

Agriculture and Food Management

“Agriculture not only gives riches to a nation, but the only riches she can call her own.”

– Samuel Johnson

The dual economy model of Sir Arthur Lewis explores the inter relationship between the agriculture and industrial sectors during the process of economic development of a country. Lewis model shows that economic development always entails movement of labour from agriculture sector to the more productive industrial sector and the agriculture sector becomes over time a less important part of the economy in terms of its share of GDP. However, the dual economy model does not undermine the significance of agriculture sector in developing economies. Development must happen along with rapid productivity growth in agriculture, ensuring rising farm incomes and adequate food supplies for the people.

INTRODUCTION

7.1 In India's growth story, there are reasons to focus attention on agriculture and allied sector, which will continue to play a significant role in providing employment and sustainable livelihoods for the growing population in India. However, the agriculture sector is characterised by instability in incomes owing to various types of risks related to production, markets and prices.

OVERVIEW OF AGRICULTURE AND ALLIED SECTORS

7.2 In the recent past, growth rates of agriculture have been fluctuating at 1.5 per cent in 2012-13, 5.6 per cent in 2013-14, (-) 0.2 per cent in 2014-15, 0.7 per cent in 2015-16 and 4.9 per cent in 2016-17 (PE). The uncertainties in growth of agriculture are explained by the fact that shocks

emanate mainly from deficiency in rainfall since 55 per cent of agriculture in India is rainfall dependent and there have been two consecutive years of less than normal rainfall in 2014-15 and 2015-16.

Area, Production and Yield

7.3 As a result of good monsoon during 2016-17, area sown under most crops increased in 2016-17. The largest increase was recorded under pulses which is around 43.66 lakh hectares (around 17.5 percent) more over 2015-16. The area coverage under tur, gram, urad and moong increased by around 36 per cent, 14 per cent, 24 per cent and 12 per cent respectively, over 2015-16. The area coverage under wheat and coarse cereals also increased by 2.97 lakh hectares to 307.15 lakh hectares and by 2.94 lakh hectares to 246.83 lakh hectares in 2016-17 compared to 2015-16 respectively. However,

**Table 1. Agriculture Sector –Key indicators
(per cent change at constant 2011-12 prices)**

Item	2012-13	2013-14	2014-15	2015-16	2016-17 (PE)
Growth in GVA in Agriculture & Allied Sectors #	1.5	5.6	-0.2	0.7	4.9
Share of Agriculture & Allied Sectors in total GVA at current prices #	18.2	18.6	18.0	17.5	17.4
Share of Agriculture & Allied Sectors in total Gross Capital Formation *	7.6	8.5	7.8	6.9	n.a.
Share of Crops*	6.4	7.1	6.4	5.7	n.a.
Share of Livestock*	0.7	0.8	0.8	0.7	n.a.
Share of Forestry and logging*	0.1	0.1	0.1	0.1	n.a.
Share of Fishing *	0.4	0.4	0.5	0.5	n.a.

Source: Central Statistics Office

Note: * in GVA of Agriculture and allied sectors; Calculations have been based on National Accounts Statistics, First Revised Estimates, 31st January 2017

Based on provisional estimates released on 31st May, 2017

there was a decline in the area under rice by 5.77 lakh hectares in 2016-17 as compared to the previous year.

7.4 As per the third Advance Estimates released on 9th May, 2017, (http://eands.dacnet.nic.in/Advance_Estimate/3rd_Adv_Estimates_2016-17_Eng.pdf) foodgrains production during 2016-17 is estimated at 273.38 million tonnes compared to 251.57 million tonnes during 2015-16. The total production of rice and wheat during 2016-17 is estimated at 109.2 million tonnes and 97.4 million tonnes respectively compared to 104.4 million tonnes (rice) and 92.3 million tonnes (wheat) in 2015-16. The production of pulses during 2016-17 is estimated at 22.4 million tonnes, sugarcane at 306.0 million tonnes, oilseeds at 32.5 million tonnes and cotton at 32.6 million bales of 170 kgs each. The percentage change in the yield of various crops in 2016-17 over 2015-16 shows an increase in all crops, except groundnut and sugarcane. The details of area, production and yield of different crops during 2016-17 are at Table 2 & Table 3.

7.5 The average yield of major crops has shown relatively higher growth over the decades in 1970-71 to 1990-91 (Table 3). The average yield of pulses registered negative growth rate during 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. The percentage change in average yields has been fluctuating as can be seen in Figure 1.

GROSS CAPITAL FORMATION IN AGRICULTURE AND ALLIED SECTOR

7.6 As per the Second Advance Estimates of National Income, released on 28th February 2017, growth in GVA in Agriculture & Allied Sectors (at 2011-12 prices) was 4.4 per cent in 2016-17. As per Provisional Estimates, it is 4.9 per cent in 2016-17 (as on 31.05.2017). The Gross Capital Formation (GCF) in Agriculture and Allied Sectors relative to GVA in this sector has been fluctuating from 16.6 per cent in 2012-13 to 16.3 per cent in 2015-16. The Gross

Table 2. Area, Production and Yield (2016-17*)

Group/ Commodity	Area (Million ha)	Percentage change (as compared to 2015-16)	Production (Million tonnes)	Percentage change (as compared to 2015-16)	Yield (kg/ha)	Percentage change (as compared to 2015-16)
Foodgrains ^a	127.6	3.55	273.38	8.67	2142	4.94
Rice	42.9	-1.33	109.15	4.54	2543	5.95
Wheat	30.7	0.98	97.44	5.58	3172	4.56
Jowar	5.1	-15.59	4.74	11.85	924	32.51
Maize	9.8	10.79	26.14	15.83	2679	4.55
Bajra	7.5	4.78	9.86	22.18	1319	16.60
Pulses	29.3	17.52	22.40	37.03	765	16.59
Gram	9.5	13.57	9.08	28.59	951	13.22
Tur	5.4	35.92	4.60	79.57	854	32.11
Oilseeds	26.5	1.45	32.52	28.80	1229	26.95
Groundnut	5.3	15.21	7.65	13.62	1445	-1.38
Rapeseed and Mustard	6.2	8.38	7.98	17.36	1281	8.29
Cotton ^b	10.8	-12.14	32.58	8.57	513	23.57
Sugarcane	4.5	-8.62	306.03	-12.17	68#	-3.89

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

Note: *Third Advance Estimates; # tonnes/ha, 'a' Includes cereals and pulses; 'b' Million Bales of 170 kg each

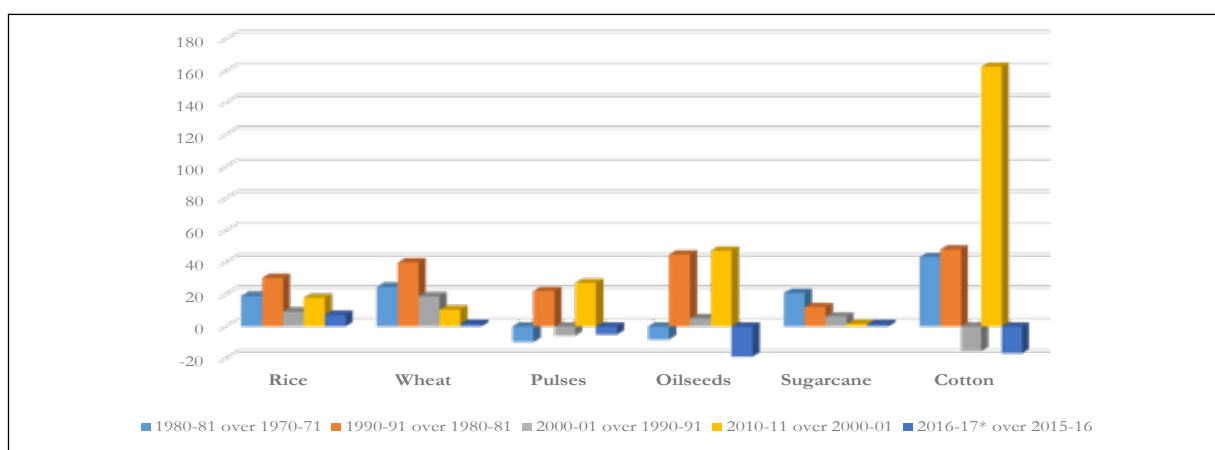
Table 3. Average Yields of Major Crops in India (kg/ha)

Crops	1970-71	1980-81	1990-91	2000-01	2010-11	2015-16	2016-17*
Rice	1123	1336	1740	1901	2239	2400	2543
Wheat	1307	1630	2281	2708	2989	3034	3172
Pulses	524	473	578	544	691	656	765
Oilseeds	579	532	771	810	1193	968	1229
Sugarcane (tonnes/ha)	48	58	65	69	70	71	68
Cotton	106	152	225	190	499	415	513

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

Note: *Third Advance Estimates.

Figure 1. Percentage Change in Average Yields of major crops



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

Capital Formation (GCF) in agriculture as a proportion to the total GCF declined from 7.8 per cent in 2014-2015 to 6.9 per cent in 2015-16 at 2011-12 prices. As per the First Revised Estimates, the percentage share of GCF in agriculture & allied sector to GVA has also shown a declining trend from 17.3 per cent in 2014-2015 to 16.3 per cent in 2015-16 at 2011-12 prices (Table 4)

PATTERN OF AGRICULTURAL LANDHOLDINGS

7.7 The average farm size in India is small (1.15 ha) and has shown a steady declining

trend since 1970-71. The small and marginal land holdings (less than 2.0 ha) account for 72 percent of land holdings (Figure 2).

The predominance of small operational holdings is a major limitation to economies of scale in agriculture operations. Further, the small and marginal farmers have low bargaining power, since they have very little marketable surplus and are price takers in a market. The pre dominance of small operational holdings is a major limitation to reap the benefits of economies of scale in agriculture operations.

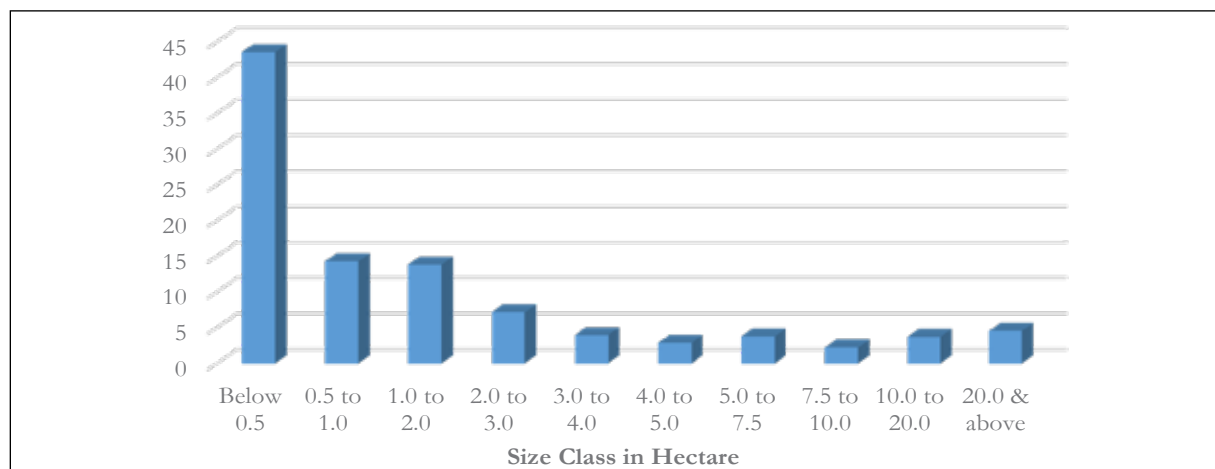
Table 4. GCF in Agriculture sector

Period	GCF in Agriculture & Allied Sectors (in ₹ Crore)			GVA in Agriculture & Allied Sectors (in ₹ Crore)	GCF in Agriculture & Allied Sectors as percentage of GVA of Agriculture & Allied Sectors		
	Public	Private	Total		Public	Private	Total
2011-12	35715	238717	274432	1501816	2.4	15.9	18.3
2012-13	36077	217201	253279	1524398	2.4	14.2	16.6
2013-14	33882	250252	284134	1609061	2.1	15.6	17.7
2014-15	36725	240711	277436	1604259	2.3	15.0	17.3
2015-16*	44852	218295	263147	1616461	2.8	13.5	16.3

Source: Central Statistics Office (CSO), M/o Statistics & Programme Implementation

*As per First Revised Estimates of National Income, Consumption Expenditure, Saving and Capital Formation 2015-16 (latest available) released on 31st January 2017

Figure 2. Percentage of Agricultural land holdings by size class



Source: DAC & FW, Agriculture Census 2010-11

PROFILE OF AGRICULTURAL HOUSEHOLDS

7.8 The median agricultural incomes (as measured by income from cultivation, net of cost and unsold produce valued at local market rates) at about ₹19,250 in 2012-13 or about ₹1600 per month, are still meagre (NSS, 2012-13).

Pattern of expenditure on productive assets by agricultural households

7.9 The percentage of monthly average household expenditure on productive assets shows that among the households that possess less than 0.4 hectares of land, almost 50 per cent of average expenditure is incurred on livestock and poultry (Table 5).

The marginal farmers as part of their income diversification strategy have productive assets like livestock and poultry. In a mixed (crop-livestock) farming production system, livestock can supplement incomes, provide replacement for manual labour, supplement nutritional needs and can also be used as collateral in times of financial distress.

Indebtedness among cultivator households

7.10 The indebtedness of households is an indicator of their vulnerabilities to shocks, poverty and economic insecurity. The data on indebtedness of cultivator households in India (Table 6) reflects the lack of economic security. The distribution of total rural household debts between the two categories

Table 5. Distribution of monthly average expenditure incurred on productive assets used for farm and non-farm business (in per cent)

Size class of land possessed (in hectares)	Farm business			Total	Non-farm business
	Livestock and poultry	Agricultural machinery and implements	Other productive assets		
<0.01	66.8	5.6	6.5	79.2	20.8
0.01-0.40	48.3	13.1	19.9	81.5	18.5
0.41-1.00	15.8	41.4	36.1	93.3	6.7
1.01-2.00	11.1	16.3	66.3	93.6	6.3
2.01-4.00	21.4	45.6	28.7	95.8	4.2
4.01-10.00	14.9	56.6	26.2	97.6	2.4
10.00+	6.0	45.8	46.4	98.2	1.8
All size	18.2	32.8	42.0	93.2	6.8

Source: NSS Report No. 576, Income, Expenditure, Productive Assets and Indebtedness of Agricultural Households in India, July 2012-June 2013

Table 6. Incidence of Indebtedness (IOI) and percentage share of outstanding debt by occupational categories of the households in recent rounds of AIDIS (1991, 2002 and 2012)

Year	Rural			
	Cultivator		Non-cultivator	
	IOI (%)	% of debt to total debt	IOI (%)	% of debt to total debt
1991	25.9	79.5	18.5	20.5
2002	29.7	73.3	21.8	26.7
2012	35.0	73.6	25.6	26.4

Source: NSS Report No.577, Household Indebtedness in India- All India Debt and Investment Survey

of households in the rural sector, namely, cultivators and non-cultivators, shows that 74 percent of the total debt in 2012 was accounted for by the cultivator households, declining from 80 percent in 1991. However, the percentage of cultivator households indebted increased to 35 per cent in 2012 from 26 percent in 1991 and is a cause for concern.

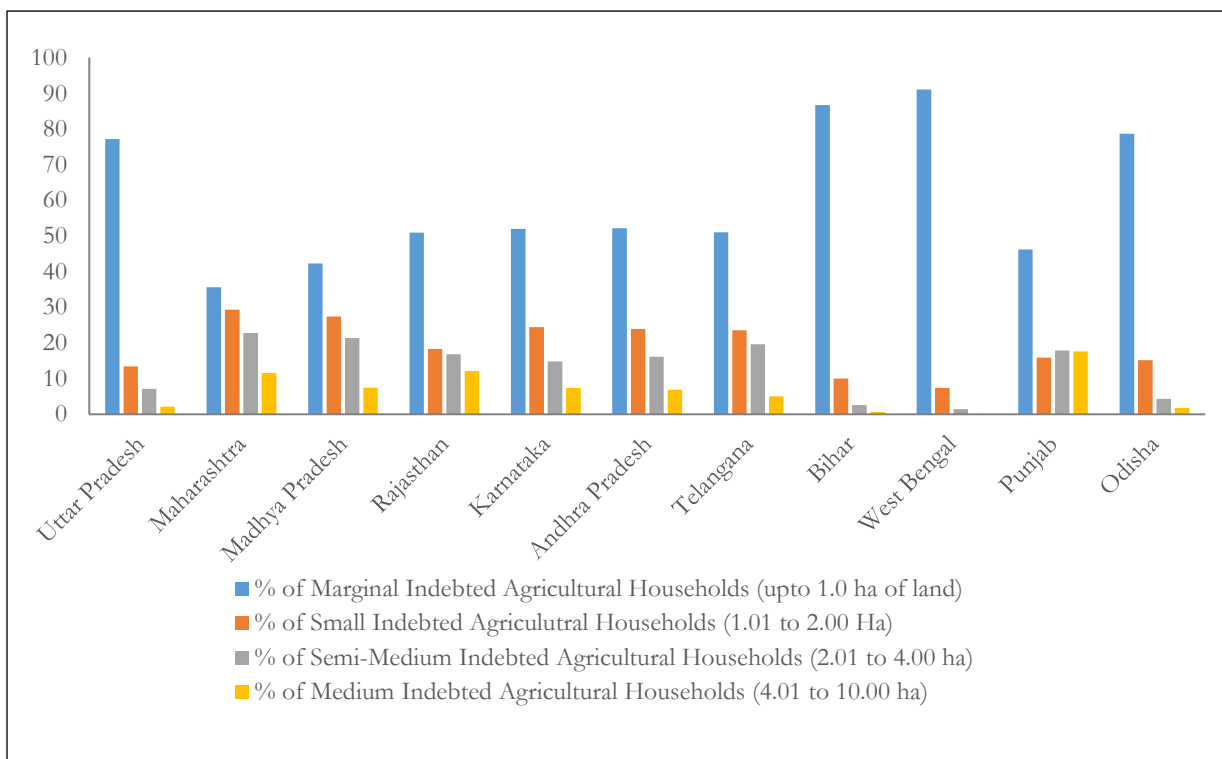
7.11 Further, the State level analysis of indebtedness among agricultural households based on the size of land holding possessed shows an inverse relationship between indebtedness and the size of land holding possessed by the agricultural households. In the States of Bihar and West Bengal, more than 80 percent of agricultural households with marginal land holdings are indebted. Indebtedness is lowest among the agricultural households with large size land holdings in all the States, as can be seen at Figure 3.

7.12 The pattern of agricultural holdings and the profile of agricultural households in India indicate that there is dominance of small farmers/small farm holdings in the agriculture sector, who are highly indebted and are vulnerable to shocks and poverty. In such a scenario, it is imperative to assess the various types of risks that farmers face in agriculture and suggest ways to reduce and mitigate risks to make agriculture an economic activity which will provide stable and sustainable incomes to the small farmers. The next section examines the various types of risks in agriculture.

RISKS IN AGRICULTURE

7.13 Agriculture, like other economic activity entails risks. Managing and reducing the risks in agriculture activities can increase the incomes, profitability, and ensure stable

Figure 3. Incidence of Indebtedness (Percentage of agricultural households) based on size of land possessed by agricultural households in select States and All India



Source: NSS Report No. 576, 2013

income flows to the farmers. In order to manage and reduce risks, there is need to analyze, categorize and address them. There are risks related to production owing to issues of inputs such as water management, market and price risks like sudden fall in prices due to bumper crop, as in the case of pulses last year, which are examined in the following section. The taxonomy of risks in agriculture is shown in Table 7.

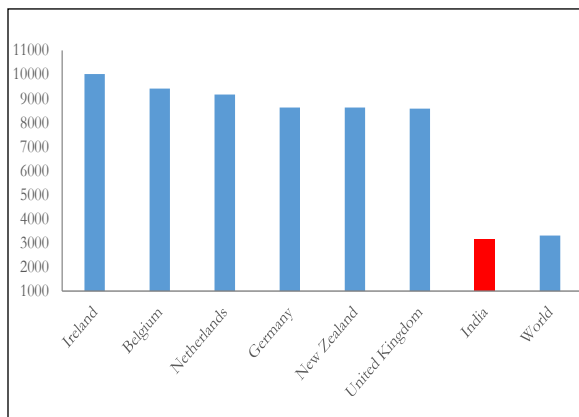
i. Production risks

7.14 The agriculture production is determined by factors like irrigation, availability of quality seeds and use/ overuse of fertilisers. The yield per hectare of wheat in India is less than the world average and less than one-third of the best performing nation, suggesting scope for significant improvement as a means to increase income of wheat farmers (Figure 4).

Table 7. Taxonomy of risks in agriculture

Type of Risks	Causes	Reasons for Severity	Suggested Solutions
Production risks	Pests, Diseases, Shortage of inputs like seeds/ irrigation	Low productivity, declining yield	Pest and disease resistant seeds, Free markets for inputs, Set and enforce standards for quality seeds
Weather and Disaster related risks	High share of rainfed agriculture, Low irrigation coverage, drought, flooding, hailstorm and unseasonal rains	Production loss, Lower than potential production	Increase share of irrigated agriculture, Restore and expand irrigation, especially small projects, Adopt outcome measure of performance such as level of water table, water management
Price risks	Lower than remunerative price	Absence of marketing infrastructure, Presence of and excessive profiteering by middlemen	Build marketing infrastructure along the value chain, Regime based on selective timely interventions
Credit risks	Predominance of informal sources of credit, money lenders, Lack of capital for short term and long term loans	Absence of stable incomes/ profits lead to defaults/ indebtedness	Increase availability of formal credit and institutional credit to farmers
Market risks	Changes in demand/ supply domestic or international	Loses market/ market share	Allow long term contracts for purchase on pre-determined prices, Start direct purchase from farmers by exempting Government purchases by PSU, Defence, Paramilitary etc.
Policy risks	Uncertain policies, regulations	Impact of Government policies, APMC Act and other regulations	Trade or policy changes to be announced well before sowing and to stay till arrivals and procurement is over

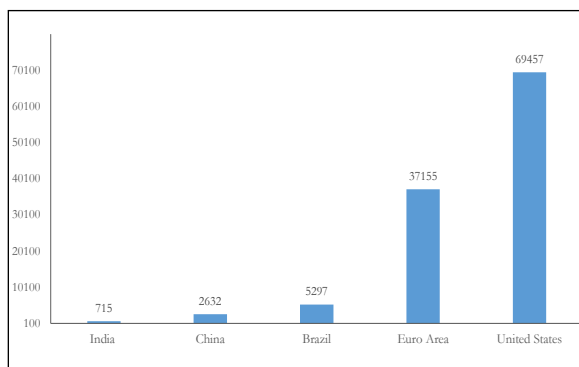
Figure 4. Comparison of Yields of Wheat (kg. /hectare)



Source: FAO Statistics

7.15 The overall agricultural labour productivity of India in terms of GVA per worker is less than a third of that in China and about 1 percent of that in the frontier countries (Figure 5).

Figure 5. Overall Agricultural Productivity: Still Very Far From Frontier (GVA per worker USD, 2005 prices)



Source: Food and Agriculture Organisation

Declining response ratio of inputs like fertilisers

7.16 The soil health is adversely impacted by the indiscriminate use of chemical fertilisers. The lower pricing of fertilisers by government has resulted in farmers resorting to larger use of fertilisers like urea. The skewed distribution of fertilizer subsidy, pricing policies, and the resultant imbalances in the use of fertilizer, require corrective measures to retain soil fertility. Towards

addressing these issues, the soil health cards initiative and the Direct Benefit Transfer (DBT) on fertilizer have been introduced on a pilot basis in selected districts, which are steps in the direction to correct distortions.

Skewed availability of certified quality seeds

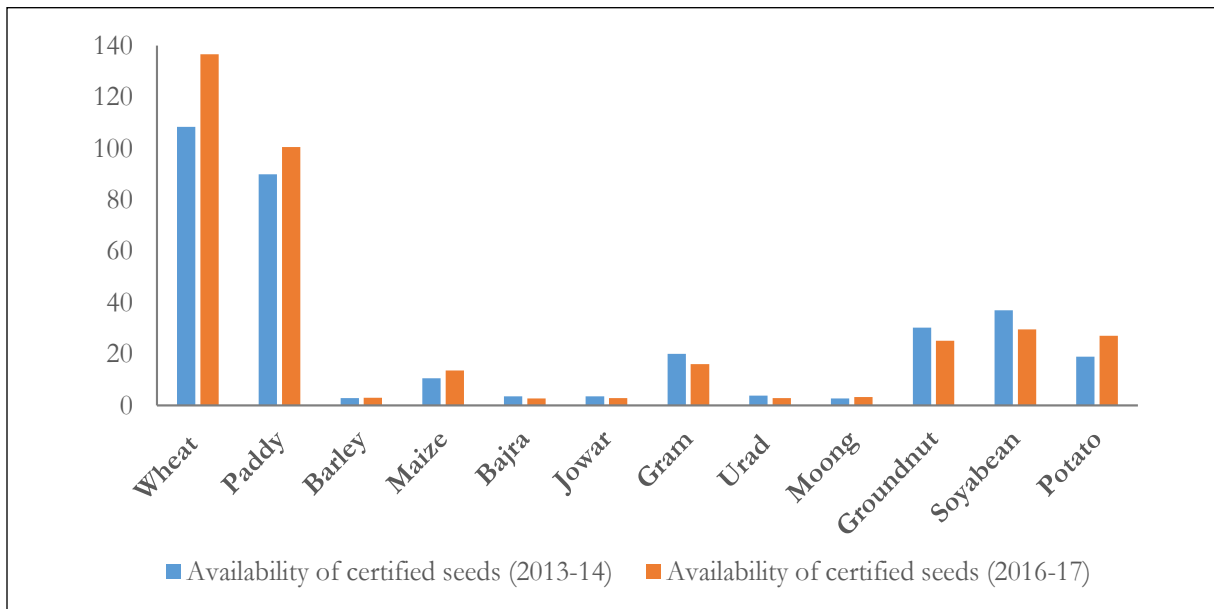
7.17 The availability of quality seeds is critical for higher productivity and yield in agriculture. The availability of quality seeds in the country has increased from less than 40 lakh quintals during the decade of 60s to 380.29 lakh quintals in 2016-17. The crop wise availability of certified seeds may be seen at Figure 6. The availability of pulses' certified/quality seeds for kharif 2017 is 10,53,814 quintals, an increase of 18.06 per cent more than that of kharif 2016.

ii. Weather related environmental risks and water stress

7.18 Water is the most critical input for agriculture and the risks associated with agriculture are directly proportional to water stress. In a scenario of water stress, cultivation of water intensive crops like sugarcane/cereal/grain need to be replaced by less water intensive crops like pulses and vegetables and shifting of water intensive crops to less water-stressed regions. The cost based water pricing can help to correct water stress and increase availability of water.

7.19 The water use efficiency in conventional irrigation ranges from 30 per cent to 50 percent against 80 per cent to 95 percent in the case of Micro Irrigation (MI) including drip irrigation. With MI system, irrigation costs across States have reduced by about 30 per cent and in case of fertilizer use, the saving is about 28 per cent in consumption in the surveyed states (PMKSY, 2015-pmksy.gov.in/microirrigation/Archive/August2015.pdf).

Figure 6. Crop wise Availability of Certified Seeds (in lakh quintals)

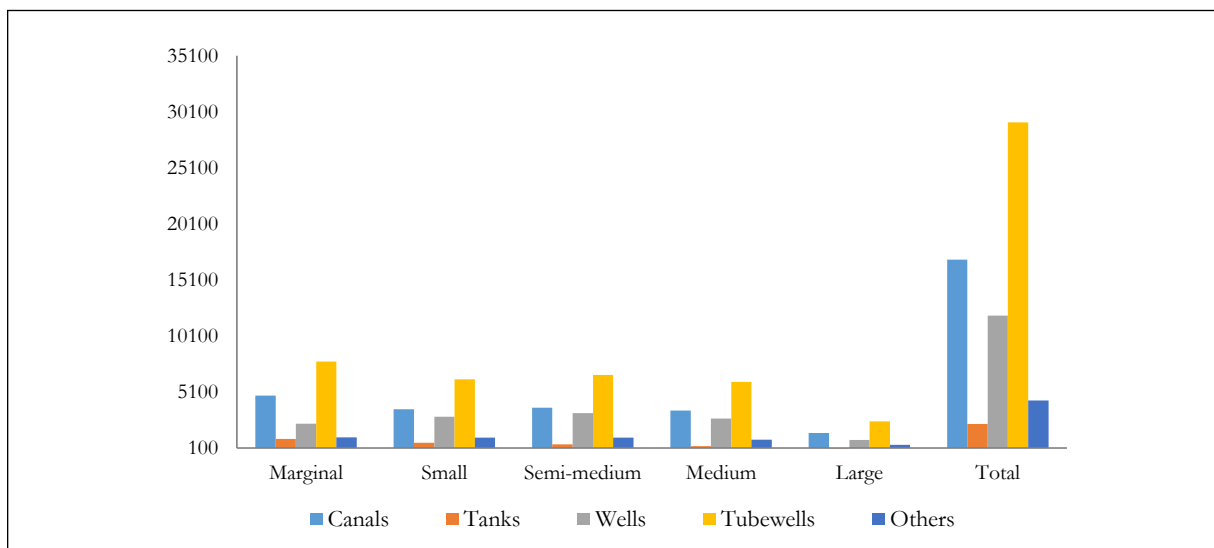


Source: Directorate of Economics & Statistics, Department of Agriculture, Cooperation and Farmers Welfare

7.20 The Benefit Cost (BC) ratio of installing MI (micro irrigation) system is greater than “1” across states and across crops, signifying the importance of MI systems in enhancement of the farmers net income. The BC ratio was the highest in Odisha for fruits and vegetables whereas, in flowers, Rajasthan and Haryana beneficiary farmers achieved higher BC ratio.

7.21 The area irrigated by different sources in India shows that tube wells are the most common source of irrigation across farm holdings, followed by canals (Figure 7). Both types of irrigation systems rely on flood irrigation and waste water, suggesting the need for systems efficient in the use of water like drip and sprinkler irrigation.

Figure 7. Area irrigated by different source of irrigation by size classes (ha)



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

Agro-meteorological Advisory Services (AAS)

7.22 To reduce weather/climate/environmental risks, the effective use of weather-climate forecasts along with crop model and advanced IT and communication can benefit the farming community. A study aiming to assess Economic Impact of AAS (Agro-meteorological Advisory Service (AAS), a mechanism to provide relevant meteorological and agricultural practices information to help the farmer improve agricultural production; (both in quantity and quality) carried out during 2003 to 2007 in 15 districts covering 3 kharif and 3 rabi seasons, concluded that the farmers saved significant quantity of farm inputs like seeds, water, pesticides and fertilizers, reaped better harvest and made their farming more profitable by using the AAS. In general there was a net gain ranging from 8 to 10 percent to farmers who used the information provided by the AAS system.

iii. Price Risks

7.23 The Indian farmer faces price uncertainties, for his produce in seasons during a year, across years owing to supply and demand fluctuations, speculation and hoarding by traders. The price risks emanating from an inefficient APMC market, are severe for farmers in India since they have very low resilience owing to the perishable nature of produce, inability to hold produce, hedge in surplus/shortage scenarios or to insure against losses.

7.24 The market price determined by demand and supply, gets impacted by surplus and shortages, however, the response of the farmer, impacted by expectations is only with a lag. In year/season 1, if there is a shortage of a crop, the market price increases but the farmer does not necessarily benefit because his output is low and the price increase in the market, takes place in the post procurement

sale/transaction. In year/season 2, based on higher price in the previous year/season (in the market and not necessary of the procurement) the farmers expectations soar and he alongwith other farmers, increases the sown area and so supply. The increases in output in year/season 2, result in oversupply and reduction/sharp reduction in prices, at times below the MSP and the farmer loses. In year 3, there is a curtailment of sown area and so supply reduces but price increases. The farmer is still not able to benefit from higher prices because of curtailed supply. A farmer in the above scenarios can benefit only if his pattern of sowing is contra-cyclical, akin to trading in the stock market, for which he needs to be educated. The farmer should adopt a stable pattern of sowing so that in the long run he receives the average price of the produce.

7.25 In this context, the progress in area sown under kharif crops till 07.07.2017 (latest available), (Table 8), reflects the early sowing pattern, including a decline in area coverage under arhar by 6 per cent compared to previous year. If this pattern stays the same, it may be attributed to the fall in prices of arhar in the previous season owing to bumper production. It may be premature to make a judgement since the sowing season is still in progress. However, it is essential to watch the trend in sowing of arhar and take timely measures to offload the buffer stocks if sowing declines to very low levels and results in shortage in the coming months.

7.26 There have been several reports of distress sale by farmers, especially of perishables including in the last few years of tomatoes in Odisha, Maharashtra and Tamil Nadu, coconuts in coastal Andhra Pradesh, potatoes in Andhra Pradesh, Punjab and West Bengal, onions in Maharashtra, Madhya Pradesh and Odisha. Earliest memories recall distress sale of cane sugar in 1978-79

in Western Uttar Pradesh. This compilation only intends to highlight that large expansion of output accompanied by normal demand, leaves little room for MSP operations to maintain the floor level of prices. Possible solutions lie in increasing food processing in

conventional and modern forms; staggering sowing and so outputs, an option only in irrigated areas; introduce seed varieties that have longer shelf life, take shorter time to mature, and can be planted in different seasons, soils and regions.

Table 8. Progress in Area sown under Kharif crops as on 07.07.2017

Sl. No.	Crops	Normal Area (DES)*	Normal of Corresponding week	Area Sown (in lakh hectares)		Percentage increase in area sown	
				2017-18	2016-17	Corresponding week	2016-17
1	Rice	395.94	86.70	79.81	75.28	-7.95	6.03
2	Pulses	105.58	22.00	44.11	35.88	100.53	22.92
a	Arhar (Tur)	39.25	9.11	14.25	15.10	56.37	-5.65
b	Urdbean	24.80	4.32	10.13	7.40	134.74	36.81
c	Moongbean	23.41	6.25	12.49	10.08	99.72	23.96
d	Kulthi	2.41	0.06	0.04	0.01	-33.33	-60.00
e	Other pulses	15.71	2.25	7.20	3.20	219.38	124.95
3	Coarse cereals	192.15	63.77	80.78	70.11	26.68	15.23
a	Jowar	23.46	6.94	6.21	7.19	-10.43	-13.59
b	Bajra	76.67	16.38	30.35	18.88	85.28	60.72
c	Ragi	11.73	1.73	1.36	1.46	-21.03	-6.62
d	Small millets	6.95	1.44	1.37	1.35	-5.16	1.65
e	Maize	73.34	37.28	41.49	41.23	11.28	0.64
4	Oilseeds	184.05	67.75	72.87	69.74	7.55	4.48
a	Groundnut	41.49	16.02	16.30	17.30	1.78	-5.79
b	Soybean	110.37	47.96	53.57	48.56	11.69	10.31
c	Sunflower	2.29	0.59	0.53	0.91	-10.69	-41.73
d	Sesamum	15.37	2.48	2.11	2.51	-14.93	-15.98
e	Niger	2.74	0.15	0.07	0.14	-56.02	-52.78
f	Castor	11.79	0.55	0.29	0.32	-46.55	-7.82
5	Sugarcane	50.05	45.00	47.93	45.22	6.52	5.99
6	Jute & Mesta	8.39	7.74	6.95	7.27	-10.20	-4.39
7	Cotton	122.45	71.70	71.82	67.89	0.17	5.78
	Total	1058.62	364.66	404.27	371.39	10.86	8.85

Source: Crops Division, Directorate of Economics & Statistics, Department of Agriculture, Cooperation & Farmers Welfare

Note: All figures are tentative and eye estimated by the States. *Normal Area- DES Avg. : 2011-2012 to 2015-2016

7.27 The Minimum Support Price (MSP) announced by the Government for 23 crops attempts to cover the price risks faced by the farmer. The MSP backed procurement of crops by government agencies, intends to benefit the farmers directly. However, the data on awareness of MSP and procurement among farmers as shown in Figure 8 suggests that the awareness of MSP and procurement operations is high only with regard to crops like paddy and wheat.

7.28 However, for an individual farmer who produces one or two crops, the benefits of MSP is more than offset since he consumes other crops also, for which he pays a higher price. In respect of the crop that he sells at MSP, in case he is a net buyer or a buyer at the margin, he ends up paying a higher price for the quantity purchased.

7.29 The entire focus of remunerating a

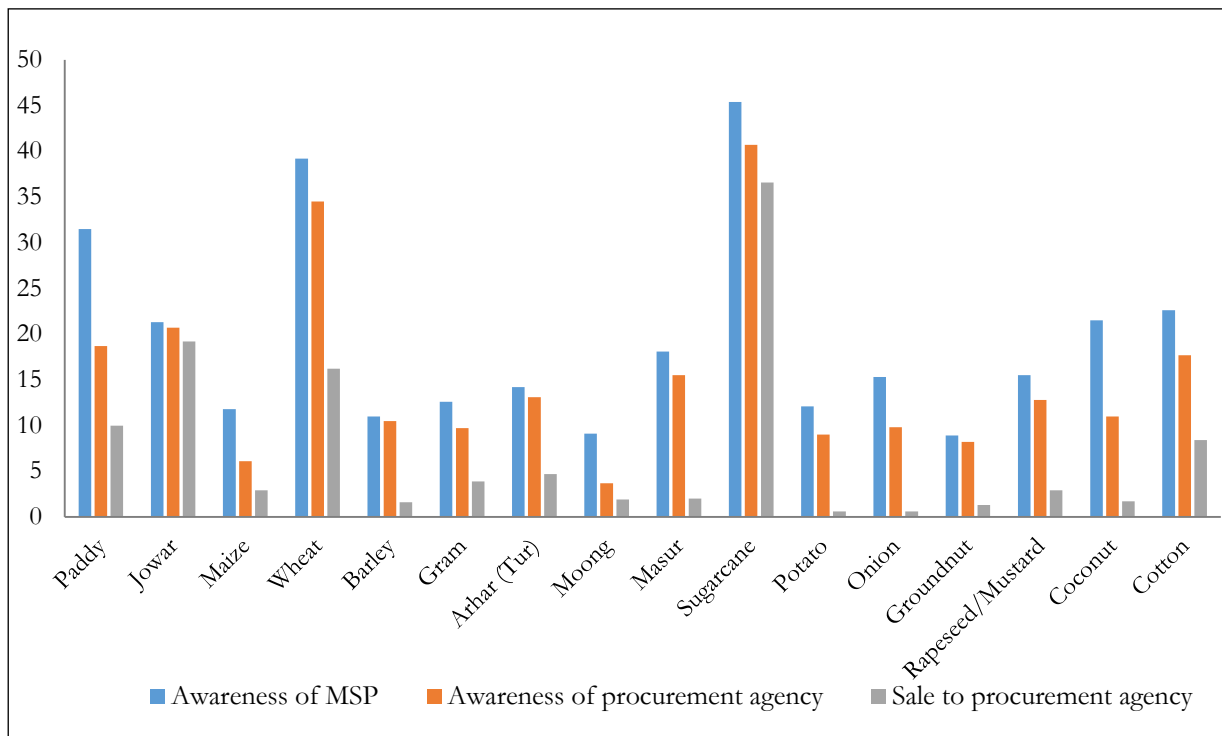
farmer with a higher income in the equation below is on increases in P. Previous section on production risk suggests large room for increasing Q. There is a need to shift the focus to Q and may entail a revisit on the present mechanism of CACP recommending MSP, on the assumption that input costs cannot be decreased and most, if not all increases in farmer income are to come from increases in P.

$$\text{Net Revenue} = \text{Price} \times \text{Quantity} - \text{Input Costs} \quad (\text{NR} = \text{P} \times \text{Q} - \text{IC})$$

Pulses procurement during 2017

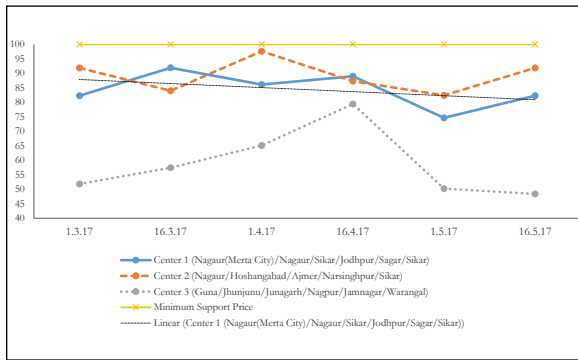
7.30 During the current year, despite significantly higher MSP for pulses and scaling up of pulses procurement to build a buffer stock close to 2 million, there were reports of sales below MSP in several markets during the procurement season as can be seen from the Figures 9 to 12 below.

Figure 8. Awareness of Minimum Support Prices (MSPs), Procurement operations and sale to procurement agency among agricultural households (in per cent)



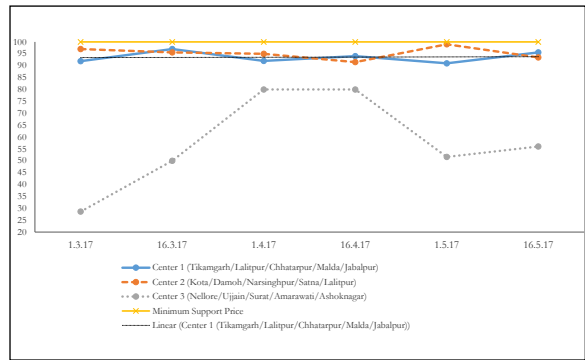
Source: NSS Report No. 573, Some Aspects of Farming in India, January 2013 to June 2013

Figure 9. Tur Modal Price (% of MSP)



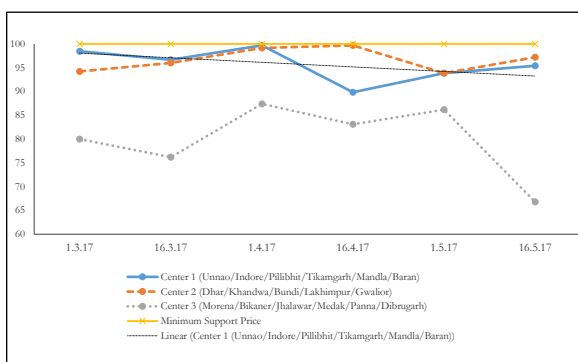
Source: Agmarknet

Figure 10. Moong Modal Price (% of MSP)



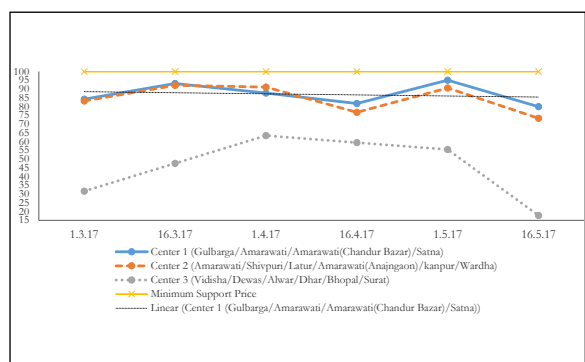
Source: Agmarknet

Figure 11. Urad Modal Price (% of MSP)



Source: Agmarknet

Figure 12. Wheat Modal Price (% of MSP)



Source: Agmarknet

7.31 Even in the case of wheat, there are reports of below MSP sales (Figure 12). This brings to the forefront the debate on the efficacy of MSP and procurement in respect of crops other than those for which there are NFSA commitments. Farmers need to be compensated for farming primarily because of inefficient markets for their inputs and outputs, which result in a high input cost and lower and volatile output price. To make farming remunerative, the delivery of inputs should be made cost effective through direct benefit transfer mode (DBT). Further, there are issues of procurement of perishables such as onions, potatoes and tomatoes for which timely disposal is necessary, and may be difficult for an agency to efficiently perform. After debating the same, support in the form of MSP for crops other than rice and wheat needs to be shifted to DBT format.

iv. Credit risks

7.32 Credit is an important mediating input for agriculture to improve productivity. Access to institutional credit enables the farmer to purchase inputs on cash, tide over periods till receipt of payment from sale of produce, which at times is delayed and staggered, and also to invest to enhance productivity and also output. Ground Level Credit (GLC) flow in absolute terms to agriculture has improved substantially over the years and stood at ₹9,59,826 crore (provisional) and the total number of agricultural loan accounts stood at ₹9.74 crore (provisional) as on 28 February 2017. Out of this, crop loan accounts stood at ₹8.09 crore (provisional). To improve agricultural credit flow, the credit target for 2017-18 has been fixed at ₹10, 00,000 crore as against ₹9,00,000 crore for 2016-17.

7.33 The predominance of informal sources of credit for farmers is a concern. As per the NSSO 70th round data (relating to January to December 2013), 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. These borrowings are at significantly higher rates of interest. In addition to reducing the share of informal credit, there is a need to provide timely and affordable credit to the resource constrained group, the small and marginal farmer.

7.34 The ratio of agricultural credit to agricultural GDP has increased from 12 per cent in 2001-02 to around 40 per cent in 2016-17. The Government's priority to enhance capital formation in agriculture arrested the declining trend in the share of long term credit in agriculture over past few years in 2016-17, when it rose to 35 per cent. Towards this end, the corpus of Long Term Rural Credit Fund (LTRCF) of NABARD was increased to ₹15,000 crore in 2016-17.

7.35 The regional disparity in the distribution of agricultural credit also needs to be addressed. The coverage of agriculture credit is very low in the north-eastern and eastern regions of the country. Against the agricultural credit flow target of ₹ 8,737 crore in North Eastern Region (NER) for 2016-17, the achievement in terms of amount disbursed was only ₹4,756 crore (upto December 2016). The agricultural credit flow target for NER in 2017-18 has been fixed at ₹ 9,380 crore.

7.36 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 are for seasonal agricultural operations and do not result in major investments in agriculture. Under the Interest Subvention Scheme (ISS) in 2016-17, farmers availed crop loans up to ₹ 3 lakh at 7 per cent interest

and the effective rate of interest was lowered to 4 per cent for those who repaid their loans promptly.

v. Other risks (market and policy risks)

7.37 The market risks that arise in agriculture trade, both domestic and international are mainly due to uncertainty in the policies of agricultural trade and market policies pursued by the government from time to time. The agriculture markets under the Agricultural Produce Market Committee (APMC) Act of the State Governments, with around 2,477 principal regulated markets based on geography (the APMCs), and 4,843 sub-market yards are regulated by the respective APMCs. The posts in the market committee and the market board – which supervises the market committee are occupied by the politically influential, who enjoy a cosy relationship with the licensed commission agents, who in turn exercise monopoly power, at times by forming cartels. The farmers lose out in the APMC market dynamics.

7.38 There is need to remove all restrictions on internal trade on agricultural commodities and dismantle fragmented legislations that govern agriculture. At present, there are four legislations in existence/formulation to regulate agriculture markets,

- i. Model APMC Act, 2016 to replace the present state legislations on markets,
- ii. Agricultural Produce Trading (Development and Regulation) Act, 2017,
- iii. A law that would regulate contract farming and
- iv. A law/regulation that would regulate e-NAM.

7.39 Several legislations of the State and Centre ensure that the agricultural markets are fragmented and the benefits to the farmers remain low. The above legislations

need to be dismantled and move towards a Common National Agriculture Market as envisaged in the e-NAM initiative.

7.40 The perishable farm produce needs to be kept outside the purview of present APMC, Act/ proposed Model APMC, Act 2016 as has been stated in the Budget Speech (2017-18), in para 29, by the Finance Minister that, “Market reforms will be undertaken and the States would be urged to denotify perishables from APMC.” This will give opportunity to farmers to sell fruits and vegetables through the government created electronic trading portal and get remunerative prices.

Stock limits under the Essential Commodities Act (ECA), 1955

7.41 The stock limits imposed under ECA, 1955 end up curtailing demand for farm produce and so price. The analysis of the stock limits in select states indicates that a wholesaler is permitted a stock limit of around between 16 to 50 times in urban areas and between 10 and 80 times in other areas than the stock limits for the retailer, which is uniform for the entire year. This sharp difference needs to be rationalized by permitting the maximum limit commencing the sowing period till two months after procurement, to be gradually reduced to a ceiling of half. In the higher ceiling the farmer shall benefit due to higher demand and in the reduced ceiling the consumer shall benefit due to increased offloading. In contrast, requests for enhancing stock limits come when procurement process has commenced or is completed. However, the ideal situation relates to doing away with the stock holding limits along with the ECA, 1955 as envisaged in the ‘Removal of Licensing requirements, Stock limits and Movement Restrictions on Specified Foodstuffs Order, 2016,’ according to which all restrictions on permit/licensing requirements, stock limits and movement restrictions were to be removed.

High Yielding Variety (HYV) and Genetically Modified (GM) Seeds

7.42 An important measure that can reduce risk is the introduction of HYV and GM seeds that have been stuck in controversies over decades. Table 9 below suggests a matrix that can form a basis to resolve the same.

Table 9. Matrix on introduction of HYV and GM seeds

Sl. No	Issue	Tick
1	Terminator Gene	X
2	High cost	X
3	Disease and pest resistant	√
4	Moisture variation resistant	√
5	Resistant to soil variation	√
6	Longer shelf life	√
7	Shorter crop duration	√
8	Tree format of crop	√
9	Non food crops	√

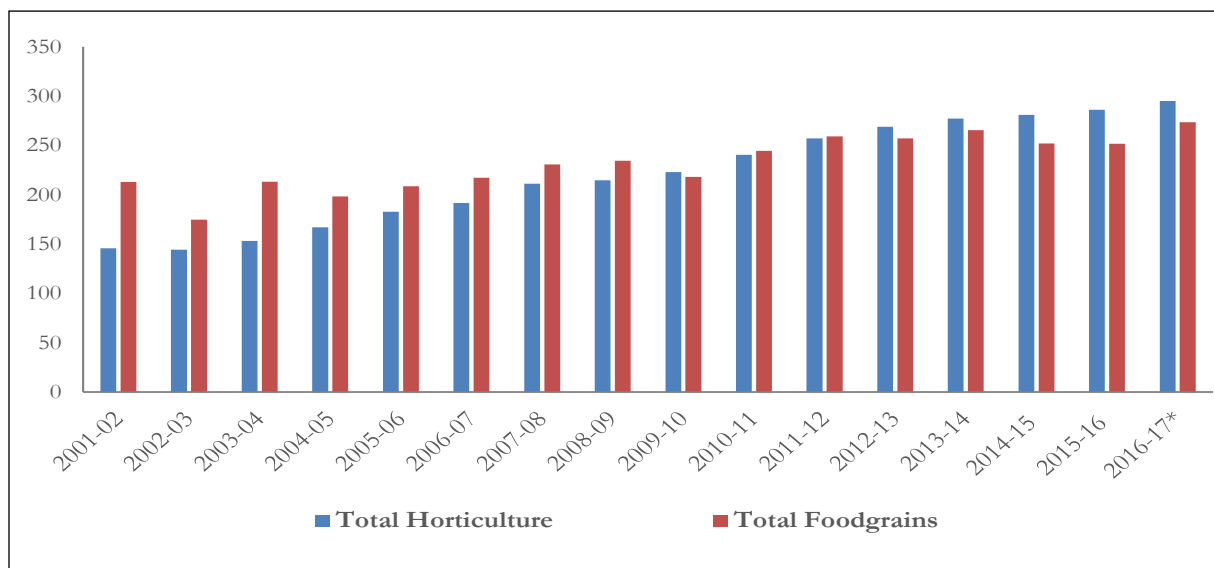
HORTICULTURE

7.43 India witnessed sharper increase in acreage of horticulture crops compared to foodgrains over the last five years (from 2012 to 2014-15). Between 2012 to 2014-15 there has been an increase of 10 per cent in horticulture production compared to an increase of 6 per cent in foodgrains. Since 2012-13, the production of horticulture has outpaced the production of foodgrains (Figures 13 & 14).

7.44 Over the last decade, the area under horticulture increased by about 3.1 per cent per annum and annual production increased by about 6 per cent. During 2015-16 the production of horticulture crops was about 286.2 million tonnes from an area of 24.47 million hectares.

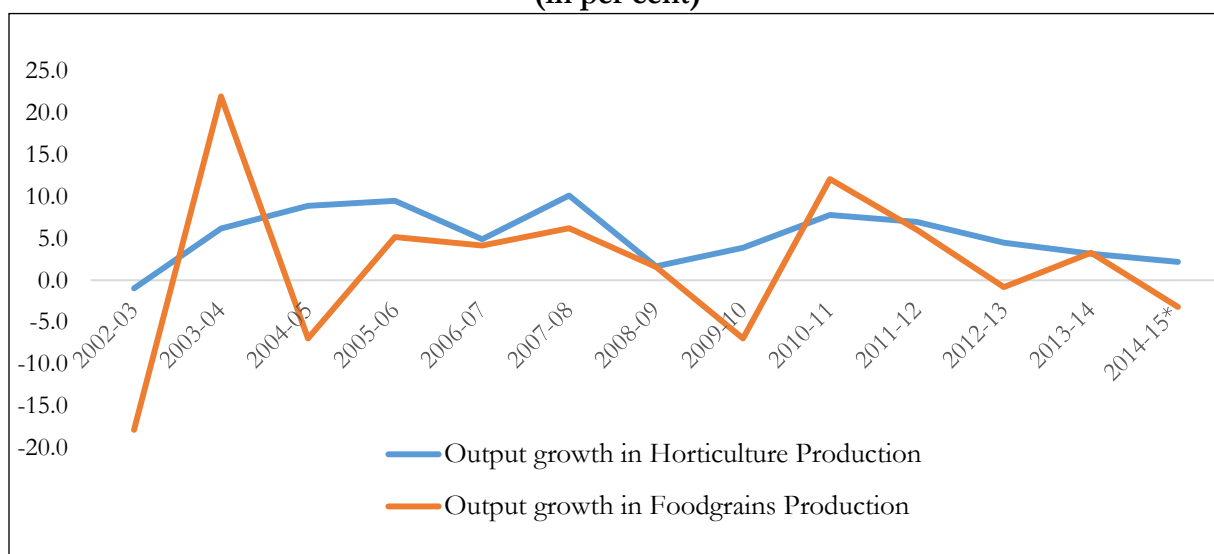
7.45 The production of fruits has increased from 28,632 thousand tonnes to 90,183 thousand tonnes and the production of vegetables has increased from 58,532

Figure 13. Production of Horticulture vis-à-vis Foodgrains (in Million Tonnes)



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

Figure 14. Growth rates in Horticulture production vis-a-vis Foodgrains production (in per cent)

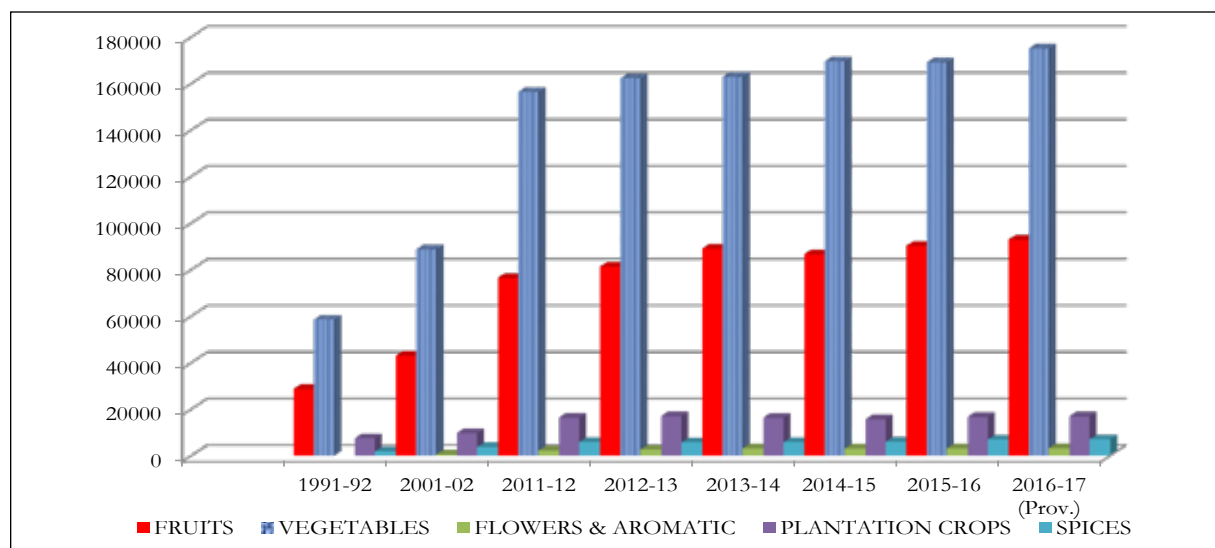


Source: Central Statistics Office

thousand tonnes to 1,69,064 thousand tonnes since 1991-92 to 2015-16 as depicted in Figure 15. Among the horticulture crops, vegetables constitute more than 50 per cent of total horticulture production. The export growth of fresh fruits and vegetables in terms of value is around 14 per cent and of processed fruits and vegetables is around 16 per cent. The vegetable and fruit segments

of the horticulture sector can be key drivers of agricultural growth and can be further developed by appropriate investments in harvesting, low cost storage facilities and processing technologies along with development of marketing infrastructure.

7.46 The key challenge that the horticulture sector faces in India are post harvest losses, availability of quality planting material and

Figure 15. Production of various Horticulture Crops (in Thousand Tonnes)

Source: Department of Agriculture, Cooperation and Farmers Welfare.

lack of market access for horticultural produce of small farmers. The combined wastage (harvest and post harvest) for horticulture crops between 5 to 15 per cent in the case of fruits and vegetables is very high, compared to the range of 5 to 6 per cent in the case of cereals, around 6 to 8 per cent for pulses and 5 to 10 per cent for oilseeds (CIPHET, 2015). During 2016-17, 7554 post-harvest infrastructure, 801 markets infrastructure were established under MIDH (Mission for Integrated Development of Horticulture), to reduce wastages which range between 5 to 16 per cent in the case of horticultural crops.

7.47 The availability of quality planting material, specially processable and exportable varieties, has been another area of concern in the horticulture sector. Under MIDH, financial assistance is provided for setting up and modernization of nurseries, tissue culture labs, seed and planting material production, seed processing infrastructure and import of planting materials. To further step up the availability of quality planting material, the fund allocation for interventions related to planting material under MIDH has been enhanced to about 10 per cent from

this financial year along with accreditation of nurseries.

7.48 The majority of the horticultural producers are small and marginal farmers. This, along with high perishability of the produce, present challenges to marketing of horticultural produce. The weakness in the horticultural supply generally results into cyclical glut/shortages and price spike/troughs. To improve the market access for horticulture producers, several steps have been initiated under MIDH. The small and marginal farmers have been mobilized to form Farmer Producer Organisation (FPO)/ Farmer Interest Group (FIG). From this year, the FPO model – enabling FPOs to directly market their produce – is being implemented on pilot basis.

ALLIED SECTORS: ANIMAL HUSBANDRY, DAIRYING AND FISHERIES

7.49 In India's predominantly mixed crop-livestock farming system, dairying has become an important secondary source of income for millions of rural families and has assumed the most important role in providing employment and income

generating opportunities particularly for marginal and women farmers. Most of the milk is produced by animals reared by small, marginal farmers and landless labourers. About 15.46 million farmers have been brought under the ambit of 165835 village level dairy corporative societies up to March 2015. Government of India is making efforts for strengthening the dairy sector through various Central sector Schemes like “National Programme for Bovine Breeding and Dairy Development”, National Dairy Plan (Phase-I) and “Dairy Entrepreneurship Development Scheme”.

7.50 India continues to be the largest producer of milk in world. Several measures have been initiated by the Government to increase the productivity of livestock, which has resulted in increasing the milk production significantly. During the years 2014-15 and 2015-16 the milk production registered an annual growth rate of 6.27 per cent. The per capita availability of milk is around 337 grams per day in 2015-16.

7.51 It is noteworthy that women have played a key role in the development of the dairy sector as producers, women cooperatives and in marketing. As per NDDDB, the annual growth rate of all women Dairy Cooperative Societies is about 10 per cent. Hence measures to enhance women’s involvement in the dairy projects of the government needs emphasis through appropriate mechanisms and fund allocation earmarked for specific gender components. There are approximately 43.8 lakh women producers of which 3.29 lakh are Management Committee Members (2013, NDDDB). Representation of women in Management Committees also needs to be increased.

7.52 The economics of livestock farming and the future of this source of livelihood depends on the terminal value of assets, in this case the no-longer-productive livestock.

If social policies drive this terminal value precipitously down, private returns could be affected in a manner that could make livestock farming less profitable. This declining terminal value arises both because of the loss of income from livestock as meat and the additional costs that will arise from having to maintain unproductive livestock. It is possible that social policies could affect social returns even more adversely. However, the cultural and social norms will influence to a great extent the behavior and choices made by the population.

7.53 The poultry production in India has taken a quantum leap in the last four decades, emerging from an unscientific farming practice to commercial production system with state-of-the-art technological interventions. The total poultry population in our country is 729.21 million (as per 19th Livestock Census) and egg production is around 82.93 billion during 2015-16 (Table 10). The per capita availability (2015-16) is around 66 eggs per annum.

Table 10. Production of Major Livestock Products and Fish

Year	Milk (Million tonnes)	Eggs (Millions Nos.)	Fish (Thousand tonnes)
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	10334
2015-16	155.5	82929	10795

Source: Department of Animal Husbandry, Dairying and Fisheries.

7.54 India is the second largest producer of

fish and also the second largest producer of fresh water fish in the world. Fish production has increased from 41.57 lakh tonnes (24.47 lakh tonnes for marine and 17.10 lakh tonnes for inland fisheries) in 1991-92 to 107.95 lakh tonnes (35.8 lakh tonnes for marine and 72.10 lakh tonnes for inland fisheries) in 2015-16.

FOOD MANAGEMENT

7.55 The main objectives of food management is procurement of foodgrains from farmers at remunerative prices, distribution of foodgrains to consumers, particularly the vulnerable sections of society at affordable prices and maintenance of food buffers for food security and price stability. The instruments used are Minimum Support Price (MSP) and Central Issue Price (CIP). The nodal agency which undertakes procurement, distribution and storage of foodgrains is the Food Corporation of India (FCI). Procurement at MSP is open-ended, while distribution is governed by the scale of allocation and its offtake by the beneficiaries. The offtake of foodgrains is primarily under the Targeted Public Distribution System (TPDS) and other welfare schemes of the Government of India.

7.56 To ensure adequate availability of wheat and rice in central pool, to keep a check on the open market prices, to augment the domestic availability and to ensure food security, the Central Government has taken following steps for prudent management of foodgrains stocks:-

- (a) Steps have been taken to maximize procurement of wheat and rice and MSP of wheat and paddy has been increased successively. (*Table on MSP fixed for main crops is at Appendix Table.*)
- (b) State Governments, particularly through the Decentralized Procurement (DCP) States are encouraged to maximize procurement of wheat and rice by taking

up procurement of paddy from farmers by State Agencies.

- (c) Strategic reserves of 5 million tonnes of food grains over the existing buffer norms has been maintained to be used in extreme situations.
- (d) Sale of wheat and rice was undertaken through Open Market Sale Scheme (OMSS) (Domestic) to check inflationary trend in food security.
- (e) Central Issue Prices (CIPs) of rice and wheat have not been revised since July, 2002.

Procurement of Foodgrains

7.57 Foodgrains, pulses and minor crops are procured at the Minimum Support Price (MSP) fixed by the Government. In the case of food grains, during Kharif Marketing Season (KMS) 2016-17, the procurement of rice/paddy is estimated to be 380.00 lakh tonnes of rice. Till 18.05.2017, a quantity of 359.58 lakh tonnes of rice has been procured. During the Rabi Marketing Season (RMS) 2016-17 (April 2016 to March 2017), 229.61 lakh tons of wheat was procured for the Central Pool against 280.88 lakh tonnes during RMS 2015-16.

Decentralised Procurement Scheme

7.58 The DCP has the objectives to ensure that MSP is passed on to the farmers, to enhance the efficiency of procurement of PDS and to encourage procurement in non-traditional States. The system enables extending the benefits of MSP to local farmers, to save on transit losses and costs and enables procurement of foodgrains more suited to local taste for distribution under the TPDS.

7.59 The DCP, introduced in 1997-98, is operationalised through food grains procurement and distribution by the State Governments themselves. Under this scheme, the designated DCP States procure,

store and issue foodgrains under TPDS and other welfare schemes of the Government of India. The Central Government undertakes to meet the entire expenditure incurred by the State Governments on the procurement operations as per the approved costing. While the Central Government monitors the quality of foodgrains procured under the scheme and reviews the arrangements made to ensure that the procurement operations are carried on smoothly, there have been instances of diversion of stocks. The States which are under DCP system are listed in the Table 11.

Table 11. States which adopted DCP system

Crops	States with Decentralised Procurement (DCP)
Rice	A&N Islands, Karnataka, Kerala, Odisha, Tamil Nadu, Andhra Pradesh, Telangana, Maharashtra, Jharkhand (for 1 district)
Wheat	Gujarat, Punjab, Rajasthan (in 9 Districts)
Rice/ Wheat	Bihar, Chhattisgarh, Madhya Pradesh, Uttarakhand, West Bengal

* Exempted for RMS 2017-18

Foodgrain stocking norms for the central pool (Buffer norms)

7.60 The main objectives of the foodgrain stocking Norms (Buffer Norms) is to meet the prescribed minimum stocking norms for food security, to ensure monthly releases of foodgrains for the TPDS/Other Welfare Schemes and to augment supply in eventualities like emergency situations arising out of unexpected crop failure, natural disasters etc. The Government of India has revised the Buffer Norms w.e.f. January, 2015 and the nomenclature of buffer norms has been changed to "Foodgrain Stocking Norms for the Central Pool". The Government has revised the norms for better management of foodgrain stocks. The minimum stocking norms of foodgrains in the Central Pool with effect from January, 2015 are as follows:

Table 12. Minimum Stocking norms of food grains (in million tonnes)

As on	Rice	Wheat	Total
1st April	13.58	7.46	21.04
1st July	13.54	27.58	41.12
1st Oct	10.25	20.52	30.77
1st Jan	7.61	13.80	21.41

Source: Department of Food and Public Distribution

7.61 The above norms include a Strategic Reserve of 30 lakh tonnes of wheat and 20 lakh tonnes of rice.

National Food Security Act, 2013 (NFSA)

7.62 The National Food Security Act, 2013 (NFSA) is an important initiative for food security of the people. With a view to make receipt of foodgrains under TPDS a legal right, Government of India has enacted NFSA which came into force w.e.f. 5-7-2013. The Act provides for coverage of upto 75 per cent of the rural population and upto 50 per cent of the urban population for receiving subsidized foodgrains under Targeted Public Distribution System (TPDS), at Rs.1/2/3 per kg for coarse grains/wheat/rice respectively at 35 kg per family per month to households covered under Antyodaya Anna Yojana (AAY) and at 5 kg per person per month to priority households.

7.63 The Act is now being implemented in all the States/UTs, covering 80.54 crore persons, against the total targeted coverage of 81.35 crore persons. In Chandigarh, Puducherry and urban areas of Dadra & Nagar Haveli, the Act is being implemented in the cash transfer mode, under which food subsidy is being transferred into the bank accounts of beneficiaries who then have a choice to buy foodgrains from open market. There is a case for expanding the cash transfer to other states also.

7.64 During the Financial Year 2016-17, ₹2500 crore has been released to State

Governments as Central assistance to meet the expenditure incurred on intra-State movement of foodgrains and fair price shop dealers' margins. Such an arrangement has been made for the first time under the NFSA. Earlier, States/UTs were required to meet this expenditure or they could pass it on to beneficiaries (except AAY beneficiaries).

Allocation of foodgrains under NFSA/TPDS

7.65 As on 1st November, 2016, NFSA has been implemented in all the 36 States/UTs and they are receiving monthly allocation of foodgrains under NFSA. The States/UTs which had not implemented NFSA, 2013 were receiving foodgrains under erstwhile TPDS at 35 kg per family per month for AAY and BPL families and at 10-35 kg per family per month for APL families as per March, 2000 population estimates of Registrar General of India and 1993-94 poverty estimates of erstwhile Planning Commission. During the year 2016-17, Government of India allocated 628.91 lakh tonnes of foodgrains to States/UTs/Welfare Institutions, etc. (Table 13).

Table 13. Food grains allocation under NFSA/ Non-NFSA

Sl. No.	Category	Quantity (in lakh tonnes)
1.	Non-NFSA	29.27
2.	NFSA	513.45
3.	Addl.APL/BPL Allocation	1.87
4.	Festival calamity etc.	29.03
5.	Other Welfare schemes	55.29
Total		628.91

Source: Department of Food & Public Distribution

Open Market Sale Scheme (Domestic)

7.66 In addition to maintaining buffer stocks and for making a provision for meeting the requirement of the TPDS and other

Welfare Schemes, FCI on the instructions from the Government sells excess stocks out of Central Pool through Open Market Sale Scheme (Domestic) (OMSS-D) in the open market from time to time at predetermined prices to achieve the following objectives:-

- To enhance the supply of food grains especially during the lean season and thereby to have a healthy and moderating influence on the open market prices.
- To offload the excess stocks in the Central Pool and to reduce the carrying cost of food grains to the extent possible.
- To save the food grains from deteriorating in quality and to use food grains for human consumption.
- To release valuable storage space for stocks procured during the ensuing marketing season of wheat/rice.

Sale of wheat and rice under OMSS (domestic) during 2016-17

7.67 A target of 65-75 lakh MT was set for sale of wheat by FCI out of Central Pool under OMSS-D during 2016-17. A target of 20 lakh MT of Grade 'A' rice was also kept for sale under OMSS (D) during 2016-17. The reserve for the sale of wheat under OMSS (D) in 2016-17 to private bulk buyers/traders was kept as ₹1640 per quintal. For sale from the depots of FCI outside surplus procuring States of Punjab, Haryana and Madhya Pradesh, freight/road transport charges upto the concerned depots of FCI, ex-Ludhiana were to be added in this reserve price. For sale under dedicated movement, the handling and transportation charges from FCI depot to the loading in Railway rake were also added in the reserve price. The overall reserve price for sale of Grade 'A' rice under OMSS (D) was kept at ₹2400 per quintal for 2016-17. The quantities of wheat and rice sold under the OMSS (D) during the last 5 years are at Table 14.

Table 14. OMSS (Domestic)
(Qty. in lakh MT)

Year	Wheat	Rice
2012-13	68.67	0.99
2013-14	61.16	1.68
2014-15	42.37	*NIL
2015-16	70.77	1.11
2016-17	45.67	1.78

Source: Department of Food & Public Distribution

Note: * Sale of rice was not conducted in 2014-15

Food Subsidy

7.68 The provision of minimum nutritional support to the poor through subsidized foodgrains and ensuring price stability in different states are the twin objectives of the food security system. In fulfilling its obligation towards distributive justice, the Government incurs food subsidy. While the economic cost of wheat and rice has continuously gone up, the issue price has been kept unchanged since 1st July, 2002. Due to implementation of NFSA, CIP has further gone down for APL and BPL categories. The Government, therefore, continues to provide large and increasing amounts of subsidy on food grains for distribution under the TPDS/NFSA and other nutrition-based welfare schemes and open market operations (Table 15).

Table 15. Quantum of food subsidies released by Government

Year	Food Subsidy (₹ in crore)	Annual growth (in per cent)
2010-11	62,929.56	8.05
2011-12	72,370.90	15.00
2012-13	84,554.00	16.83
2013-14	89,740.02	6.13
2014-15	1,13,171.16	26.11
2015-16	1,34,919.00	19.22
2016-17	1,05,672.96	-21.68
2017-18*	69,273.00	

Source: Department of Food & Public Distribution

Note: *Figures as on 08.05.2017

THE WAY AHEAD

7.69 The response to the agrarian distress needs to be addressed by increasing the productivity, mainly by increasing the coverage of water saving irrigation systems like micro irrigation systems and routing inputs through direct benefit transfer mode in a crop neutral manner. The progress needs to be evaluated in terms of outcomes such as catching up with global yields as a means to increase income of farmers. The dissemination of scale neutral technology suited to small scale farming and use of IT is necessary to improve the productivity of small farm holdings which dominate the Indian agriculture sector. The controversies on the adoption of HYV and GM seeds need to be resolved and extended to all crops, not just mustard.

7.70 To address the agrarian concerns, the primary among the changes required is to allow a greater role for market forces; recognizing that market does not necessarily have a physical form.

7.71 The stock limits imposed under ECA, 1955 end up curtailing demand for farm produce and so price. There is need to lift all restrictions on permit/licensing requirements, stock limits and movement restrictions alongwith the laws on which they are based.

7.72 The challenge of enhancing access to formal and institutional credit for farmers for long term investments needs to be addressed. Providing timely and affordable credit to the small and marginal farmers is the key to inclusive growth.