction of efficient irrigation technologies which are both economically and technically efficient like drip and sprinkler irrigation can improve water use efficiency, reduce costs of production by reducing labour costs and

power consumption. One of the objectives of the Prime Minister's Krishi Sinchai Yojana (PMKSY) is to enhance on-farm Water-Use-Efficiency (WUE) spatially and temporally to reduce wastage by promoting precision irrigation like sprinkler, drip etc.

5.31 The case for greater spread of Micro Irrigation (MI) technology arises in the context of the successful outcomes seen in some of the major states that have adopted MI technology in India [National Committee on Plasticulture Applications in Horticulture (NCPAH), 2009]. The adoption of sprinkler irrigation resulted in 35 to 40 per cent savings of irrigation water in the cultivation of groundnut and cotton in Gujarat, Karnataka and Andhra Pradesh. The adoption of drip irrigation resulted in 40 to 65 per cent savings in water for horticulture crops and 30 to 47 per cent for vegetables. Such examples need to be emulated by other areas/crops in these states and in other states for a larger basket of crops.

Water Productivity

5.32 Water productivity at the all India level is very low and needs to be enhanced through tapping, harvesting and recycling water, efficient on-farm water management practices, MI, use of waste water and resource conservation technologies. The overall irrigation efficiency of the major and medium irrigation projects in India is estimated at around 38 per cent. Efficiency of the surface irrigation system can be improved from about 35-40 per cent to around 60 per cent and that of groundwater from about 65-70 per cent to 75 per cent. In order to promote judicious use of water ensuring 'more crop per drop' of water in agriculture for drought proofing, the Government has recently launched the PMKSY aiming at providing water to every field of agriculture.

ii. Mechanization

5.34 The level of farm mechanization in India requires more to be done in terms

of introduction of better equipment for each farming operation in order to reduce drudgery, to improve efficiency by saving on time and labour, improve productivity, minimize wastage and reduce labour costs for each operation. With shortage of labour for agricultural operations owing to rural urban migration, shift from agriculture to services and rise in demand for labour in non-farm activities, there is need to use labour for agricultural operations judiciously, which makes a strong case for mechanization of farming. Another notable aspect of Indian agriculture is the high proportion of female workforce in both the cultivation and processing stages of farming. Therefore, ergonomically designed tools and equipment for reducing drudgery, enhancing safety and comfort and also to suit the needs of women workers would help in better adoption of technologies in agriculture.

5.35 Table 5.10 shows the level of mechanization in Indian agriculture. The overall level of mechanization in farming is below 50 per cent in the case of majority of the farming operations in India.

Table 5.10: Level of Mechanization in Indian Agriculture

Operations in farming	Percentage of mechanization
Soil working and seed-bed preparation	40
Seeding and planting	29
Plant protection	34
Irrigation	37
Harvesting and threshing	60 to 70 per cent for wheat and rice; less than 5 for others

Source: Department of Agriculture, Cooperatives and Farmer's Welfare.

5.36 According to the Agricultural Machinery and Manufacturers Association in India, tractor penetration is 38 per cent for large farmers (with more than 20 acres), 18 per cent for medium farmers (5-20 acres) and just around 1 per cent for marginal

farmers. With increase in fragmentation of landholdings and low rates of tractor penetration among small farmers, there is need for a market in tractor rentals, akin to cars and road construction equipment, driven by private participation. With suitable mobile and internet applications, manufacturers of tractors along with other stakeholders need to deliberate on this, since it will also increase demand for tractors.

5.37 The promotion of appropriate farm equipment which are durable, light weight and low cost, region, crop and operation specific using indigenous/ adapted technologies need to be made available for small and marginal farmers to improve productivity.

iii. Productivity through Seed Development

5.38 The basic input for increasing productivity in agriculture is seed. It is estimated that the quality of seed accounts for 20 to 25 per cent of productivity (DAC&FW, 2015). Therefore, the adoption of quality seeds is critical along with other inputs to improve agricultural output in India.

5.39 In India, there are multiple challenges to the development and adoption of quality seeds, in the form of inadequate research inputs for development of new seeds especially early ripening and resistant (to pest, moisture variations, etc.) varieties, high cost of seeds for small and marginal farmers, shortage of supply of quality seeds, non-resolution of issues related to adoption of Genetically Modified (GM) crops and inadequate number of players restricting competition. The issues that require immediate attention are:

- i. **Affordability:** Seeds which are open pollinated varieties can be developed by farmers from their own harvested crops. However, for high-yielding hybrid varieties, the farmer has to depend on the market for each crop. For small and marginal farmers the cost of hybrid seeds is very high, affecting the viability of farming (Boxes 5.2 & 5.3).

Box 5.2: Direct Benefit Transfer (DBT) of Hybrid Seeds in Uttar Pradesh

The Pardarshi Kisan Sewa Yojana (PKSY) was launched in September, 2014 and rolled out in April 2015 in Uttar Pradesh for distribution of hybrid seeds through DBT (Direct Benefit Transfer). The aim of the scheme was to target the intended beneficiaries and prevent diversion of subsidized seeds, corruption and manipulation. Under the scheme, farmers have to register themselves on a portal where the name, address and copy of land-holding revenue record (khatauni) details are compiled and a unique kisan id is generated. This data-base becomes the basis for all transactions. The subsidy distribution process through the treasury is software driven and is directly paid into the account of the beneficiaries. Under this scheme, the quantity of hybrid seeds procured was 15,173 quintals and the subsidy distributed was ₹23.77 crores. As on 14.12.2015, for wheat 4.58 lakh quintals of hybrid seeds were distributed under DBT, for pulses 22,296 quintals of hybrid seeds, oilseeds, 1,111 quintals and for barley 960 quintals of hybrid seeds. In total 5,64,909 farmers were beneficiaries under the scheme.

The PKSY has reduced leakages as subsidy goes directly into bank accounts of farmers. It has also reduced the chances of financial misappropriation and has enhanced communication between farmers and departments. However, the challenges in this scheme are generating and managing the data-base of farmers, creating awareness about the scheme and ensuring quality of seeds distributed.

The scheme needs to take into account the ground reality that all cultivators (sharecroppers) are not owners of the land and so possessing a khatauni. The actual benefits of the PKSY need to be measured in terms of plugging leakages and possibly higher output of the HYV seeds used.

Box 5.3: The Cotton Seeds Price (Control) Order, 2015

The Government decided to fix the maximum sale price of cotton seeds through the Cotton Seeds Price (Control) Order, notified in December 2015. As per the order, the Government may, after taking into consideration the Seed Value, Licence fee which includes one time and recurring Royalty (Trait Value), trade margins and other taxes, whenever necessary, as it may deem fit, from time to time, notify in the Official Gazette, the Maximum Sale Price of cotton seeds on or before 31 March of every year, applicable for the next financial year. It has also decided to fix and regulate the seed value and licensee fee including royalty or trait value, through a notification issued by the Ministry of Agriculture. It is in accordance with the provisions of the Seeds Act 1966 and the Seeds (Control) Order 1983.

A committee under the chairmanship of the Joint Secretary (Seed) and Controller, Department of Agriculture, Cooperation and Farmers Welfare will be constituted to recommend the maximum sale price of cotton seed. The committee may take inputs from such persons or associations or authority, as may be necessary for working out the maximum sale price of cotton seed. The 'maximum sale price' is the maximum price inclusive of seed value, licence fee, trade margin and local taxes or duties, at which cotton seeds or transgenic varieties of cotton seeds are sold to farmers. The government, while fixing the maximum sale price, shall also fix and regulate the seed value and licence fee including royalty or trait value, if any, that constitute components of the maximum sale price. Accordingly, no licensor, licensee or dealer shall cause sale of cotton seeds at a price exceeding the maximum sale price or collect license fee in excess of that notified by the Government. The order also states that any person who contravenes any of the provisions of this order or fails to carry out any direction or requisition made there under, shall be punishable under section 7 of the Act.

Given the past experience and limitations in administratively fixing prices in India, resulting from asymmetries/assumptions in the cost and price data, levels of utilization/ efficiency/norms adopted, guaranteed returns, time taken to arrive at and then alter the administered price, limited capacity to administer such a price, it is desirable to let markets determine the price of seeds, enhancing competition through more players can help to check/reduce cases of price rigging and cartel formation.

- ii. **Availability:** Another concern is shortage in the supply of quality seeds. While there is a demand for banning non-certified seeds, certification *per-se* does not ensure quality seeds. Ideally, facilitating more players (private and public) and competition in the market for seeds would improve availability of quality seeds at lower/ competitive prices.
- iii. **Research and technology for seed development:** The first Green Revolution was driven by indigenously developed High Yielding Varieties (HYVs) of seeds for paddy and wheat. Inadequate research and genetic engineering has been a constraint in the development of seeds/ seed technologies in major crops during the past few decades in India. There is need to encourage development of seeds/ seed technologies in both private and public sectors to initiate another round of Green Revolution. This development should cover all agricultural segments/ crops--cereals, coarse cereals, fruits and vegetables, pulses, oilseeds, animal husbandry and pisciculture--simultaneously.
- iv. **GM crops and seeds:** Concerns about affordability of hybrids and GM seeds, environmental and ethical issues in

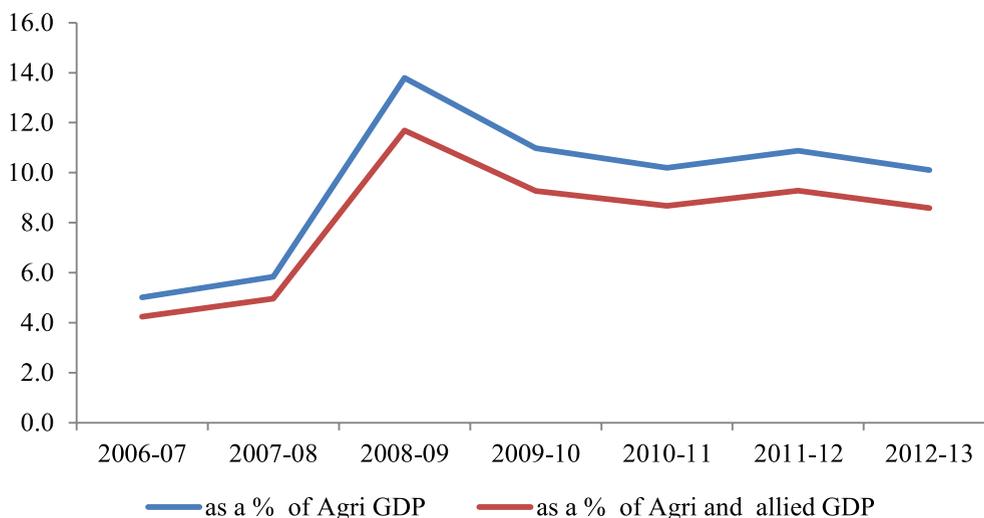
cultivation of GM crops, risks to the food chain, disease spread and cross pollination have resulted in their non-introduction. These issues needs to be debated, tested, evaluated, so that introduction of hybrids is facilitated in the next three to six months. The adoption of hybrid and HYV seeds is one definite pathway to raising productivity in Indian agriculture.

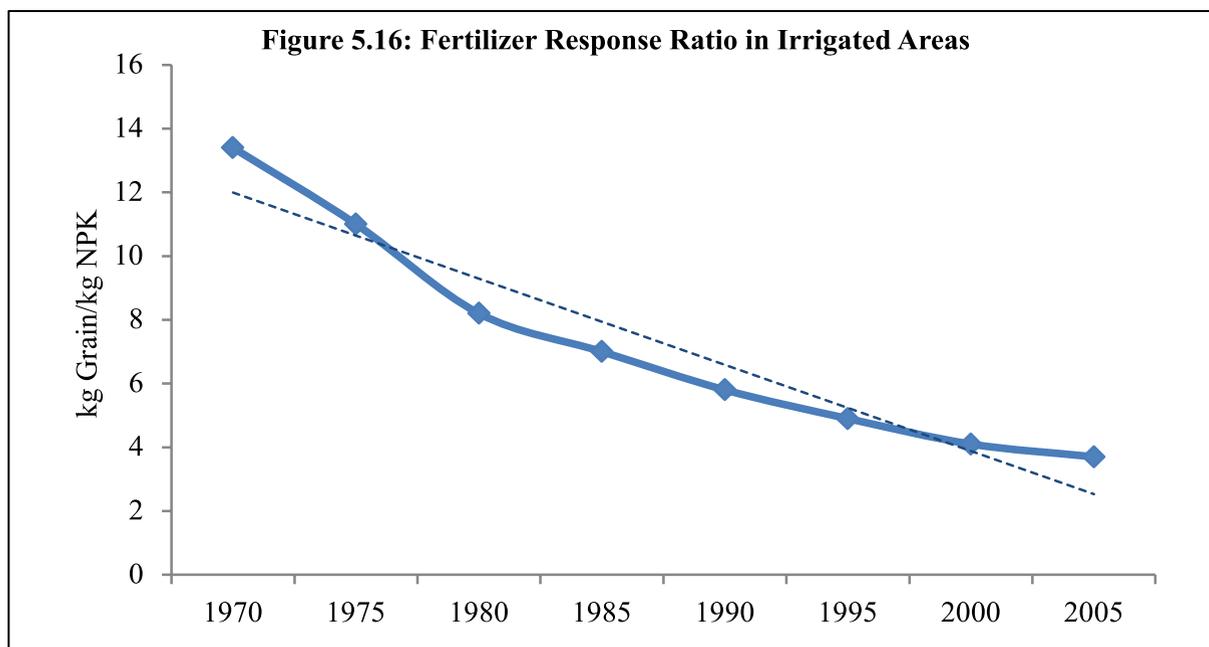
iv. Fertilizers

5.40 Fertilizer is a critical and expensive input required to improve agricultural output. In India, there has been a sharp increase in the use of fertilizers since the Green Revolution in the mid 1960s. To facilitate and promote the use of fertilizers in order to improve productivity, the Government has been providing fertilizer subsidy to farmers. The fertilizer subsidy is around 10 per cent of the total agricultural GDP in 2013-14 as can be seen in Figure 5.15.

5.41 However, the use of fertilizers has not resulted in commensurate growth in agricultural productivity. The declining response ratio or marginal productivity of fertilizers since the 1970s is a pointer to their inefficient use in Indian agriculture. As can be seen in Figure 5.16, the yield of grain per kilogram use of NPK fertilizer has declined

Figure 5.15: Fertilizer Subsidy as Percentage of Agriculture /Agriculture and allied GDP





Source: Department of Fertilizers.

from 13.4 kg grain per ha in 1970 to 3.7 kg grain per ha in irrigated areas by 2005.

5.42 In the post Green Revolution agriculture scenario, there have been imbalances in the use of fertilizers such as excessive dependence on urea owing to low/distorted prices of fertilizers, especially urea, crop and regional imbalance in the use, neglect/low use of compost, manure and other forms of natural nutrient providers, discontinuing practices of inter and rotational cropping. In addition, there has been diversion of the subsidized fertilizers to non-agricultural use. The indiscriminate use of fertilizers has not proportionally improved the yield of crops, but has resulted in the depletion of soil fertility and salination of soil in many areas. There is need to rationalize fertilizer subsidy in an *input, crop and region neutral format* and minimize diversions. The disbursement of subsidy on fertilizers should shift to DBT, the benefits of which will be maximized, if all controls (including imports) on the fertilizer industry/outputs are lifted simultaneously. In the case of P and K fertilizer subsidy, with the Nutrient Based Subsidy (NBS) scheme, a fixed amount of subsidy will be given on each grade based on their content.

5.43 *Crop-responsive, balanced use of fertilizers:* It is important to facilitate the optimal use of fertilizers depending on the soil health and fertility status. Linking the soil health card to provide profile of the soil and fertilizer on the basis of the same profile utilizing fertilizer, even if not subsidized can improve the yield of crops.

5.44 *Micro nutrients and organic fertilizers:* Indian soils show deficiency of micro nutrients like boron, zinc, copper and iron in most parts of the country, which limits crop yields and productivity. According to agronomic trials conducted by the Indian Council of Agricultural Research (ICAR), fertilizers which supplement micro nutrients can provide an additional yield in cereals in the range of 0.3 to 0.6 ton per ha. The micro nutrient deficiency can be overcome if there is expansion of the use of organic fertilizer. Moreover, it is cheaper for small farmers to adopt and use organic composting and manure. This can help improve and retain soil fertility. With 67 per cent of Indian soil characterised by low organic carbon, there is great scope for enhancing the use of organic fertilizers.

5.45 *Nutrient Management:* Judicious use of chemical fertilizers, bio-fertilizers and locally available organic manures like farmyard manure, compost, vermi compost and green manure based on soil testing is necessary to maintain soil health and productivity. With over 12 crore farm holdings in India, it is a big challenge to provide soil-testing facilities for overcoming the multi-nutrient deficiencies in soils so as to improve agricultural output. Use of information technology and providing soil fertility maps to farmers can go a long way in efficient nutrient management for improved productivity.

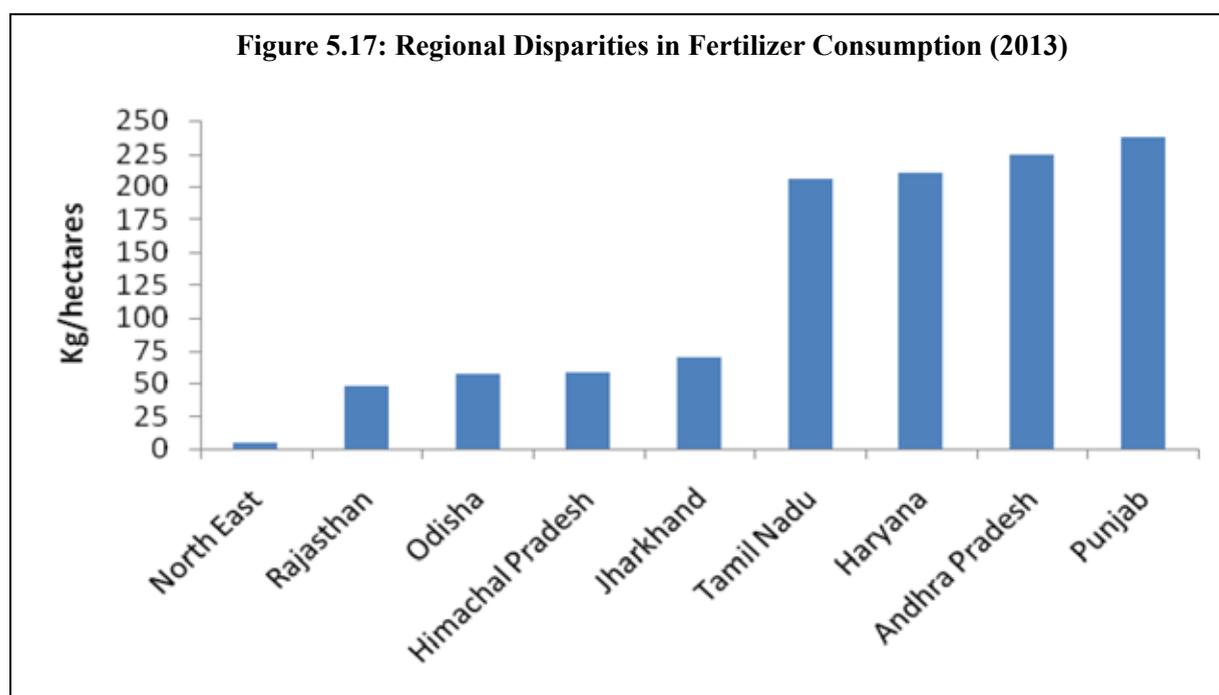
5.46 *Regional disparity in fertilizer consumption:* There are wide regional disparities in the consumption of fertilizers (Figure 5.17). These disparities in fertilizer consumption may be attributed to the availability of irrigation facilities in the high consuming states since irrigation is a requirement for proper absorption of fertilizers. It is necessary to reduce the disparities through appropriate soil-testing facilities and policy measures.

v. Pesticides

5.47 In India, the farmer's crop yield losses range from 15 to 25 per cent owing to the presence of weeds, pests, diseases and rodents. Even though pesticides are essential for improving crop yields, per hectare pesticide use is much lower in India in comparison with other countries. India uses a low amount of 0.5 kg per ha pesticide compared to 7.0 kg per ha in the USA, 2.5 kg per ha in Europe, 12 kg per ha in Japan and 6.6 kg per ha in Korea.

5.48 However, the use of pesticides without following proper guidelines, use of sub standard pesticides and lack of awareness about pesticide use are key concerns in India. These practices have given rise to pesticide residues being found in food products in India, posing major threats to the environment and human beings.

5.49 Farmers need to be educated about the classification of insecticides on the basis of their toxicity. They should also be advised whether specific pesticides are suitable for aerial application. There have been incidents like the aerial spraying of Endosulphan in a



Source: Department of Fertilizers.

literate state like Kerala, which resulted in serious health hazards in an entire village.

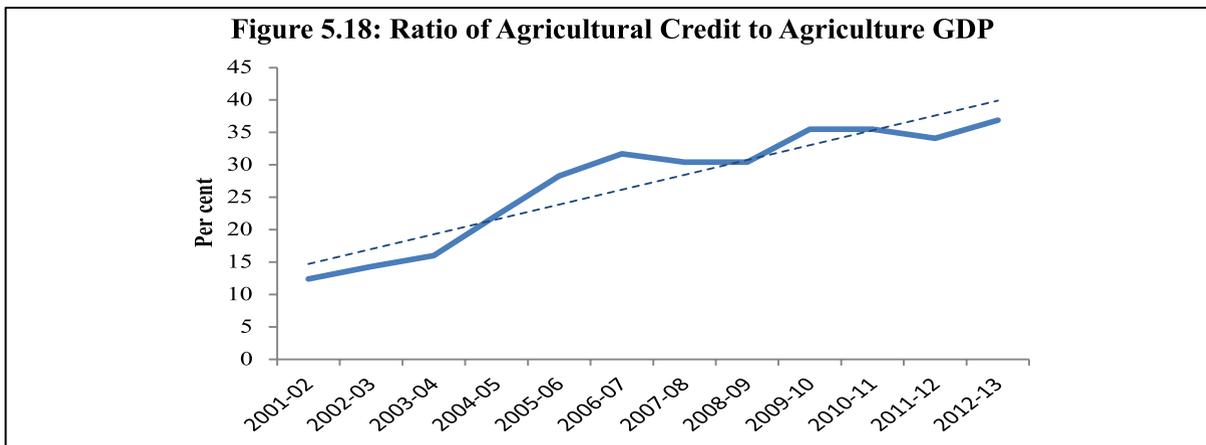
5.50 The Central Insecticide Board and Registration Committee (CIBRC) has issued guidelines for the application of pesticides, their dosage, minimum intervals to be maintained, and the levels of toxicity. This information needs to be widely disseminated among farmers in order to encourage appropriate application of pesticides and prevent environmental damages. There is also need for greater focus on Integrated Pest Management (IPM) which will encompass a judicious mix of pest control methods by leveraging the cultural, mechanical, biological methods and need-based use of chemical pesticides by giving preference to the use of bio-pesticides and bio-control agents. Being environment friendly, non-toxic and cost effective, bio-pesticides need to be promoted among small farmers to improve productivity in agriculture.

vi. Credit

5.51 Credit is an important mediating input for agriculture to improve productivity. Access to institutional credit enables the farmer to enhance productivity by investing in machinery and purchase of variable inputs like fertilizers, quality seeds, and manure and providing funds till the farmer receives payment from sale of produce, which is at times delayed and staggered. Input use

by farmers is sensitive to credit flows to the agriculture sector. In this context, the predominance of informal sources of credit for farmers is a concern. According to NSSO, 70th round data, as much as 40 per cent of the funds of farmers still come from informal sources. Local money lenders account for almost 26 per cent share of total agricultural credit. Though there has been a decline in informal sources over time, enhancing access to institutional credit for farmers needs to be addressed. There is need to address the problem of availability of credit on several fronts. In respect of high interest rates, DBT may be considered to replace subvention of interest rates. The intermediation and refinance model to promote agricultural credit needs to be revisited and replaced with DBT that shall subsidize the interest paid by the farmer, instead of subsidizing refinance to financial institutions.

5.52 The ratio of agricultural credit to agricultural GDP has increased from 10 per cent in 1999-2000 to around 38 per cent by 2012-13 (Figure 5.18). However, the share of long-term credit in agriculture or investment credit has declined from 55 per cent in 2006-07 to 39 per cent in 2011-12. The decline in the share of long-term credit in agriculture needs to be arrested and reversed. In view of this, the Government has prioritized lending towards investments in agriculture and allied sectors to enhance capital formation



Source: Ministry of Agriculture and Farmers Welfare.

in agriculture. Accordingly, the Government of India has allocated ₹15,000 crore to the Long Term Rural Credit Fund (LTRCF) set up in the National Bank for Agriculture and Rural Development (NABARD) for 2015-16 as compared to ₹5000 crore in 2014-15. With the help of this fund, the Cooperative Banks/ Regional Rural Banks (RRBs) can draw much higher refinance support from NABARD for financing medium- and long-term agricultural loans during 2015-16.

5.53 The regional disparity in the distribution of agricultural credit also needs to be addressed. The coverage of agricultural credit is very low in the north-eastern and eastern regions of the country. To improve agricultural credit flow, the credit target for 2015-16 has been fixed at ₹8,50,000 crore against ₹8,00,000 crore for 2014-15. As against the target, the achievement for 2014-15 was ₹8,45,328.23 crore (provisional) vis-à-vis ₹7,30,122.62 crore for 2013-14.

5.54 Crop Loans being short term in nature are meant to meet the current expenditure for raising crops on land till the crop is harvested and hence they are short-term credit for seasonal agricultural operations and do not result in major investments in agriculture. In India, farmers can avail of crop loans up to ₹3 lakh at 7 per cent interest and the effective rate of interest has been lowered to 4 per cent during 2015-16 for those who repay their loans promptly. These measures help farmers tide over short-term contingencies and price shocks which may affect their seasonal operations.

5.55 The small and marginal farmers with Kisan Credit Cards can also avail the benefit of interest subvention scheme extended for a further period of up to six months (post-harvest) against Negotiable Warehouse Receipts (NWRs) at the same rate as available to crop loan to discourage distress sale of crops by small farmers. Post-harvest loans against NWRs are available at commercial rates for farmers with large

farm holdings. The limited spread of formal warehousing, which would issue NWRs, the additional cost of warehousing and possibly transport, inability to distinguish the type/size of farm on which the produce has been cultivated with potential for mis-utilization of the benefits, limits the advantages of this scheme and the same translating into higher income to the farmer.

5.56 With increase in the number of natural calamities, from 2014-15 interest subvention of 2 per cent is available to banks on restructured loan amounts on account of natural calamities which are made available to farmers. It will have a nominal rate of interest from the second year onwards and this provision has been continued during 2015-16. The value of total number of agricultural loan accounts stood at ₹8.54 crore as on 31 March 2015, out of which crop loans accounted for ₹7.41 crore. Timely availability and access to credit both short term and long term credit from formal sources at affordable rates of interest are essential to improve productivity in agriculture.

vii. Agriculture Extension Services

5.57 Agriculture extension services constitute another key input which can improve productivity in agriculture by providing timely advisory services to farmers to adopt best practices, technology, meet with contingencies, market information etc. The Global Forum for Rural Advisory Services (GFRAS) defines extension services, also called rural advisory services, 'as consisting of all the different activities that provide the information and services needed and demanded by farmers and other actors in rural settings to assist them in developing their own technical, organizational and management skills and practices so as to improve their livelihoods and well-being (GFRAS, 2010)'. In India, though there are multiple agencies offering agricultural advisory services, lack of functional autonomy, rigid hierarchical structures leading to lack of innovative

methods of providing extension services and coordination failures at multiple levels have resulted in inefficient delivery of extension services.

5.58 Agriculture extension services have to be revitalized by making it more relevant, useful and timely in order to improve agricultural productivity. The improvement need not take the form of implementing a new scheme or additional outlays in existing schemes. It needs to take the form of a one-stop-shop that offers both hardware and software solutions to raise the incomes of farmers, especially small and marginal farmers. This needs to be done independent of the fact that the scheme designed to benefit the farmer is a central sector or a centrally sponsored scheme, or the ratio of the sharing in the centrally sponsored scheme or even without a scheme. It also needs to be done in an *input, crop and region neutral* way. The extension services should also aim at minimizing wastage in inputs in all agricultural operations and also in the produce, till it leaves the farm gate. Efforts also need to be made to enhance post harvest processing/value added activities at the farm. Extension service should also support and highlight practices in inter and rotational cropping and efficient utilization of all available inputs in the context of ground realities, soil and water conditions and on new seeds/crops. They should be able to share with the farmer, information on weather, in order to improve the sowing, including time of sowing, so as to reap maximum yield, as well as on storms, rains and flood in order to minimize damage to crops.

5.59 There needs to be a shift to demand-driven agricultural advisory services that will cater to farmer, region and crop-specific needs. This can be done through a virtual connect, using IT (mobile and internet), integration of agricultural extension services with all stakeholders, their respective hierarchy, extension services in other villages, blocks, agro climatic regions, largely for

sharing of information, suppliers of inputs, agro-processors, markets and their activity, especially price.

Gross Capital Formation in Agriculture and Allied Sectors

5.60 The Gross Capital Formation (GCF) in agriculture as a proportion of total GCF showed a decline from 8.6 per cent in 2011-2012 to 7.4 per cent in 2013-14 at 2011-12 prices. As per the revised estimates released by CSO, the percentage share of GCF in agriculture and allied sector in the GVA (GDP) from agriculture has also shown a decline from 18.3 per cent in 2011-12 to 15.8 per cent in 2014-15 (Table 5.11). As the ratio of GCF to GDP from agriculture reflects the investment rate in agriculture, the declining trend needs to be arrested and reversed since growth in agriculture sector is an imperative, given the significance of the sector in employment, income and inclusive growth. The increase in investment rate in agriculture has to come from both the public and private sectors.

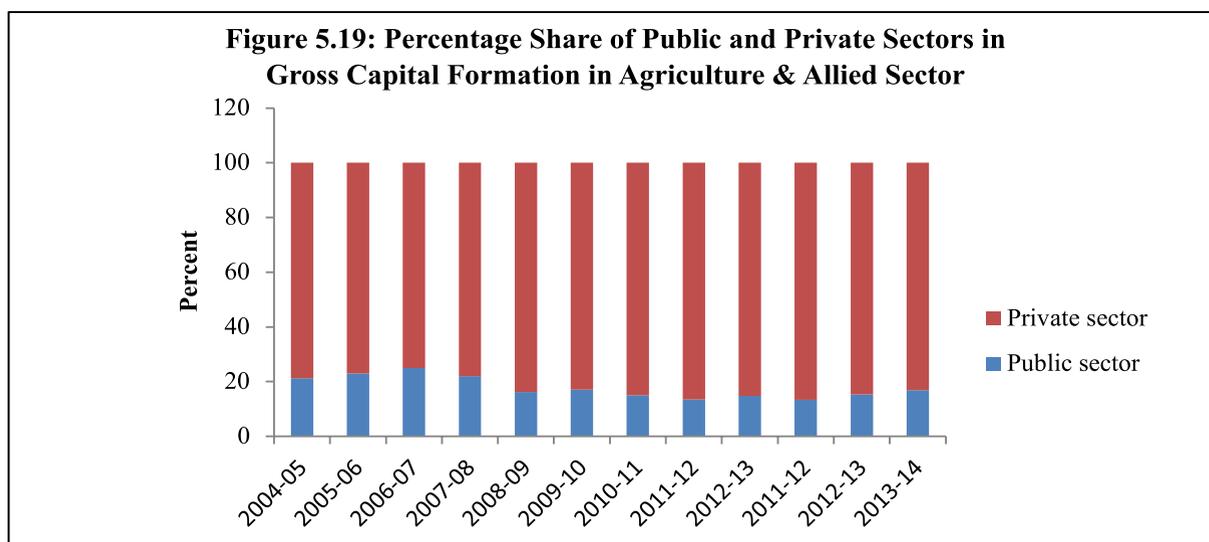
Table 5.11: GVA and Gross Capital Formation in Agriculture & Allied Sector

Year	Agriculture & Allied Sector		Share of GCF in GVA (GDP) of Agriculture & Allied Sector (%)
	GVA	GCF	
2011-12	1501816	274432	18.3
2012-13*	1680797	274727	16.3
2013-14*	1902452	322723	17.0
2014-15@	1995251	314640	15.8

Source: CSO.

Notes: * Second Revised Estimates (New Series), @ First Revised Estimates.

5.61 The declining GCF to GDP ratio in agriculture can be attributed to the decline in public sector investments as can be seen from the percentage share of the public and private sectors in the GCF in agriculture and allied sectors. The share of the public sector in GCF has declined from above 20 per cent during 2004-05 to 16.8 per cent by 2013-14 (Figure 5.19). Correspondingly, the share of



Source: CSO, Ministry of Statistics and Programme Implementation MoSPI.

the private sector increased from 78 per cent in 2004-05 to 83 per cent by 2013-14.

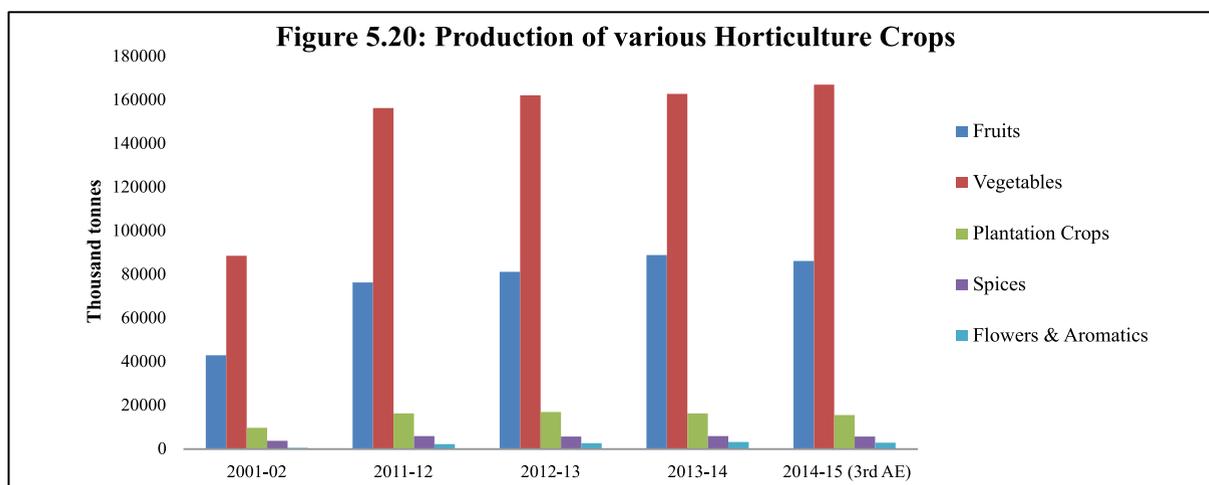
Horticulture

5.62 The scenario of horticulture crops in India has become very encouraging. The percentage share of horticulture output in agriculture is more than 33 per cent. Under the purview of agriculture and allied activities, the share of plan outlay for horticulture, which was 3.9 per cent during Ninth Plan, has increased to 4.6 per cent during the Twelfth Plan.

i. Production

5.63 India has witnessed voluminous increase in horticulture production over the

last few years. Significant progress has been made in area expansion resulting in higher production. Over the last decade, the area under horticulture grew by about 2.7 per cent per annum and annual production increased by 7.0 per cent. During 2013-14, the production of horticulture crops was about 283.5 million tonnes from an area of 24.2 million hectares. Out of the six categories e.g. Fruits, Vegetables, Flowers, Aromatic plants, Spices and Plantation Crops, the highest annual growth of 9.5 per cent is seen in fruit production during 2013-14. The production of vegetables has increased from 58,532 thousand tonnes to 1,67,058 thousand tonnes since 1991-92 to 2014-15 (3rd AE) as depicted in Figure 5.20.



Source: Department of Agriculture, Cooperation and Farmers Welfare.

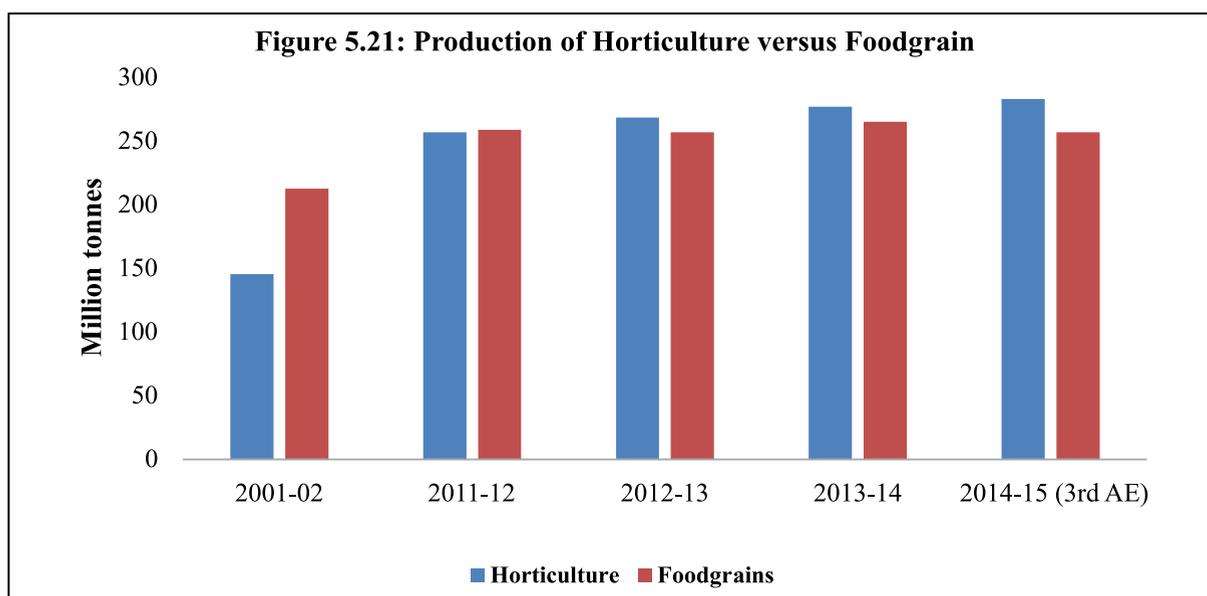
5.64 India witnessed sharper increase in acreage in horticulture crops compared to food grains over the last five years (from 2010-11 to 2014-15). The area under horticulture crops increased around 18 per cent compared to an expansion of area under food grains by 5 per cent during the stipulated period. The production of horticulture crops have outpaced the production of food grain since 2012-13, as may be seen in Figure 5.21.

ii. Mission for Integrated Development of Horticulture

5.65 The Mission for Integrated Development of Horticulture (MIDH), was launched during the Twelfth Plan with effect from 2014-15, for the holistic development of the horticulture sector covering fruits, vegetables, mushrooms, spices, flowers, aromatic plants, coconut, cashew, cocoa and bamboo. The MIDH subsumes the National Horticulture Mission (NHM), the Horticulture Mission for North East & Himalayan States (HMNEH), the National Bamboo Mission (NBM), the National Horticulture Board (NHB), the Coconut Development Board (CDB) and the Central Institute for Horticulture (CIH), Nagaland. The Government of India (GOI) contributes 85

per cent of the total outlay for developmental programmes in all the states. From 2015-16, the pattern of assistance is 60:40 between the Government of India and NHM states and 90:10 for HMNEH states. All states are covered under the MIDH. During 2014-15, a budget provision of ₹2,263.00 crore had been made for the MIDH, out of which, an amount of ₹1,584.84 crore was released for the NHM and HMNEH components.

5.66 Since the inception of the NHM, an area of 24.63 lakh ha has been covered under various horticulture crops. In addition, an area of 5.25 lakh ha of old orchards, has been rejuvenated. 12.04 lakh farmers have been trained under various horticulture activities. 2,923 nurseries have been established for supply of quality planting material to beneficiaries. Under protected cultivation practices, an area of 1.54 lakh ha has been covered. An area of 11.96 lakh ha has been covered under Integrated Pest Management (IPM)/ Integrated Nutrient Management (INM). 816 IPM infrastructures have been established. A total of 45,858 water harvesting structures have been created. To promote apiculture, 6,10,048 bee colonies, with hives have been distributed.



Source: Department of Agriculture, Cooperation and Farmers Welfare.

Under Horticulture Mechanization, 82,771 mechanical equipments including Plant Protection equipments have been distributed.

5.67 The key concerns that the horticulture sector faces in India are post-harvest wastages and losses. A study by the Central Institute of Post-Harvest Engineering and Technology (CIPHET) has calculated the wastage in various kinds of produce during 2010 and 2015. According to the study, the cumulative wastage is very high and has increased during the period of study (2010 and 2015) in most horticulture crops as can be seen in Table 5.12.

Table 5.12 Comparative Harvest and Post-Harvest losses of major crops and commodities in India

Crops	Cumulative Wastage (in percentage)	
	2010	2015
Cereals	3.9 - 6.0	4.65 - 5.99
Pulses	4.3 - 6.1	6.36 - 8.40
Oilseeds	2.8 - 10.1	5.26 - 9.96
Fruits and Vegetables	5.8 - 18.0	4.58 - 15.88
Milk	0.8	0.92
Fisheries (Inland)	6.9	5.23
Fisheries (Marine)	2.9	10.52
Meat	2.3	2.71
Poultry	3.7	6.74
Horticultural Crops		
Guava	18.0	15.8
Mango	12.7	9.2
Apple	12.3	10.4
Grapes	8.3	8.6
Papaya	7.4	7.8
Banana	6.6	6.7
Cereal Crops		
Wheat	6.0	4.9
Paddy	5.2	5.5
Bajra	4.8	5.2
Maize	4.1	4.7

Source: Ministry of Food Processing Industries.

Note: Figures in Red implies increase in cumulative wastage; Green implies reduction in cumulative wastage

5.68 The wastage occurs at all levels of the value chain-at the levels of farmer, transporter, wholesaler and retailer. Wastage and losses occur due to crop damage, improper harvesting techniques, poor packaging, poor transportation, poor handling, multiple handling, storage, grading sorting, and moisture loss at various stages of the value chain. Though there are 51,858 post-harvest infrastructures and 1,106 market infrastructures established so far in 2015-16, the cumulative wastage is very high and ranges between 5 to 20 per cent in the case of horticulture crops.

5.69 Even though the National Centre for Cold Chain Development claims that the biggest wastage happens during the transportation of horticulture products from the farm gate to mandis and thereafter, there is wastage at every post harvest stage, from the farm to the table, which needs to be minimized. Starting from the plucking, initial processing at the farm level, sorting and grading, transportation to the market, storage in the farm and subsequent levels, warehousing, which could be located near the mandis, there is loss of freshness, moisture, handling and other wastages. The answer lies in minimizing the wastage at all stages, to enable farmers to get remunerative prices, and can be done by improving practices and facilities at each stage including the transportation stage.

ALLIED SECTORS: ANIMAL HUSBANDRY, DAIRYING AND FISHERIES

5.70 The Indian agricultural system is predominantly a mixed crop-livestock farming system, with the livestock segment supplementing farm incomes by providing employment, draught animals and manure. India ranks first in milk production, accounting for 18.5 per cent of world production, achieving an annual output of 146.3 million tonnes during 2014-15 as compared to 137.69 million tonnes during 2013-14 recording a

growth of 6.26 per cent. Whereas, the Food and Agriculture Organization (FAO) has reported a 3.1 per cent increase in world milk production from 765 million tonnes in 2013 to 789 million tonnes in 2014.

5.71 The per capita availability of milk in India has increased from 176 grams per day in 1990-91 to 322 grams per day by 2014-15 (Figure 5.22). It is more than the world average of 294 grams per day during 2013. This represents a sustained growth in availability of milk and milk products for the growing population. Dairying has become an important secondary source of income for millions of rural households engaged in agriculture. The success of the dairy industry has resulted from the integrated co-operative system of milk collection, transportation, processing and distribution, conversion of the same to milk powder and products, to minimize seasonal impact on suppliers and buyers, retail distribution of milk and milk products, sharing of profits with the farmer, which are ploughed back to enhance productivity and needs to be emulated by other farm produce/ producers.

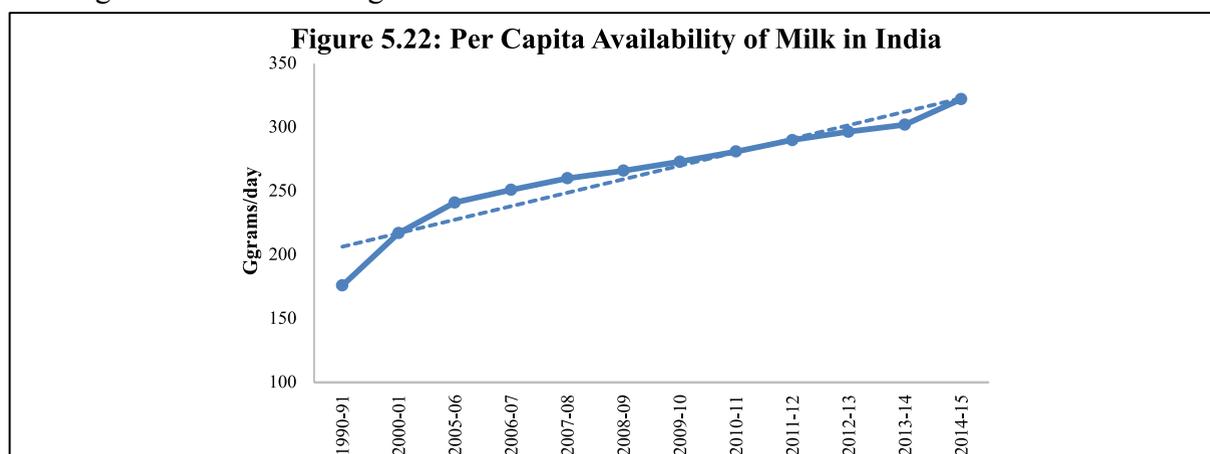
5.72 In the poultry segment, the Government's focus, besides framing suitable policies for enhancing commercial poultry production, is for strengthening the family poultry system, which addresses livelihood issues. Both egg and fish production has also registered an increasing trend over the

years (Table 5.13). Egg production was around 78.48 billion eggs in 2014-15, while poultry meat production was estimated at 3.04 MT. Fisheries constitute about 1 per cent of the GDP of the country and 5.08 per cent of agriculture GDP. The total fish production during 2014-15 was 10.16 MT, an increase of 6.18 per cent over 2013-14. Fish production during the first two quarters of 2015-16 has also shown an increasing trend and is estimated at 4.79 MT (Provisional). There is increasing significance of poultry and livestock products in the context of diversifying farm and non-farm activities in the agriculture sector to increase livelihood security.

Table 5.13: Production of Major Livestock Products and Fish

Year	Milk (Million tonnes)	Eggs (Million Nos.)	Fish (Thousand tons)
1990-91	53.9	21101	3836
2000-01	80.6	36632	5656
2006-07	102.6	50653	6869
2007-08	107.9	53583	7127
2008-09	112.2	55562	7620
2009-10	116.4	60267	7914
2010-11	121.8	63024	8400
2011-12	127.9	66450	8700
2012-13	132.4	69731	9040
2013-14	137.7	74752	9572
2014-15	146.3	78484	10164

Source: Department of Animal Husbandry, Dairying and Fisheries.



Source: Department of Animal Husbandry, Dairying and Fisheries.

5.73 For sustainable and continuous growth of the livestock sector by emulating the success achieved in the dairy and poultry sectors, across species and regions, the National Livestock Mission has been launched in 2014-15 with an approved outlay of ₹2,800 crore during the Twelfth Plan. This Mission is formulated with the objective of sustainable development of the livestock sector, focusing on improving availability of quality feed and fodder, risk coverage, effective extension, improved flow of credit, and organization of livestock farmers/rearers. Given the high contribution of protein items in inflation, the growth rate of this sector has to match the rising demand reflected in increasing share of these items in consumption expenditure.

FOOD MANAGEMENT

5.74 The main aim of food management policy is to provide food security to the population. Providing food security entails making food available at affordable prices at all times, without interruptions. In order to provide food security, in the current agriculture scenario, India has to focus on supplies which are timely and uninterrupted and affordable for the poor. Though India's GDP growth has been impressive and the agricultural production has also increased over the past few decades, hunger and starvation still persist among the poorer sections of the population. There has been moderation of inflation including food inflation during the last two years, but more needs to be achieved by freeing up markets, augmenting supply of food and leveraging the use of IT.

5.75 According to the data of the 66th round of the National Sample Survey (2009-10), the average dietary energy intake per person per day was 2147 Kcal for rural India and 2123 Kcal for urban India. As per the Report of Nutritional Intake in India, 2011-12 (NSSO, 68th round), among the bottom 5 per cent of rural population ranked by Monthly Per Capita Expenditure (MPCE), 57 per cent of

households had calorie intake below 2160 Kcal/consumer unit/day. The average protein intake per capita per day rises steadily with MPCE level in rural India from 43gm for the bottom 5 per cent of population ranked by MPCE to 91gm for the top 5 per cent, and in urban India from 44 gm for the bottom 5 per cent to about 87gm for the top 5 per cent.

5.76 The prevalence of undernourishment among the total population in India can be seen in Table 5.14. India has the second highest number of undernourished people at 194.6 million persons (FAO, State of Food Insecurity in the World, 2015), which warrants immediate attention. Moreover, with 27 per cent of the population below the poverty line, the rise in prices of food impacts the poor adversely, with a greater proportion of their household incomes being spent on food. Therefore, along with provision of food subsidy, stability in agricultural commodity prices is essential for making the poorer sections food secure.

Table 5.14: Prevalence of Undernourishment in India

Year	Number of persons undernourished (in millions)	Proportion of undernourished in total population (in per cent)
1990-92	210.1	23.7
2000-02	185.5	17.5
2005-07	233.8	20.5
2010-12	189.9	15.6
2014-16*	194.6	15.2

Source: FAO, 2015.

Note: *Provisional Estimates.

5.77 There is a strong correlation between stability in agricultural production and food security. Volatility in agricultural production impacts food supplies and can result in spikes in food prices, which adversely affect the lowest income groups of the population.

5.78 With a large number of people who remain undernourished and the issues of volatility in agricultural prices, India has

one of the largest number of food schemes in the World to ensure food security. There is entitlement feeding programmes like the Integrated Child Development Scheme (ICDS) (All Children under six, pregnant and lactating mothers) and MDMS (Mid Day Meal Schemes), food subsidy programmes like the Targeted Public Distribution System, Annapurna (10 kgs of free food grain for destitute poor) and the Employment Programmes like Mahatma Gandhi National Rural Employment Guarantee Scheme (100 days of employment at minimum wages) to ensure food security.

i. Public Distribution System and Food Subsidy

5.79 The PDS strives to ensure food security through timely and affordable distribution of foodgrains to sections of population that live below the poverty line and cannot afford to pay market prices for their food. This involves procurement of foodgrain at Minimum Support Price (MSP) by the Government, building up and maintenance of food stocks, their storage, and timely distribution, making food grains accessible at

reasonable prices to the vulnerable sections of the population. However, the system of PDS has many weaknesses leading to leakages and targeted beneficiaries being left out of the system. The procurement, off-take and the stocks maintained by the Food Corporation of India is given in Table 5.15. The PDS incurs high costs for procurement, storage and distribution of foodgrains. There is scope to increase efficiency of the PDS operations and reduce costs. Only a small proportion of the public expenditure/subsidy on PDS reaches the beneficiary. There is a case for introducing DBT for consumers of food and kerosene as is under way in Andhra Pradesh. The numerous challenges to implementing this are discussed in Vol.1 of this Economic Survey.

5.80 During 2014-15, while procurement of foodgrains (rice and wheat) increased from 56.9 million tonnes to 60.2 million tonnes, offtake of foodgrains (rice and wheat) from the PDS decreased from 59.8 million tonnes to 55.9 million tonnes (Table 5.15). This suggests that despite increased availability in the PDS and prevalence of high inflation

Table 5.15: Public Distribution System - Procurement, Offtake and Stocks

(Million tonnes)

Year	Procurement			Offtake			Stocks		
	Rice	Wheat	Total	Rice	Wheat	Total	Rice	Wheat	Total
2003-04	22.9	15.8	38.7	25.0	24.3	49.3	13.1	6.9	20.7
2004-05	24.7	16.8	41.5	23.2	18.3	41.5	13.3	4.1	18.0
2005-06	27.6	14.8	42.4	25.1	17.2	42.3	13.7	2.0	16.6
2006-07	25.1	9.2	34.3	25.1	11.7	36.8	13.2	4.7	17.9
2007-08	28.7	11.1	39.9	25.2	12.2	37.4	13.8	5.8	19.8
2008-09	34.1	22.7	56.8	24.6	14.9	39.5	21.6	13.4	35.6
2009-10	32.0	25.4	57.4	27.4	22.4	49.7	26.7	16.1	43.3
2010-11	34.2	22.5	56.7	29.9	23.1	53.0	28.8	15.4	44.3
2011-12	35.0	28.3	63.4	32.1	24.2	56.3	33.4	20.0	53.4
2012-13	34.0	38.2	72.2	32.6	33.2	65.8	35.5	24.2	59.8
2013-14	31.8	25.1	56.9	29.2	30.6	59.8	30.6	17.8	48.4
2014-15	32.2	28.0	60.2	30.7	25.2	55.9	23.8	17.2	41.0
2015-16	21.9*	28.1*	50.0*	23.3#	20.3#	43.6#	26.0@	23.8@	49.8@

Source: Department of Food and Public Distribution.

Notes: *Procurement as on 18 January 2016; #Offtake up to November, 2015; @Stock as on 1 January 2016 and stock for the previous years are as on 1 April.

Table 5.16: Percentage Distribution of Economic Cost of Rice and Wheat

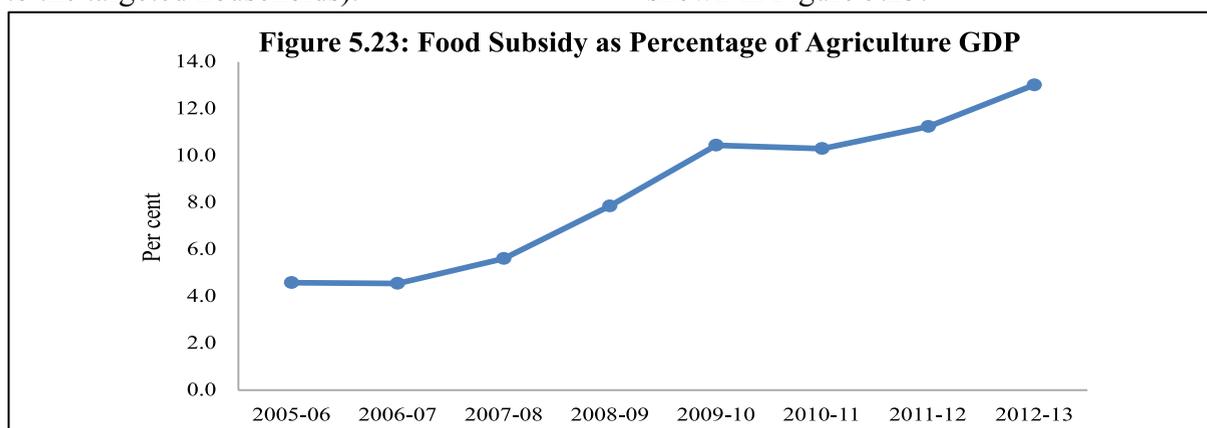
Year	2010-11	2011-12	2012-13	2013-14	2014-15 (UA)	2015-16 (RE)	2015-16 (BE)
Rice							
Pooled cost of grain	72.9	71.2	70.9	66.6	64.2	63.5	62.7
Procurement incidentals	15.8	16.5	16.6	15.0	16.9	16.4	16.3
Distribution cost	11.3	12.3	12.5	18.4	18.9	20.1	21.0
Economic cost (Total Cost)	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Wheat							
Pooled cost of grain	71.2	7.5	69.6	67.4	62.9	66.8	65.5
Procurement incidentals	14.2	14.8	15.0	17.7	20.2	15.9	16.6
Distribution cost	14.6	15.1	15.4	14.9	16.9	17.2	17.9
Economic cost (Total Cost)	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Food Corporation of India. UA: Unaudited; RE: Revised Estimates; BE: Budget Estimates.

in foodgrains, dependence on the PDS is reducing, suggesting that there may be issues of availability, timely availability and quality of the PDS foodgrains.

5.81 The percentage distribution of the economic cost of wheat and rice is given in Table 5.16. The pooled cost of grain (MSP and bonus) accounts for two-thirds of the economic cost of wheat and rice. The economic cost of foodgrains to the Food Corporation of India (FCI) has been increasing over the years. As the cost of production of crops is rising on account of labour costs, costs of inputs like fertilizers and commensurately the MSPs are also increasing. The increase in the food subsidy bill is determined by the rate at which the MSPs for wheat and rice increase and the economic cost of handling grains (their procurement, stocking and distribution to the targeted households).

5.82 The procurement incidentals of wheat and rice consist of costs related to mandi charges and taxes, cost of gunny bags, arhatiya commission, mandi labour, forwarding charges, internal movement, storage charges, interest, administrative charges and others. Out of these costs, mandi charges and taxes constitute more than 40 per cent of the total costs. According to the Commission for Agricultural Costs and Prices (CACP) report, the increasing economic costs of handling foodgrains through procurement, distribution and storage, large procurement in recent years and the widening gap between the economic cost of foodgrains and the central issue price have been the major factors leading to the ballooning food subsidy. The increasing food subsidy bill is shown in Table 5.17. Food subsidy as a percentage of agriculture GDP is shown in Figure 5.23.



Source: Department of Food and Public Distribution.

Table 5.17: Food Subsidy in India

Year	Food subsidy (₹ in crore)
2005-06	23071.00
2006-07	23827.59
2007-08	31259.68
2008-09	43668.08
2009-10	58242.45
2010-11	62929.56
2011-12	72370.90
2012-13	84554.00
2013-14	89740.02
2014-15	113171.16
2015-16*	105509.41

Source: Department of Food and Public Distribution.

Notes: *Figures as on 6 January 2016.

5.83 PDS costs are high and increasing with leakages, high administrative costs, corruption and mismanagement. The costs including opportunity costs of resources diverted for subsidy are high in terms of the public investments in agriculture which are foregone and which can improve productivity. Additionally, subsidies bring distortions in the market and also pose a heavy burden on the government budget, especially during times when domestic or international prices are on the rise, when the Government has to resort to raising the MSPs of crops on a regular basis.

AGRI-MARKETING REFORMS

i. National Agriculture Market through Agri-Tech Infrastructure Fund

5.84 Following the Budget announcements in July 2014 and 2015, the scheme for setting up of a National Agriculture Market (NAM) through an Agri-Tech Infrastructure Fund (ATIF) was approved by the Cabinet Committee on Economic Affairs (CCEA) on 1 July 2015 with a budget of ₹200 crore, to be implemented during 2015-16 to 2017-18.

5.85 The revised scheme envisages implementation of NAM by setting up of an appropriate common e-market platform that would be deployable in selected regulated wholesale markets in States/Union Territories (UT) desirous of joining the e-platform. The Small Farmers Agribusiness

Consortium (SFAC) will implement the national e-platform and will cover 250, 200 and 135 mandis during 2015-16, 2016-17 and 2017-18 respectively. The Department of Agriculture, Cooperation & Farmers Welfare (DAC&FW) will meet expenses on software and its customization for the States and provide it free of cost to the States and UTs. The DAC&FW will also give grant as one-time fixed cost subject to a ceiling of ₹30 lakhs per mandi for related equipment/infrastructure in 585 regulated mandis, for installation of the e-market platform.

5.86 Integration of state Agricultural Produce Market Committees (APMC) with NAM requires certain pre-requisites in the State AMPC Acts, namely- (i) a single license to be valid across the State, (ii) single point levy of market fee and (iii) provision for electronic auction as a mode for price discovery. Only those States/UTs that have completed these three pre-requisites will be eligible for assistance under the scheme.

5.87 Proposals from States for integration of their Mandis from Gujarat (40 Mandis), Maharashtra (30 Mandis), Telangana (44 Mandis), Jharkhand (19 Mandis), Chhattisgarh (5 Mandis), Madhya Pradesh (50 Mandis), Rajasthan (25 Mandis) & UT of Chandigarh (1 Mandi) have been approved so far. The implementation of these and their impact in equalizing prices needs to be monitored.

5.88 Meanwhile, other States/UTs like Andhra Pradesh, Uttar Pradesh, Karnataka, Uttarakhand, Punjab, Odisha, Tamil Nadu, Puducherry, Haryana, Andaman and Nicobar Islands, Assam, Manipur, Arunachal Pradesh, Nagaland and Mizoram have also expressed their willingness to join the NAM and have proposed integration of 644 mandis at this stage. Detailed Project Reports (DPRs) for integration of mandis with NAM including for setting up Soil Testing Laboratories are awaited from the States. Meanwhile, the DAC&FW is also pursuing other State Governments to complete the pre-requisite

reforms in their APMC Acts which will enable them to join NAM.

ii. Price Policy for Agricultural Produce

5.89 The government decides on the support prices for various agricultural commodities,

taking into account the recommendations of CACP, the views of state governments and Ministries/Departments concerned and other relevant factors. There has been steady increase in the MSP of crops over the years since 2011-12 (Table 5.18).

Table 5.18: Minimum Support Prices (Crop Year) of Major Crops (₹/Quintal)

Commodity	2011-12	2012-13	2013-14	2014-15	2015-16	(#) increase in MSP 2015-16 over 2014-15
KHARIF CROPS						
Paddy (Common)	1080	1250	1310	1360	1410	50(3.7)
Paddy (Grade 'A')	1110	1280	1345	1400	1450	50(3.6)
Jowar (Hybrid)	980	1500	1500	1530	1570	40(2.6)
Jowar (Maldandi)	1000	1520	1520	1550	1590	40(2.6)
Bajra	980	1175	1250	1250	1275	25(2.0)
Maize	980	1175	1310	1310	1325	15(1.1)
Ragi	1050	1500	1500	1550	1650	100(6.5)
Arhar(tur)	3200 [¶]	3850	4300	4350	4425 [^]	75(1.7)
Moong	3500 [¶]	4400	4500	4600	4650 [^]	50(1.1)
Urad	3300 [¶]	4300	4300	4350	4425 [^]	75(1.7)
Cotton (Medium Staple)	2800 ^a	3600	3700	3750	3800	50(1.3)
Cotton (Long Staple)	3300 ^{aa}	3900	4000	4050	4100	50(1.2)
Groundnut in Shell	2700	3700	4000	4000	4030	30(0.8)
Sunflower Seed	2800	3700	3700	3750	3800	50(1.3)
Soyabean (Black)	1650	2200	2500	2500	-	-
Soyabean (Yellow)	1690	2240	2560	2560	2600 ^{\$\$}	40(1.6)
Sesamum	3400	4200	4500	4600	4700	100(2.2)
Nigerseed	2900	3500	3500	3600	3650	50(1.4)
RABI CROPS						
Wheat	1285	1350	1400	1450	1525	75(5.2)
Barley	980	980	1100	1150	1225	75(6.5)
Gram	2800	3000	3100	3175	3425 ^{**}	250(7.9)
Masur (Lentil)	2800	2900	2950	3075	3325 ^{**}	250(8.1)
Rapeseed/Mustard	2500	3000	3050	3100	3350	250(8.0)
Safflower	2500	2800	3000	3050	3300	250(8.2)
Toria	2425	2970	3020	3020	-	-
OTHER CROPS						
Copra (Milling) [@]	4525	5100	5250	5250	5550	300(5.7)
Copra (Ball) [@]	4775	5350	5500	5500	5830	330(6.0)
De-husked Coconut [@]	1200	1400	1425	1425	1500	75(5.3)
Jute	1675	2200	2300	2400	2700	300(12.5)
Sugarcane*	145	170	210	220	230	10(4.5)

Source: DAC&FW.

Notes: # Figures in brackets indicate percentage increase. *Fair and remunerative price.

¶ Additional incentive at the rate of Rs. 500 per quintal of tur, urad and moong sold to procurement agencies was payable during the harvest/arrival period of two months.

^a Staple length (mm) of 24.5 - 25.5 and Micronaire value of 4.3 - 5.1

^{aa} Staple length (mm) of 29.5 - 30.5 and Micronaire value of 3.5 - 4.3

[^] Bonus of Rs. 200 per quintal is payable over and above the Minimum Support Price.

^{\$\$} Single Minimum Support Price has been fixed irrespective of the variety.

^{**} Bonus of Rs. 75 per quintal is payable over and above the Minimum Support Price.

[@] Calender Year

Trade Policy

5.90 The agriculture sector is critical for achieving the objectives of food security and price stability. Therefore, tariff protection and support accorded to this sector remains higher than that of manufacturing and services sectors. The average tariff protection for agriculture (36.4 per cent) is substantially higher than that for non-agricultural products (9.5 per cent). India has adopted a trade policy vis-à-vis agricultural commodities, which is responsive to the changing domestic situation of crop production, demand, supply and most importantly retail prices. The Basic Customs Duty (BCD) of agricultural products is, therefore, subject to frequent revisions, including their reductions or removals depending on the domestic conditions, purportedly to protect farmers and agriculture linked value added industries.

5.91 During 2015, the import duty on sugar was increased from 25 per cent to 40 per cent, while that of crude and refined edible oils has been raised from 7.5 per cent to 12.5 per cent and 15 per cent to 20 per cent respectively in November 2015. Further, import duty on wheat was first raised from 'zero' to 10 per cent in August 2015 and from 10 per cent to 25 per cent in October 2015.

5.92 The following policy changes were made in the last few years to benefit farmers and to incentivize the development of the agro-processing sector, and enhance farm productivity:

- Export of edible oils in branded consumer packs of upto 5 kg was permitted with a minimum export price of US\$900 per MT. vide the Directorate General of Foreign Trade's (DGFT) Notification dated 30 April, 2014.
- Export of rice bran oil was permitted vide DGFT's Notification dated 6 April, 2015.
- Export of Kabuli Chana and 10,000 MTs of organic pulses per annum have been allowed.

- Since 2011, export of rice and wheat has been permitted.
- Since February 2013, processed and/or value-added agricultural products were exempted from export restrictions/bans even if their base produce is subject to an export ban.
- Export of cotton is free without any restrictions.

5.93 Frequent changes in the policy parameters/goal posts of trade in agricultural products in the form of changes in import duties and minimum export prices, etc., create instability of policy for any investment in the agro-processing industry. These changes in policy parameters have limited impact on the price the consumer pays, because of the time taken to arrive at the decision and the same translating into additional/ reduced supplies. It certainly does not impact the farmer who has received his remuneration based on the price prevailing at the time the produce leaves the farm gate. High prices of commodities in a particular year do not translate into benefits to the farmer in the same year, but create expectations, possibly not rational, of the same in the next year, enhancing cropped area in the next year/cropping season, leading to oversupply and reduction in prices and so incomes. The entire activity of changes in the policy parameters vitiates the concept of a market and needs to be discontinued.

5.94 The Union Cabinet gave its ex-post facto approval for the approach adopted by India at the Tenth Ministerial Conference of the WTO held in Nairobi, Kenya during 15-19 December 2015. The outcomes of the Conference, referred to as the 'Nairobi Package' include Ministerial Decisions on agriculture, cotton and issues related to Least Developed Countries (LDCs). These cover a Special Safeguard Mechanism (SSM) for developing countries, public stockholding for food security purposes, a commitment to abolish export subsidies for farm exports and

measures related to cotton. Decisions were also made regarding preferential treatment to LDCs in the area of services and the criteria for determining whether exports from LDCs may benefit from trade preferences (refer Chapter 4 for details on ‘Nairobi Package’).

India’s Agriculture Trade

5.95 India has emerged as a significant agri-exporter in a few crops, namely cotton, rice, meat, oil meals, spice, guar gum meal and sugar. As per the WTO’s Trade Statistics, the share of India’s agricultural exports and imports in the world trade in 2014 were 2.46 per cent and 1.46 per cent respectively. Agricultural exports as a percentage of agricultural GDP increased from 7.95 per cent in 2009-10 to 12.08 per cent in 2014-15. During the same period, agricultural imports as a percentage of agricultural GDP also increased from 4.90 per cent to 5.82 per cent.

The Way Forward

5.96 There is need to increase agricultural output through productivity increases by investing in water-efficient irrigation to achieve ‘*more crop per drop*’, along with effective use of other inputs like fertilizers, quality seeds and pesticides. There is tremendous potential to increase availability of agricultural produce by reducing wastages. Increasing the share of processing can be done by increasing reliance on markets, rationalizing and targeting subsidy, as well as disbursing it through DBT. There is a need to rationalize fertilizer subsidy in an input, crop and region neutral format and to minimize

diversions. The disbursement of subsidy on fertilizers should shift to DBT (direct benefit transfer), benefits of which (DBT) will be maximized, if all controls (including on imports) on the fertilizer industry/outputs are lifted simultaneously.

5.97 The problem of availability of credit has to be addressed on several fronts. In respect of high interest rates, the system of DBT may be considered to replace subvention of interest rates. The intermediation and refinance model to promote agricultural credit needs to be revisited and replaced with DBT that shall subsidize the interest paid by the farmer, in place of the present subsidized refinance to financial institutions.

5.98 The success of the dairy industry has resulted from the integrated co-operative system of milk collection, transportation, processing and distribution, conversion of the same to value added products, to minimize seasonal impact on suppliers and buyers, retail distribution of milk and milk products, sharing of profits with the farmer, which are ploughed back to enhance productivity and needs to be emulated by other farm produce/producers.

5.99 There is a case for replacing the present system of MSP/procurement based PDS with DBT and freeing the market of all controls on domestic movement and import. The entire activity of changes in the policy parameters vitiates the concept of a market and needs to be discontinued to enhance productivity in agriculture.