

Price Policy for **Rabi Crops**



THE MARKETING SEASON 2019-20



Commission for Agricultural Costs and Prices

Department of Agriculture, Cooperation & Farmers Welfare

Ministry of Agriculture & Farmers Welfare

Government of India, New Delhi

July 2018

Members of the Commission, July 2018

Prof. Vijay Paul Sharma

Chairman

Phone: 011-23385216

e-mail: chairman-cacp@nic.in

Dr. Shailja Sharma

Member Secretary

Phone: 011-23384006

e-mail: ms-cacp@nic.in

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सत्यमेव जयते

कृषि लागत एवं मूल्य आयोग

Commission for Agricultural Costs and Prices

कृषि, सहकारिता एवं किसान कल्याण विभाग

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भारत सरकार

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Vijay Paul Sharma
Chairman
Tel : 011-23385216
Fax : 011-23383848



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Krishi Bhawan, New Delhi-110 001

Preface and Acknowledgements

It is an honour and privilege for me to submit the report of **“Price Policy for Rabi Crops: The Marketing Season 2019-20”**. The report contains the recommendations on Minimum Support Prices (MSP) for the mandated Rabi crops, namely, **wheat, barley, gram, lentil, rapeseed & mustard and safflower**, and a set of non-price recommendations. I hope that these recommendations will help in achieving the goal of doubling farmers' income by 2022 by incentivising farmers to adopt new technologies and practices, competitiveness of Indian agriculture and inclusive growth.

Summary of Recommendations is followed by an overview of Indian agriculture in Chapter 1. Chapter 2 of the report discusses demand-supply and procurement operations. Trends in productivity and input management issues are analysed in Chapter 3 and trade patterns and competitiveness is presented in Chapter 4. Costs and returns and cost projections for Rabi Marketing Season 2019-20 including inter-crop price parity issues are discussed in Chapter 5. Non-price and price policy recommendations are given in the Chapter 6.

Many people have assisted in the preparation of this report. First and foremost, I would like to express my sincere thanks to farmers, farmers' representatives/associations, officers from Central and State Governments, representatives of various agencies/organizations involved in procurement, post-harvest management, processing and marketing of agricultural commodities, and various other stakeholders for providing valuable insights and suggestions during the meetings and preparation of this report. Special thanks to the Directorate of Economics and Statistics, Ministry of Agriculture & Farmers Welfare for providing data on cost estimates for this report.

Last but not least, credit is due to the officers and staff of the commission, who contributed to this report. Sincere gratitude goes to Dr. Shailja Sharma, Member Secretary for her contribution and excellent support in preparation and timely completion of the report. The report would not have been possible without active support of Mr. D. K. Pandey (Adviser), Mr. K. M. M. Alimalmigothi (Adviser), Ms. Nutan Raj (Adviser), Mr. Nikhil Kumar Agarwal, Dr. Harish Kumar Kallega, Mr. Amit Sahu, Ms. Reeta Yadav, Mr. Ayush Punia, Mr. Sube Singh, Mr. Raj Kumar, Dr. S. K. Gupta, Mr. Byasadev Naik, Mrs. Shilpa Taneja, Mr. Md. Abdul Aleem, Ms. Meenakshi Choudhary, Dr. Bhavik Lukka, Mr. S. K. Srivastava, Dr. Surendra Singh, Mr. Chandra Kumar, Mr. Vedprakash Meena, Mr. Deepdyuti Sarkar, Mr. Mohd Shoeb, and Mr. A. K. Pandey, who worked tirelessly in preparation of this report. I would like to thank them all for their contribution and support.

31th July 2018

(Vijay Paul Sharma)

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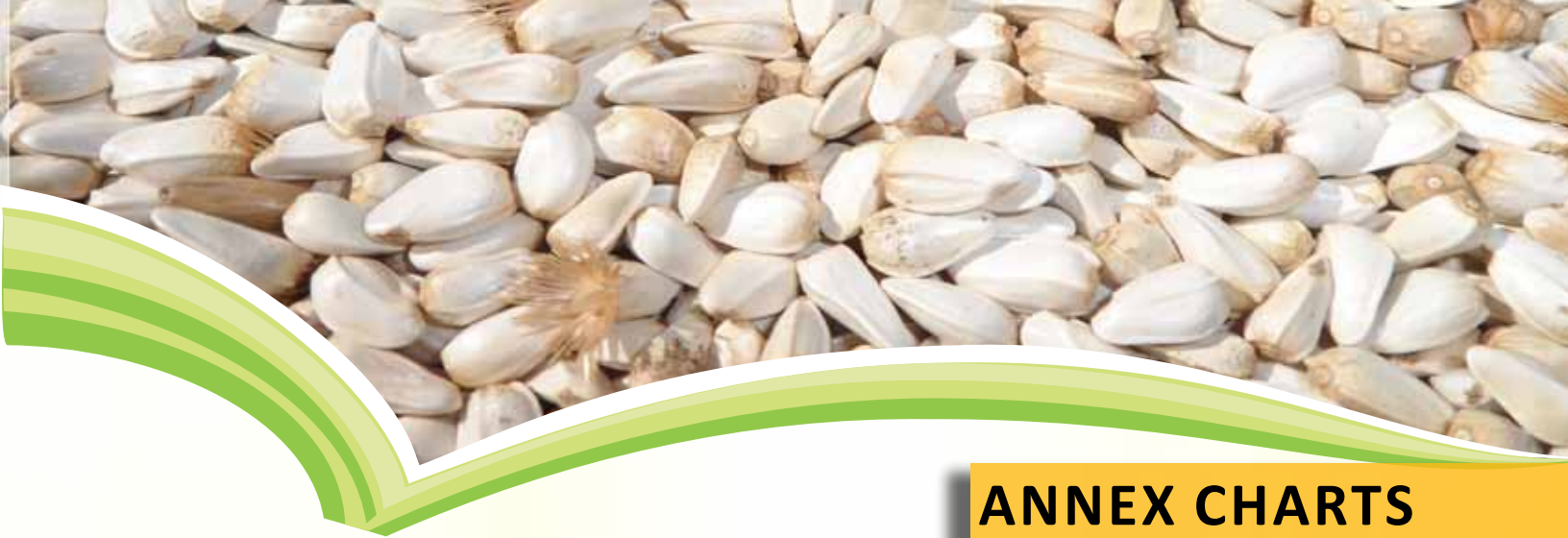
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ACRONYMS

A ₂	Actual paid out cost
A ₂ +FL	Actual paid out cost plus imputed value of family labour
AAY	Antyodaya Anna Yojana
AeFDS	Aadhaar enabled Fertilizer Distribution System
AERCs	Agro-Economic Research Centres
AGMARKNET	Agricultural Marketing Information Network
APEDA	Agricultural and Processed Food Products Export Development Authority
APMC	Agricultural Produce Market Committee
BPL	Below Poverty Line
C ₂	Comprehensive cost including imputed rent and interest on owned land and capital
CACP	Commission for Agricultural Costs and Prices
CAP	Cover and Plinth
CBDT	Central Board of Direct Taxes
CIPI	Composite Input Price Index
CIS	Commonwealth of Independent States
CoC	Cost of Cultivation
CoP	Cost of Production
CPI	Consumer Price Index
CS	Comprehensive Scheme
DAC&FW	Department of Agriculture, Co-operation and Farmers Welfare
DBT	Direct Benefit Transfer
DES	Directorate of Economics and Statistics
DGCIS	Directorate General of Commercial Intelligence & Statistics

ACRONYMS

DIPP	Department of Industrial Policy & Promotion
DMI	Directorate of Marketing and Inspection
DTA	Domestic Tariff Area
ECA	Essential Commodities Act
EDI	Electronic Data Interchange
e-NAM	e-National Agriculture Market
EOU	Export Oriented Units
EU	European Union
FAI	Fertilizers Association of India
FAO	Food and Agriculture Organisation
FAQ	Fair Average Quality
FCI	Food Corporation of India
FLD	Front Line Demonstration
FPI	Food Price Index
FPO	Farmer Producers' Organizations
GrAMs	Gramin Agricultural Markets
GST	Goods and Service Tax
GVA	Gross Value Added
GVO	Gross Value of Output
HSD	High Speed Diesel
ICAR	Indian Council of Agricultural Research
IGC	International Grains Council
IWP	Irrigation Water Productivity
KMS	Kharif Marketing Season
LCS	Land Custom Stations
MAS	Market Assurance Scheme
MEIS	Merchandise Export from India Scheme (MEIS)
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MoA&FW	Ministry of Agriculture and Farmers Welfare
MSP	Minimum Support Price
MT	Metric Tonnes
N, P, K	Nitrogen, Phosphorous and Potash
NABARD	National Bank for Agriculture and Rural Development

NAFED	National Agricultural Cooperative Marketing Federation of India Ltd.
NBS	Nutrient Based Subsidy
NFSM	National Food Security Mission
OECD	Organization for Economic Cooperation and Development
OGL	Open General License
OMS	Open Market Sale
PDP	Price Deficiency Payment
PDS	Public Distribution System
PHH	Priority Households
PMKSY	Pradhan Mantri Krishi Sinchayee Yojana
PoS	Point of Scale
R&D	Research and Development
R&M	Rapeseed and Mustard
RBD	refined, bleached, deodorized
RKVY	Rashtriya Krishi Vikas Yojana
RMS	Rabi Marketing Season
RRB	Regional Rural Banks
SAUs	State Agricultural Universities
SEZs	Special Economic Zones
SHCs	Soil Health Cards
SRR	Seed Replacement Rates
SUR	stock-to-use ratio
TE	Triennium Ending
USDA	United States Department of Agriculture
W/N	Whether or Not
WPI	Wholesale Price Index
WTO	World Trade Organization
y-o-y	year-on-year

Summary of Recommendations

- S.1. Rabi foodgrains production witnessed an increase of around 2.9 percent in 2017-18, though area under Rabi foodgrains declined by about 1.8 percent in 2017-18 compared with 2016-17. Improvement in productivity (4.8 percent) has driven the rabi production, which augurs well for Indian agriculture. Production of wheat, barley, gram and lentil increased by 0.1 percent, 2.3 percent, 19.0 percent and 23.8 percent, respectively in 2017-18 over the previous year. According to the FAO, USDA and IGC, world wheat production is anticipated to fall (2.8 percent) and stocks-to-use ratio is also expected to decline (2.0-4.8 percent) in 2018-19 compared with 2017-18. On the other hand, wheat consumption and trade is forecast to improve marginally in 2018-19.

Price Policy Recommendations

- S.2. Union Budget 2018-19 recommended a pre-determined principle of offering to farmers a threshold MSP of at least one and half times the cost of production for the mandated crops. Taking forward this recommendation, Department of Agriculture, Cooperation and Farmers Welfare (DAC&FW) mandated CACP to consider, in addition to cost of production, trends in market prices, demand and supply situation, effect on general price level and cost of living, a minimum of 50 percent as the margin over the cost of production, in calibrating the price policy for mandated crops. Accordingly, the Commission recommends the MSPs for 6 Rabi crops for RMS 2019-20 as given in the Table S.1. It may be noted that share of production covered at MSP is 100 percent in case of wheat, barley, gram, lentil, rapeseed & mustard and safflower i.e. MSP fully covers projected A_2 +FL cost of production in all States.

Table S.1: MSPs Recommended for RMS 2019-20

(₹/qtl)

Crops	Projected Costs for RMS 2019-20 (A ₂ +FL)	MSP, RMS 2018-19	Recommended MSP for RMS 2019-20	MSP as percent of A ₂ +FL
Wheat	866	1735	1840 (6.05)	212
Barley	860	1410	1440 (2.13)	167
Gram	2637	4400*	4620 (5.00)	175
Lentil	2532	4250**	4475 (5.29)	177
R&M	2212	4000**	4200# (5.00)	190
Safflower	3294	4100**	4945 (20.61)	150

Note: Figures in parenthesis represent increase in MSP over the previous year.

corresponding to oil content of 35 percent

**including bonus of ₹150 per quintal*

***including bonus of ₹100 per quintal*

Incentivising Efficiency: Linking MSP of R&M with Oil Content

S.3. There are variations in oil content of different varieties of R&M and therefore a uniform MSP may not be desirable. The Commission is of the opinion that farmers be incentivized for higher 'oil content'. The Commission recommends that MSP of R&M be linked to the basic 'oil content' of 35 percent in R&M seeds. As per CACP's calculations, farmers should be compensated an additional ₹19.34 per quintal for every 0.25 percent point increase in the oil content beyond this level. The Commission also recommends that such a dispensation of linking MSP with oil content in other oilseeds, where variation in oil content is high, may be introduced in a phased manner to incentivize farmers to adopt high oil content varieties and thereby increase production of edible oils in the country.

Non-Price Policy Recommendations

Low Market Prices and Implementation of MSP

S.4. During RMS 2018-19, market prices of all rabi crops ruled below MSP in major producing states. Wheat prices ruled below MSP in Uttar Pradesh, Rajasthan and Madhya Pradesh, while gram prices were also below MSP in all major producing states. This trend essentially shows that a high MSP is not the only policy instrument to sustain higher production and income but it should be backed up by an effective procurement mechanism to arrest the prices falling below MSP. This emphasizes the importance of public procurement machinery and adequate preparatory measures for establishment of proper procurement system alongwith adequate modern storage & warehousing facilities with active participation of state/state agencies. Private sector participation needs to be encouraged and incentivized to create competitive markets for better price discovery. This calls for formulation of robust and structured mechanism for implementation of MSP.

- S.5. To ensure that farmers get remunerative price for their produce, the Market Assurance Scheme (MAS) or Price Deficiency Payment or procurement by private agencies should be implemented. Market Assurance Scheme (MAS), which proposes procurement by States and compensation of losses up to certain extent of MSP after the procurement and price realization out of sale of the procured produce, can be a better solution for nutri-cereals and pulses. The Commission is of the considered view that states producing nutri-cereals should take responsibility of procurement, storage and distribution of nutri-cereals under PDS and other welfare schemes. In case of pulses, since the quantities procured will not be large, pulses can be supplied to consumers in selected aspirational districts, which would address the problem of malnutrition in these areas and have limited financial implication that can be shared between the state governments and central government.
- S.6. In case of commercial and oilseed crops like soybean, groundnut, rapeseed & mustard, cotton, etc., Price Deficiency Payment (PDP) Scheme, under which in the event of market prices falling below the MSP, farmers need to be compensated to the difference between MSP and actual price (subject to a capping on the lowest market price), could be a better model. However, FAQ standards should be strictly adhered and transparent and efficient price discovery is essential for the success of PDP scheme. The Commission recommends that PDP Scheme should be implemented on pilot basis in case of R&M in all major producing states in the next rabi marketing season.
- S.7. Role of private sector in agricultural marketing is extremely important and cannot be ignored. Therefore, efforts should be made to attract organized private sector agribusiness companies in agricultural trade through appropriate incentives and reducing legal hurdles by amending APMC Act and Essential Commodities Act (ECA).
- S.8. The Commission suggests that States should be free to choose a particular scheme or a set of schemes from the bouquet of available choices like Market Assurance Scheme, Price Deficiency Payment, Private Sector participation, etc.

Impact of MSP and Procurement

- S.9. It is encouraging to note that total number of wheat farmers benefited from procurement operations has increased from 20.47 lakh in RMS 2016-17 to 39.75 lakh in RMS 2018-19 at all-India level, more than 94 percent increase. At state level, number of beneficiary farmers has increased significantly in Uttar Pradesh, Haryana and Madhya Pradesh during the last three years, which is a positive sign to instill confidence among farmers for assured price. However, in terms of proportion of wheat farmers benefited under procurement operations in some states like Uttar Pradesh, Rajasthan and Bihar is still very small. So, there is a lot of scope for expanding wheat procurement operations in these states.

Management of Food Stocks

- S.10. Along with robust procurement, there is a need to develop a mechanism for disposal of stocks procured by government agencies. Wheat stocks as on July 1, 2018 were

much higher (41.8 million tonnes) than buffer norms (27.58 million tonnes) as well as the last year's stocks (32.27 million tonnes). Therefore, there is a need to liquidate excess stocks in the domestic markets through Open Market Sales/PDS as well as world markets. The Commission recommends that a long-term sustainable procurement as well as disposal mechanism for nutri-cereals and pulses needs to be put in place through effective participation of state governments, Farmer Producers' Organizations (FPOs) and other players. One of the options for disposal of stocks on a continuous basis is to introduce pulses under Public Distribution System (PDS) and other welfare schemes in identified aspirational districts with active involvement of State governments to bring stability in the pulses market and encourage farmers to grow more pulses. It would not only help in disposal of stocks but help in improving nutrition and human capital in these districts. Similarly, nutri-cereals can be distributed under PDS in traditionally nutri-cereal consuming States.

- S.11. Major initiatives for creation of scientific warehouses need to be taken by the State Governments to facilitate storage of procured stocks from farmers. The availability of warehouses will also facilitate the farmers to avail credit under pledge finance. The rural educated youth may be encouraged to be trained as quality surveyors under skilled development programmes of government of India. Such an action will create rural employment as well as facilitate faster and dependable quality certification of the stocks being procured.

Timely Payment to Farmers and Announcement of MSP

- S.12. Problem of delay in payment to farmers by procurement agencies, particularly in case of pulses and oilseeds, was highlighted by farmers and it was reported that farmers received payment after many days and in some cases after months. Since small and marginal farmers need cash for the next crop season and to meet other obligations, they are forced to either sell under distress conditions at low prices or borrow from informal sources at exorbitant interest rates. The Commission recommends that payment to farmers should be made within 2-3 days and directly transferred to their bank accounts.
- S.13. The Commission has time and again re-iterated that MSPs should be announced well before the sowing season so that farmers can make informed decisions about crop acreage allocation.

Market Intelligence and Crop Outlook

- S.14. The Commission in its earlier reports has been recommending setting up of marketing information and intelligence mechanism with the primary objective of forecasting market prices and demand-supply situation for forthcoming marketing season. This will help farmers in knowing the expected prices of various crops in next season and making decision about crop choices to avoid glut or shortages of a commodity in the market. The Commission recommends that Directorate of Marketing and Inspection (DMI), Ministry of Agriculture and Farmers Welfare should be restructured and strengthened to act as a nodal agency for providing



market information and intelligence and crop outlook to farmers in making informed decisions about production and marketing of their produce. Agro-Economic Research Centres/Units under the Directorate of Economics and Statistics, Ministry of Agriculture & Farmers Welfare can generate data on prices, demand-supply and commodity markets and market outlook analysis based on farm-level empirical evidences.

Awareness Creation about MSP and FAQ


- S.15. Many studies have pointed out that farmers' awareness about MSP is low, therefore, awareness among the farmers needs to be improved. Information about MSP of important crops and procurement agencies should be timely disseminated by the central and State Governments in regional/vernacular languages in electronic and print media and public announcement in the villages. Besides, there is a need to create transparent and scientific system of measuring quality standards of the produce brought to the market rather than rejecting on subjective judgement.

Improvement in Yields: Bridging Yield Gap

- S.16. Low level of crop productivity, large inter-state differences and yield gap between potential and actual farm yield are main issues for all major Rabi crops. An integrated approach to bridging yield gaps and inter-state differences by ensuring timely availability of various farm inputs, modern technology, and policy intervention is required.

Trade Policy

- S.17. The Commission suggests that agricultural trade policy needs to be stable and predictable so that trade becomes more reliable. However, for creating favourable and stable conditions for promoting domestic production and remunerative prices to farmers, appropriate border protection measures are needed to maintain a price differential between domestic prices and international prices. To safeguard interest of oilseed farmers and domestic refining industry, duty differential between crude and refined oil should be about 15 percent. A predictable and stable export policy would help in encouraging agri-exports and achieve the objective of doubling farmers' income. Synchronization of domestic policies on trade, incentives/subsidies and infrastructure are crucial for improving exports.



Chapter 1

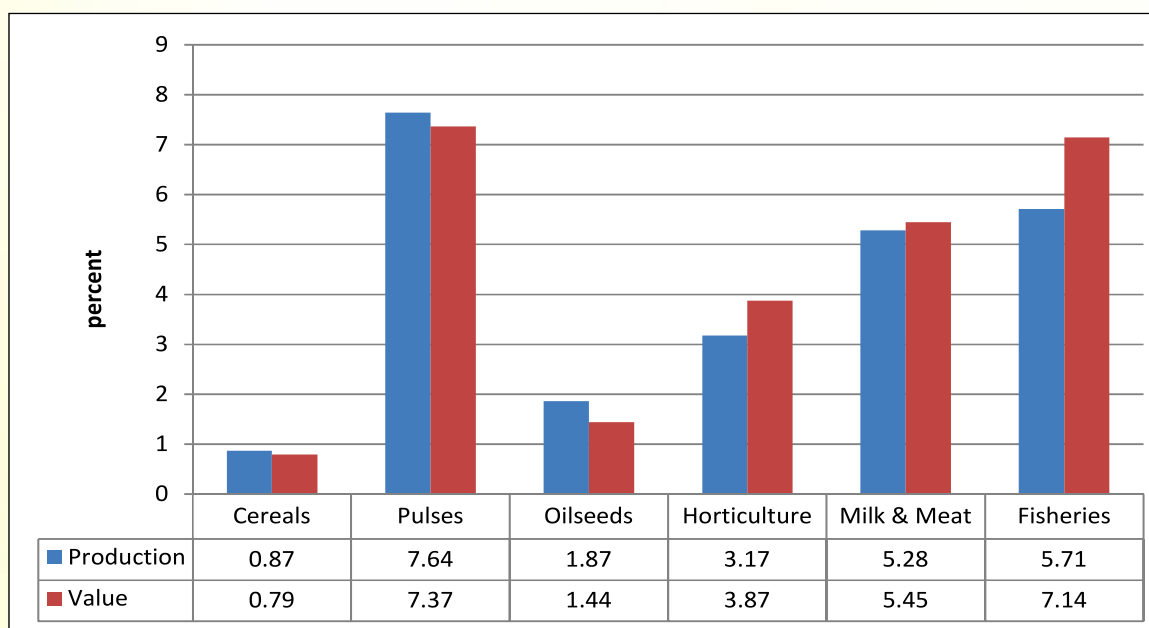
Overview

- 1.1 Agriculture plays a vital role in the Indian economy as more than 50 percent of the population is engaged in agriculture and allied activities though the share of Gross Value Added (GVA) in agriculture sector to total GVA is around 17-18 percent. India has the largest arable land in the world, with diverse agro-climatic conditions and has tremendous advantage in agriculture, with a potential to grow a vast range of agricultural commodities.
- 1.2 Total foodgrains production in 2017-18 is estimated to be 279.51 million tonnes (3rd advance estimates), 4.96 million tonnes more than the target and also higher than the last year (275.11 million tonnes). This is due to significant increase in production of rice (1.82 million tonnes), nutri-cereals (1.1 million tonnes) and pulses (1.4 million tonnes) because of good monsoon and various policy initiatives taken by the Government. Total rabi foodgrain production increased from 136.78 million tonnes in 2016-17 to 140.78 million tonnes in 2017-18 (3rd advance estimates), higher than the target mainly due to an increase of about 2 million tonnes of pulses in rabi season and over 1.5 million tonnes of rabi rice. Good weather conditions along with remunerative prices of pulses pushed up gram production significantly during last two years, from 7.06 million tonnes in 2015-16 to 9.38 million tonnes in 2016-17 and 11.16 million tonnes in 2017-18.
- 1.3 Indian agriculture sector comprises a diverse range of crops and enterprises. India has a comparative advantage in many agricultural commodities due to varied agro-climatic conditions. As per provisional estimates of National Income, the growth rate of GVA at constant (2011-12) prices for agriculture & allied sectors for the year 2017-18 is estimated at 3.4 percent as against previous year growth of 6.3 percent due to higher base. The National Accounts Statistics 2018 shows that crop sector contributed 63.8 percent of the gross value of agricultural production and the share of livestock sector was 30.8 percent and fishing and aquaculture 5.4 percent in TE2016-17. High-value sectors like horticulture (17.3 percent) and livestock (30.7 percent) contribute significantly to the gross value of agricultural production while share of cereals is only 17.2 percent (Annex Chart 1.1). In recent decades, the share of foodgrains had declined while share of horticulture and livestock sector

has increased due to increasing demand for fruits, vegetables and livestock products.

- 1.4 During the period 2012-13 to 2016-17, the average growth in production (y-o-y) of cereals was 0.87 percent with slightly higher growth in wheat at 0.95 percent (Chart 1.1). However, value of output from cereals grew at a lower rate (0.79 percent) compared with production growth. The average growth of pulses production has been very impressive with 7.64 percent but value of output was lower (7.37 percent) than production growth. Similarly, oilseeds production grew at a higher rate (1.87 percent per year) compared with growth in value of output (1.44 percent). In high-value agriculture, growth in value of output was higher compared with growth in production, e.g: value of output in case of horticulture sector grew by 3.87 percent against production growth of 3.17. Similarly, in case of fisheries, value of output grew at 7.14 percent per annum while production growth was 5.71 percent. These results show that value realization by farmers from crop sector has grown less than production growth, thereby indicating depressed commodity prices. The growth in agriculture and allied sectors is mainly driven by high-value sectors, which is in line with emerging demand patterns.

Chart 1.1: Growth in Production and Value of Output from Major Crop Groups and Sub-Sectors: 2012-13 to 2016-17



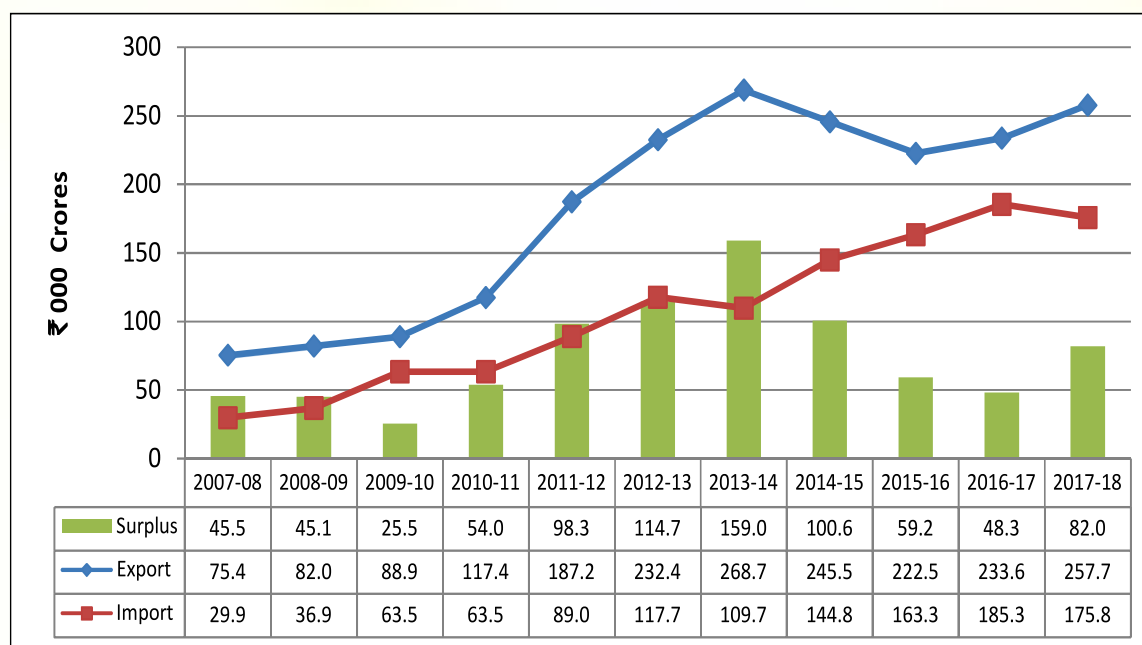
Source: DES, Department of Animal Husbandry, Dairying & Fisheries, M/o Agriculture & Farmers Welfare, National Accounts Statistics, M/o Statistics & Programme Implementation

Trade Scenario

- 1.5 Total exports of agricultural commodities, valued at ₹257.7 thousand crores in 2017-18, recorded an impressive increase of about 10 percent for second consecutive year, double than what was recorded during 2016-17. This increase in exports is mainly attributed to rice (basmati and non-basmati), with 30 percent increase in

exports compared to 2016-17. Apart from this, marine products and cotton also contributed significantly towards increase in exports. Total imports have declined this year by 5 percent and stood at ₹175.8 thousand crores compared to ₹185.3 thousand crores in 2016-17. This is mainly attributed to lower imports of pulses, sugar and wheat with the percentage decline of 34.27 percent, 12.12 percent and 72.29 percent, respectively. As is evident from the increasing trend of exports and reduced imports, trade surplus increased from ₹48.3 thousand crores in 2016-17 to ₹82 thousand crores in 2017-18 (Chart 1.2).

Chart 1.2: India's Exports, Imports and Net Trade of Agri-Commodities (2007-08 to 2017-18)

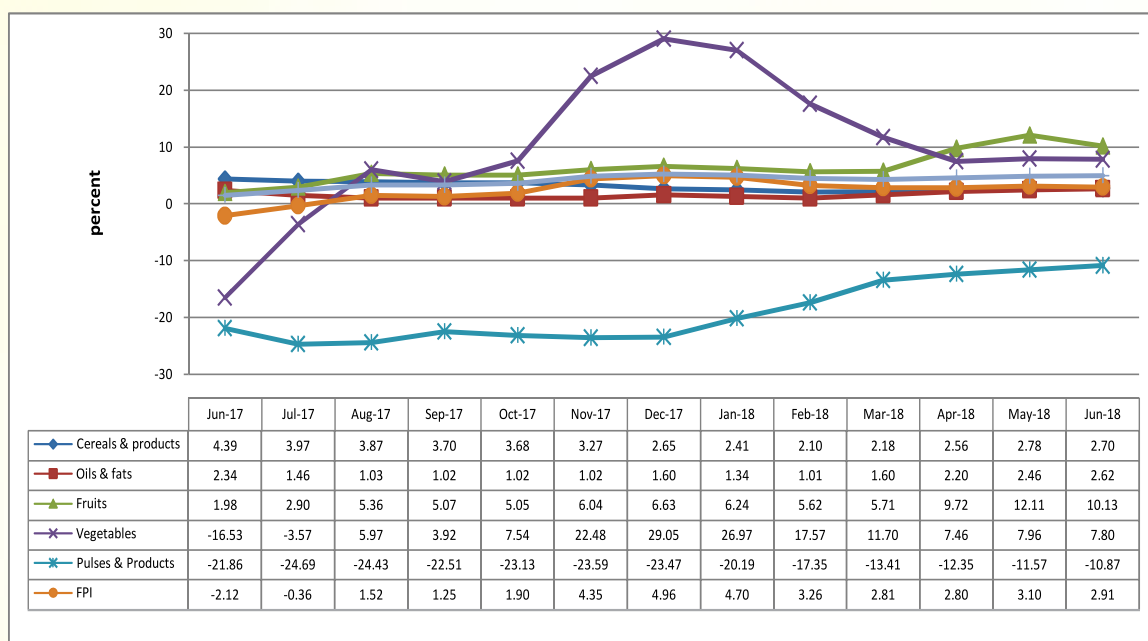


Source: DGCIS

Consumer Price Index (CPI) Based Inflation

- 1.6 Food inflation, which was negative in June-July 2017 witnessed an increasing trend up to January 2018 but declined thereafter and reached 2.91 percent in June 2018, much below general price level. Looking at component-wise inflation, it is seen that the food inflation is mainly driven by fruits & vegetables while on the other hand inflation in cereals, pulses and edible oils is much lower and even negative (-10.87 percent) in case of pulses (Chart 1.3). This clearly indicates that prices of cereals, pulses and oilseeds are depressed and adversely affecting farm income.
- 1.7 There has been a lot of debate about likely impact of recent hike in MSPs of kharif crops on inflation and it has been argued that it would lead to food inflation. However, trends in inflation clearly show that farmers are under distress due to un-remunerative prices and need to be compensated appropriately. The increase in MSP may have a marginal impact on food inflation and in case of cereals, pulses and oilseeds in particular but would certainly help farmers.

Chart 1.3: Trends in CPI based Food Inflation

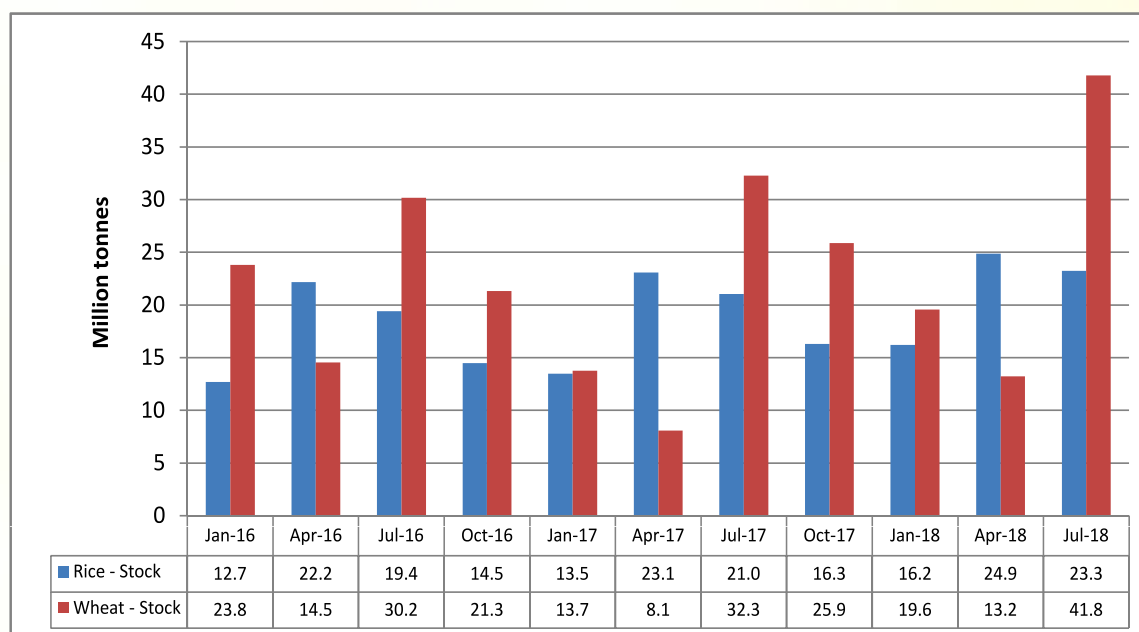


Source: Ministry of Statistics and Programme Implementation, Government of India

Central Pool Stocks

- 1.8 Trends in rice and wheat stocks during January 2016 to April 2018 are given in Chart 1.4. The total stock (wheat + rice) with the central pool has been higher than buffer-stock norms. In April 2018, total stocks (rice+wheat) were 38.1 million tonnes against the norm of 21.04 million tonnes, about 81 percent higher than the norms. Total stock of wheat in April 2018 stood at 13.2 million tonnes compared with 8.1 million tonnes in April 2017. The total stocks of rice and wheat as on 1st July, 2017 were 53.32 million tonnes, which has risen to 65.05 million tonnes on 1st July, 2018 against the buffer stock norm of 41.12 million tonnes, which is more than 24 million tonnes in excess of buffer norm.
- 1.9 Assuming likely procurement during Kharif Marketing Season (KMS) 2018-19 and Rabi Marketing Season (RMS) 2019-20 to be at the same level as last year i.e 36.3 million tonnes and 35.6 million tonnes respectively, total procurement of rice and wheat is expected to be 71.9 million tonnes. With an anticipated offtake (from July 2018 to June 2019) of 63 million tonnes as per FCI estimates (i.e 24 million tonnes of wheat, 34 million tonnes of rice and 5 million tonnes of open sale), the stock position as on July 1st 2019 is likely to be about 74 million tonnes against the buffer stock norms of 41.12 million tonnes, thus leading to a surplus stock of 32.8 million tonnes. Approximately 15-18 million tonnes of stocks will be in Cover and Plinth (CAP) storage due to scarcity of covered storage space. However, with recent increase in MSP of paddy and expected normal monsoon this year, rice procurement is expected to be higher than the last season. Hence, the problems of excess stocks and shortage of storage need to be addressed on priority basis.

Chart 1.4: Central Pool Stocks of Wheat and Rice with FCI, Jan 2016 to July 2018



Source: Department of Food and Public Distribution

Offloading of Excess Stocks

- 1.10 The accumulation of excess stocks of wheat and rice with FCI is likely to create the problem of availability of storage for next marketing season. To address the issue of surplus stocks, one possible solution could be additional allocation of foodgrains under PDS which would help in liquidating the stocks as well as address the problem of hunger and malnutrition. If an additional monthly allocation of 5 kg of foodgrains (3 kg rice and 2 kg wheat) to Antyodaya Anna Yojana (AAY) beneficiary households and 1 kg (half kg rice and wheat each) per person to Priority Households (PHHs) is made on BPL rates under PDS, about 10 million tonnes of foodgrains (rice 5.1 million tonnes and wheat 4.9 million tonnes) can be liquidated from the central pool.

Mechanism for Implementation of MSP

- 1.11 Procurement system in case of wheat and paddy is fairly robust and has become more diversified in terms of coverage of states and number of farmers but needs to be strengthened in eastern and north-eastern states for rice and in Rajasthan, Uttar Pradesh particularly in eastern region and Bihar for wheat. For rest of the crops covered under the MSP, there are two types of crops. One, for crops like nutri-cereals and pulses, procurement and distribution through Public Distribution System (PDS) and under other welfare schemes can be developed with active participation of State governments. Two, in case of commercial crops like oilseeds, cotton, etc. procurement system can be strengthened but disposal of stocks would always remain a challenge as industrial sector is the main user of these commodities. The Commission is of the view that Market Assurance Scheme



(MAS), which proposes procurement by States and compensation of losses up to certain extent of MSP after the procurement and price realization out of sale of the procured produce, can be a better solution for nutri-cereals and pulses. However, States producing nutri-cereals should take responsibility of procurement, storage and distribution of grains under PDS and other welfare schemes. In case of pulses, since the quantities procured will not be large, pulses can be supplied to consumers in selected aspirational districts which would address the problem of malnutrition in these areas and have much limited financial implications. In case of commercial crops, Price Deficiency Payment (PDP) Scheme, under which if market price is below the MSP then the farmers may be compensated to the difference between MSP and actual price (subject to a capping on the minimum price), can be launched on pilot basis in crops like soybean, groundnut, cotton, rapeseed & mustard etc. where production is concentrated in few states. However, the scheme needs to be implemented in all major producing states, FAQ standards to be strictly adhered, and extend the window of PDP Scheme through linking it to warehouse receipt financing scheme. Farmers should be encouraged and incentivized to store their produce beyond PDP period of 3 months in accredited warehouses to avoid distress sale and allow farmers to sell when prices are most favourable. However, when farmers join the programme, they should receive a loan against their produce and be entitled to receive the benefit of PDP scheme if market prices in later months are below MSP. If market prices are higher, they can choose to sell in the open market and take advantage of high prices. Apart from these, transparent and efficient price discovery is essential for the success of PDP scheme. Therefore, there is a need to make e-NAM in these markets operational and create national market for the selected commodities on priority basis. However, role of private sector in agricultural marketing is extremely important and cannot be ignored. Therefore, private sector needs to be encouraged and incentivised to actively participate in agricultural marketing.

- 1.12 The Commission recommends that States should be given a choice to select a particular scheme or a set of schemes from the bouquet of options like Market Assurance Scheme, Price Deficiency Payment, Private Sector participation, etc.

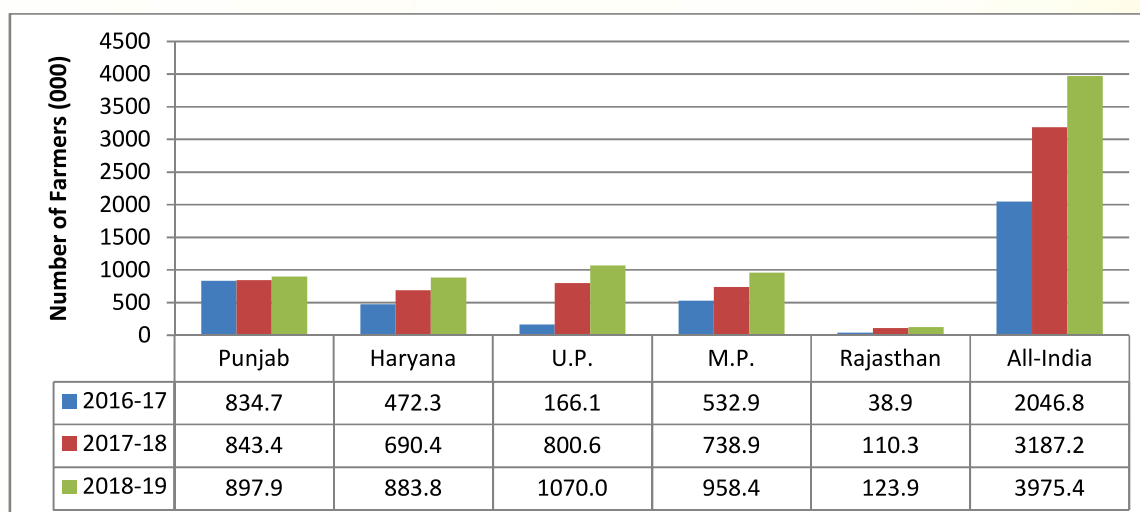
Gramin Agricultural Markets (GrAMs)

- 1.13 Government's recent announcement of upgradation of existing 22,000 rural haats into GrAMs brings good news to farmers especially small and marginal as these constitute around 85 percent of farmers in the country. Since, these farmers are not always in a position to directly transact at APMCs and other wholesale markets due to lack of accessibility and other constraints, upgradation of these rural haats can address the problem of much needed market linkages. The GrAMs can then be linked to e-NAM and exempted from regulations of APMCs. However, concern remains of smooth functioning of GrAMs in remote areas where requirement of electricity and other infrastructure is a pre-requisite as they will be connected to e-NAM.

Impact of Procurement on Farmers

1.14 It is encouraging to note that total number of wheat farmers benefitted from procurement operations has increased from 20.47 lakh in RMS 2016-17 to 39.75 lakh in RMS 2018-19 at all-India level, more than 94 percent increase. At state level, number of beneficiary farmers has increased significantly in Uttar Pradesh, Haryana and Madhya Pradesh during the last three years. Uttar Pradesh has recorded more than 500 percent increase in number of farmers benefitted under wheat procurement, which is a positive sign to instill confidence among farmers for assured price. However, in terms of proportion of wheat farmers benefitted under procurement operations in some states is still very small. Uttar Pradesh, which is the largest producer of wheat in the country and has the highest number of farmers¹ growing wheat (43.8 percent of country's total wheat growing farmers), has only around 7 percent of wheat growers getting benefit of procurement, which clearly indicates that there is still significant scope to expand procurement operations in the State. Similarly, in case of Rajasthan, only around 4 percent of wheat farmers are benefitting from procurement. So, there is a lot of scope for expanding wheat procurement operations in the state. On the other hand, more than 80 percent of wheat growers in Punjab are getting benefits of procurement though the State accounts for around 3 percent of total wheat growers in the country.

Chart 1.5: Trends in Number of Wheat Farmers Benefiting from the Procurement during last three Rabi Marketing Seasons



Source: FCI, Agriculture Census, 2010-11

Timely Payment to Farmers

1.15 Problem of delay in payment to farmers by procurement agencies, particularly in case of pulses and oilseeds was highlighted by farmers and it was reported that farmers receive payment after many days and in some cases after months. Since small and marginal farmers need cash for the next crop season and to meet other obligations, they are forced to either sell under distress conditions at low prices

¹ Number of operational holdings growing wheat, as per Agriculture Census, 2010-11, has been taken as a proxy for number of farmers



or borrow from informal sources at exorbitant interest rates. The Commission recommends that payment to farmers should be made within 2-3 days and directly transferred to their bank accounts.

Timely Announcement of MSP

- 1.16 The Commission has time and again re-iterated in its reports that MSPs should be announced well before the sowing season so that farmers can make informed decisions about crop acreage allocation. The issue was also highlighted by the farmers and farmers' organisation in the meeting organized by the Commission. It has been observed that historically, barring two to three occasions, MSPs were announced when the sowing had already started. The Commission submits its Kharif and Rabi Reports to the Government by 31st March and 31st July, respectively. The date of announcement of MSPs for last few years are given in Table 1.1:

Table 1.1: Date of Announcement of MSP for Kharif and Rabi Crops

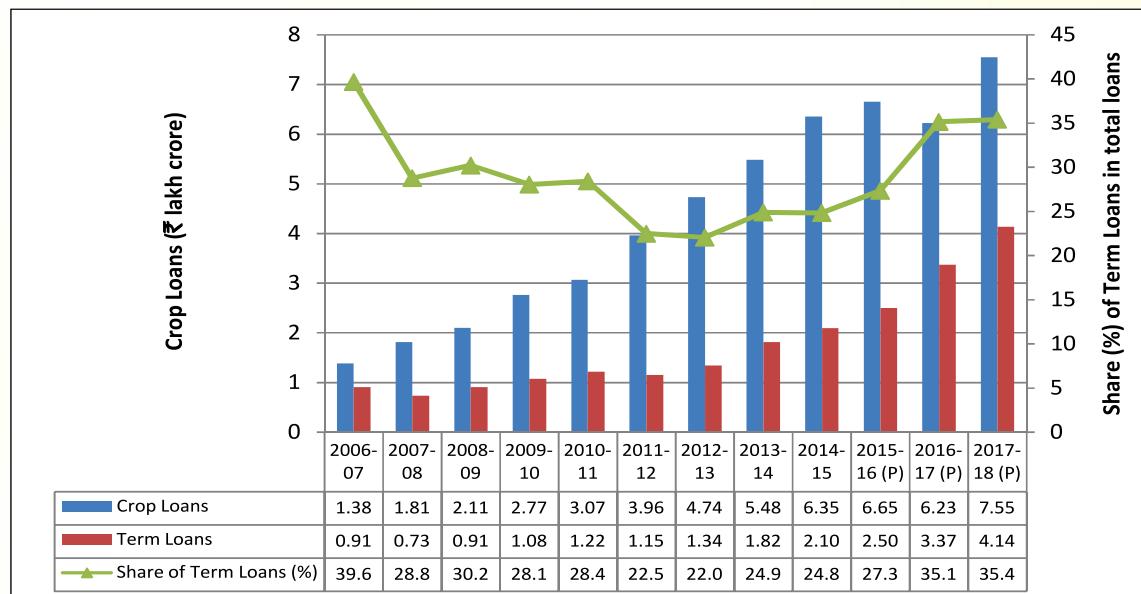
Year	2018	2017	2016	2015	2014	2013	2012	2011	2010
Kharif	4-Jul	7-Jun	1-Jun	17-Jun	25-Jun	28-Jun	14-Jun	9-Jun	10-Jun
Rabi	NA	24-Oct	18-Nov	5-Nov	29-Oct	17-Oct	1-Nov	25-Oct	20-Oct

- 1.17 It is, therefore, reiterated that Government should announce MSPs well before the sowing season starts. It is suggested that MSP for rabi crops should be announced in the first/second week of October and for kharif in the last week of May.

Agricultural Credit

- 1.18 There has been a significant increase in flow of institutional credit to agriculture sector during last 10 years, from about 3 lakh crore to about 11.7 lakh crore. Total credit disbursement for 2017-18 has exceeded the target of ₹10 lakh crore by ₹1.69 lakh crore. The share of term loan, which witnessed a steady decline during 2006-07 and 2012-13, has improved during the last five years. Although, the rate of growth of term loan has been impressive at 209 percent during last five years (from ₹1.34 lakh crore in 2012-13 to ₹4.14 lakh crore in 2017-18) compared to 59 percent growth in crop loan during the same period, but the lower share of term loan in total credit disbursement is an area of concern which needs to be addressed (Chart 1.6). The Commission in its earlier reports has time and again emphasized that the share of term loans needs to be improved to promote investment in agriculture as there is high degree of complementarity between public and private investment in agriculture. Efforts are also needed to step up loan facilities to tenant farmers as they are often deprived of institutional finance due to absence of collateral. Moreover, lower share of cooperatives and RRBs in total credit disbursement is also an area of concern as these are primary sources of short and medium term credit to small and marginal farmers due to deep penetration of these institutions in rural areas.

Chart 1.6: Trends in Institutional Credit to Agricultural Sector and Share of Term Loans in Total Agricultural Credit



Note: P-Provisional

Source: NABARD

Water Productivity

1.19 Recent report released by the National Bank for Agriculture and Rural Development (NABARD) highlighted that the country needs to look at water productivity rather than only focusing on land productivity which the Commission has emphasized time and again in its earlier reports. Given that 80 percent of water resources of the country are used by agriculture and since the country is already reeling under the acute water shortage in many parts, it is of utmost necessity to increase crop productivity per drop of water. For instance, as per the report of NABARD, Punjab reports the highest land productivity for rice, producing four tonnes per hectare. However, the Irrigation Water Productivity (IWP) is relatively low at 0.22 kg/m³ which indicates the inefficient irrigation water use. The existing almost free electricity policy in agriculture in Punjab and Haryana has led to indiscriminate groundwater exploitation and non-judicious water use in agriculture. Jharkhand and Chhattisgarh, on the other hand, show the IWP of 0.75 and 0.68 kg/m³ for the same amount of water. Thus there exists a serious misalignment in rice cropping patterns with respect to the water availability in India, which needs to be rectified with effective demand side as well as supply side policies.

Market Intelligence

1.20 The Commission in its earlier reports has been recommending setting up of separate marketing intelligence with the primary objective of forecasting market prices and demand-supply situation for forthcoming marketing season. This will help farmers in knowing the expected prices of various crops in next season and can accordingly plan their activities before the sowing season. For instance, some



State governments have started working in this area using various statistical models in consultation of various stakeholders but needs to be upscaled. The Commission recommends that DMI should be restructured and play a dominant role in this area. Agro-Economic Research Centres/Units under the DES, could be involved in this exercise.

Oilseeds and Oilcakes/Meals


- 1.21 The Government has recently increased the import duty on edible oils in order to ensure that oilseed farmers get remunerative prices for their produce. However, in order to ensure the better realization to oilseed farmers, there is a need to address issues related to oilseed complex rather than focusing only on edible oils because both edible oils and oilseeds cake/de-oiled cake play a critical role in overall value-addition from oilseeds. The major share of oilseed cakes is exported and therefore, the industry should be incentivized for exporting oilseed cakes as this will translate into better demand for oilseeds. In addition, technological interventions are required to process the oilseed cakes to increase its domestic demand in livestock and poultry industries.
- 1.22 In terms of oilseeds, Government needs to address problem of continuous decline in area under safflower during last ten years. The demand for oil has been increasing due to the change in consumption pattern in light of rising health awareness among consumers but acreage under safflower has been decreasing at an annual average rate of 15 percent with a major fall of 44 percent in 2017-18 compared to 2016-17. Therefore, appropriate R&D interventions are needed in safflower cultivation to increase its productivity.

Wildlife Management

- 1.23 The problem of human-wildlife conflict has been standing for a long time which needs to be addressed on priority as farmers cultivating crops are facing serious problem of crop losses due to wild/stray animals. To address the issue, State governments may explore the feasibility of installing electric/solar fencing or digging trenches near farmlands on community based approach. Possibility of using funds of MGNREGA, RKVY, etc. already available with the state governments may be explored for the same.

Structure of the Report

- 1.24 The report is organized as follows. Chapter 2 presents the demand-supply scenario and procurement operations of the Government. Chapter 3 discusses trends in crop productivity and related aspects. Chapter 4 presents trends in international trade and domestic prices in relation to international prices, as well as brief review of trade policies with a view to use international trade as an expanding opportunity for domestic producers. Chapter 5 presents the cost of production and returns of different rabi crops. Finally, a summary of the discussion along with non-price policy and MSP recommendations is presented in Chapter 6.



Chapter 2

Demand-Supply Scenario and Procurement Operations

- 2.1 Rabi foodgrains production witnessed an increase of around 2.9 percent in 2017-18, which was driven by improvement in crop yield (4.8 percent), as area under rabi foodgrains declined by about 1.8 percent in 2017-18 compared with 2016-17. Production of wheat has marginally increased by 0.1 percent. An increase of 2.3 percent in production of barley is due to increase in area (3.1 percent) while yield of barley recorded a decline of 0.8 percent. A significant increase in production of gram (19.0 percent) was witnessed and both area (9.8 percent) and yield (8.3 percent) contributed towards increased production. In case of rapeseed & mustard, there was a decline in area (1.1 percent) but production increased by 1.6 percent due to 2.7 percent increase in crop yield. However, there was a significant decline in production of safflower (52 percent) due to substantial decline in both area (43.9 percent) and yield (14.5 percent), which is a matter of concern.
- 2.2 As per FAO estimates (July 2018), world wheat production in 2018-19 is anticipated to fall (736.1 million tonnes) from last year's level of 756.8 million tonnes. As per USDA and International Grains Council (IGC) projections for 2018-19, global production of wheat is likely to be 745 million tonnes and 737 million tonnes, respectively, which is lower than estimated production of 758 million tonnes in 2017-18. This decline in production is due to fall in wheat production in Russia, Mexico, Germany and Poland. Global oilseeds production according to USDA is expected to be a record, an all-time high of 594 million tonnes in 2018-19, 21 million tonnes higher than 573 million tonnes estimated for 2017-18. According to FAO estimates, global oilseed output is estimated at 584 million tonnes in 2017-18, marginally below the 2016-17 level (586.8 million tonnes).
- 2.3 Global Wheat stock-to-use ratio (SUR) is forecast to be lower in 2018-19 compared with 2017-18. As per FAO estimates, the world wheat stock-to-use ratio (SUR) is forecast to be 34.9 percent in 2018-19, lower than 36.9 percent in 2017-18. However, major exporter's stock-to-disappearances ratio is forecast to decrease



to 16.8 percent in 2018-19, significantly below 2017-18 level of 20.8 percent. However, International Grains Council (IGC) projections show a marginal decline in SUR for wheat in 2018-19 at 34.4 percent as compared with 35.4 percent in 2017-18. FAO food price index decreased from 175.3 in June 2017 to 173.7 in June 2018.

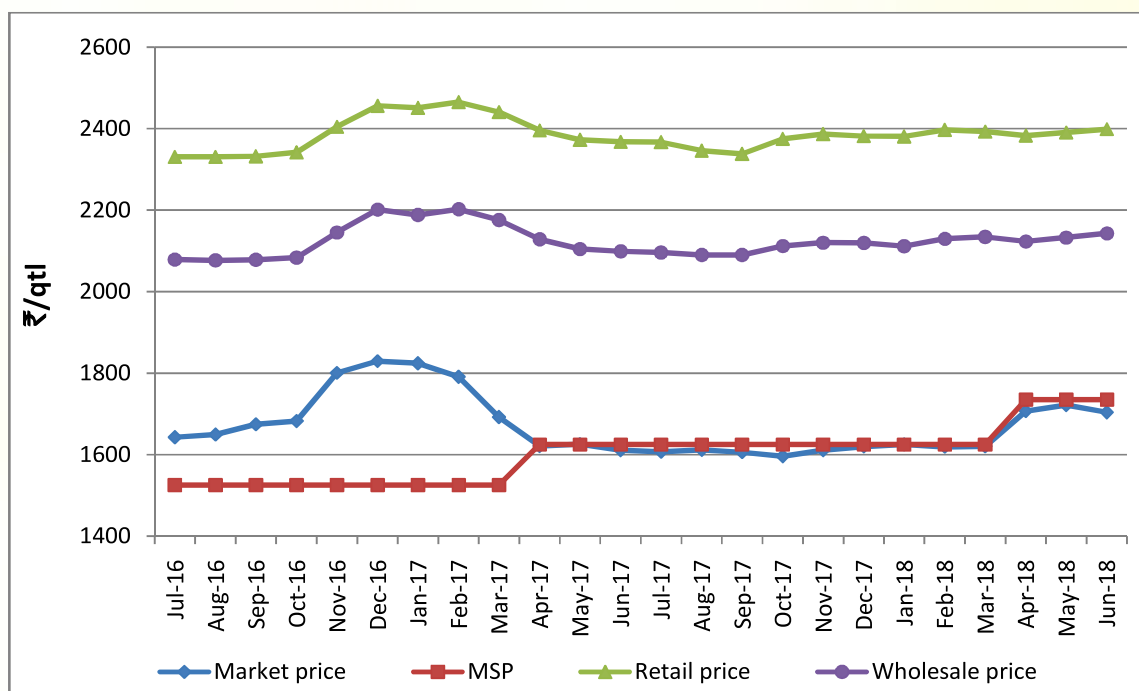
Market Prices and MSP

- 2.4 Agricultural commodity prices are primarily determined by demand and supply factors, which in turn are influenced by domestic price policy, trade policy, market structure, functioning of markets, etc. The nature of market imperfections prevailing in the agricultural commodity markets influence the price transmission along the supply chain and final consumer prices. India meets bulk of its large food demand through domestic production, barring few commodities like edible oils and pulses. The trends in market prices have been analysed by computing weighted average market prices (AGMARKNET, DMI), wholesale prices and retail prices (Department of Consumer Affairs, MoCA, F&PD), thus capturing price movements of major producing states. The analysis of trends in domestic and world prices also plays crucial role in deciding the price policy for agricultural commodities, which helps in maintaining the price stability. In this section, we analyze trends in market price (producer, wholesale and retail) and MSPs of rabi crops during July 2016 to June 2018. Charts 2.1 to 2.9 present the movement of market prices vis-à-vis MSPs of wheat, barley, gram, lentil, R&M and safflower, respectively.

Wheat

- 2.5 Chart 2.1 depicts monthly average market prices, retail prices and wholesale prices of wheat in the country. Market prices of wheat ruled above MSP continuously from July 2016 to March 2017. However, thereafter market prices dropped and hovered around MSP till March 2018. In rabi marketing season (RMS) 2018-19 (April-June 2018), market prices increased but ruled below MSP. There is a strong correlation between wholesale prices and market price. Similarly, market prices and retail prices as well as wholesale prices and retail prices were positively correlated. Chart 2.2 illustrates that market prices were ruling below MSP in two major wheat-producing states, Uttar Pradesh and Rajasthan, therefore efforts are needed to increase government procurement/intervention to improve market prices. In Madhya Pradesh, market prices improved during RMS 2018-19 mainly due to more public procurement compared to RMS 2017-18, which were reported below MSP. Overall, market prices of wheat have increased during April to June 2018. It may be due to continuous rise in global wheat prices and increase in customs duty of wheat from 20 percent to 30 percent in May 2018. Table 2.1 clearly illustrates that during RMS 2018-19, wheat prices ruled below MSP in Uttar Pradesh, Rajasthan and Madhya Pradesh. Therefore, efforts should be made to increase government intervention and attract organized private sector in wheat trade.

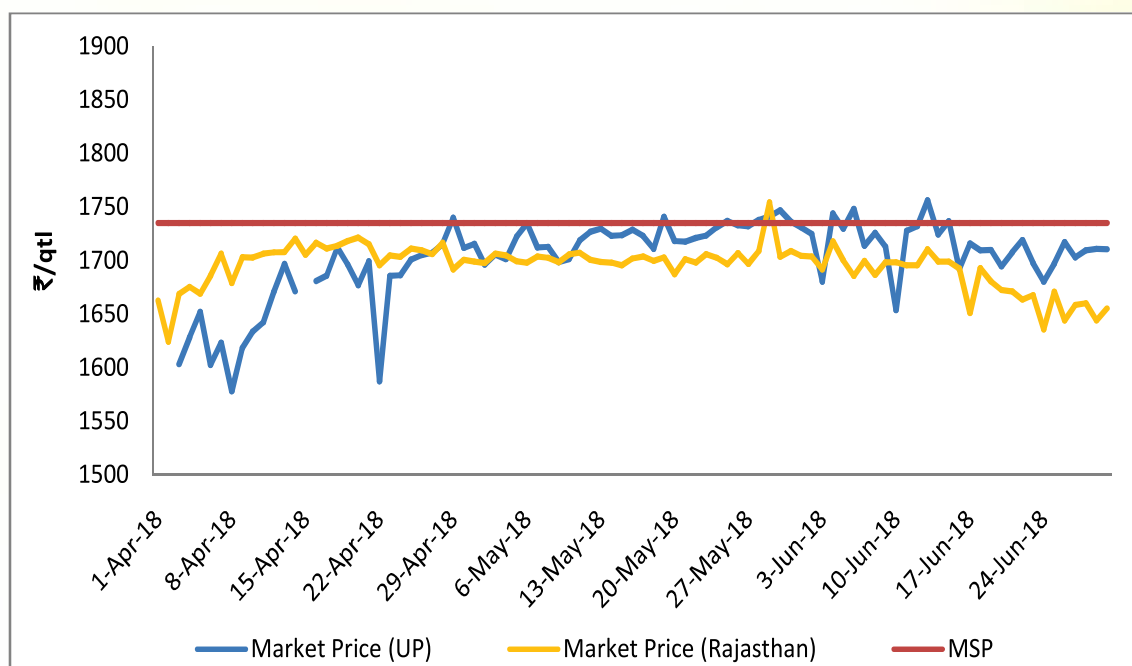
Chart 2.1: Domestic Prices vis-à-vis MSP of Wheat



Note: Weighted average market prices of Haryana, MP, Punjab, Rajasthan and UP, which constitute around 86 percent of production.

Source: AGMARKNET, Directorate of Marketing & Inspection (DMI) and Department of Consumer Affairs, MoCA, F&PD.

Chart 2.2: Comparison of Market Prices vs MSP of Wheat in Uttar Pradesh and Rajasthan (RMS 2018-19)



Source: AGMARKNET, Directorate of Marketing & Inspection (DMI) and DES, DAC&FW

Table 2.1: Market Prices vis-a-vis MSP of Wheat in Major Producing States in RMS 2018-19

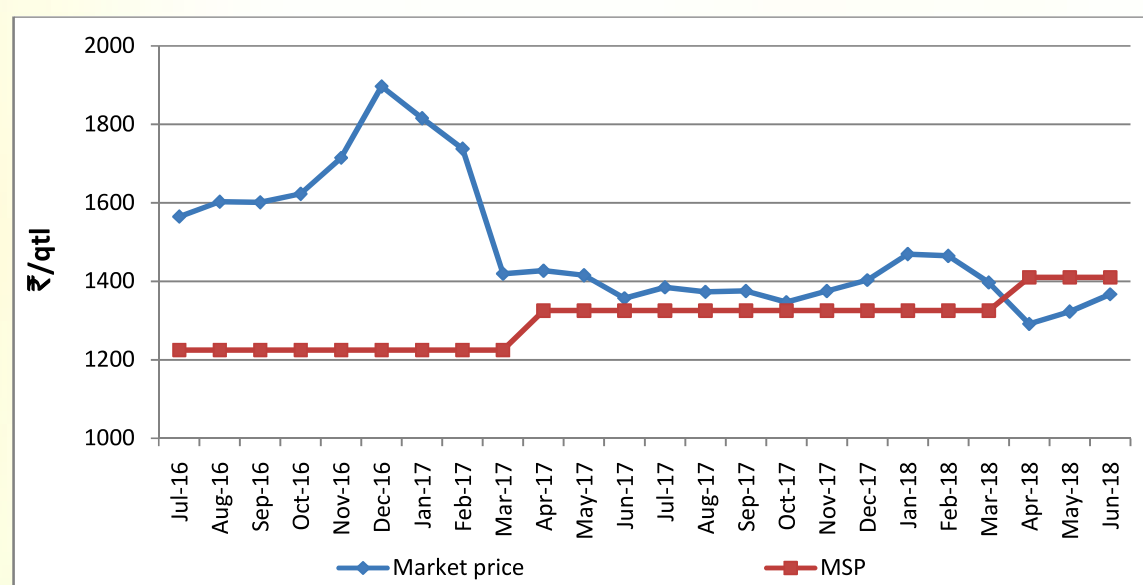
States	No. of days market prices reported			No. of days market price were below MSP			Days (percent) when market price were below MSP (April-June)
	April	May	June	April	May	June	
Haryana	28	31	13	0	1	2	4.2
Madhya Pradesh	28	31	30	18	16	27	68.5
Rajasthan	28	31	29	26	25	23	84.1
Punjab	22	31	11	6	1	0	10.9
Uttar Pradesh	30	31	30	30	30	30	98.9

Source: AGMARKNET, Directorate of Marketing & Inspection (DMI)

Barley

- 2.6 Market prices of barley showed an increasing trend during July-December 2016 but witnessed a steady decline up to October 2017 when MSP and market prices converged. Market prices of barley, which were above MSP from July 2016 to March 2018, fell below MSP during current season (April-June 2018). Market prices recovered marginally in May and June but were still below MSP (Chart 2.3). During April to June 2018, market prices in major producing states like Madhya Pradesh and Rajasthan, which contribute about 64 percent of total barley production in the country, ruled below MSP for most of the days (Annex Chart 2.1).

Chart 2.3: Market Prices vis-à-vis MSP of Barley



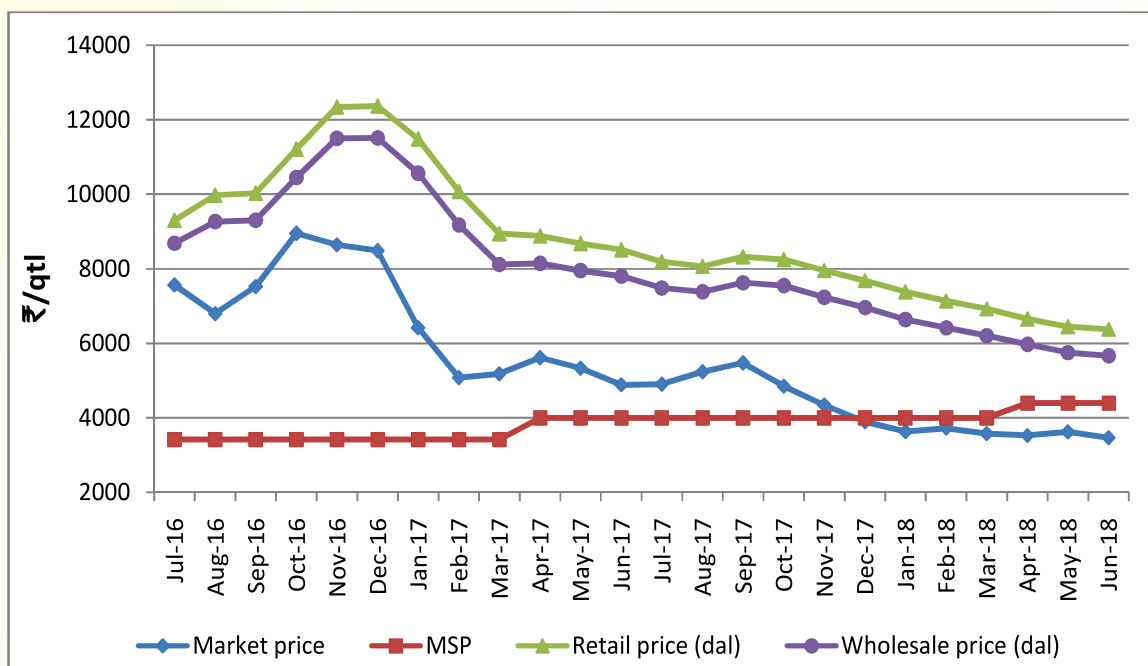
Note: Weighted average market prices of Haryana, MP, Rajasthan and UP, which constitute around 92 percent of production

Source: AGMARKNET, Directorate of Marketing & Inspection (DMI) and DES, DAC&FW

Pulses

- 2.7 In 2017-18, India produced 24.5 million tonnes of pulses compared to 14.6 million tonnes in 2008-09, an increase of about 68 percent in a decade. National Food Security Mission (NFSM) had a target for additional pulses production of 4 million tonnes by end-2017, which has been successfully achieved, thus significantly reducing the country's dependence on imports in recent years. For majority of vegetarian population in India, pulses are the major source of protein. Pulse crop residues are also major sources of high quality livestock feed in India. Rabi pulses contribute around 65 percent of the total pulses production in the country while about 35 percent is contributed by kharif pulses. More than 80 percent of total Rabi pulses production is contributed by gram (72 percent) and lentil (10 percent), whereas major kharif pulses include tur (46 percent), urad (29 percent) and moong (15 percent).
- 2.8 In order to incentivize pulses production and encourage farmers to grow pulses, government significantly increased MSPs of both kharif and rabi pulses in 2017-18 and 2018-19 and also made efforts to supply quality seed to farmers. As a result of which there was a record increase in area and production of pulses in the country, but had adverse impact on market prices, which ruled below MSP in most of the crops. Gram area has increased by about 10 percent, while production increased by about 19 percent due to significant improvement in yield (8.3 percent) in 2017-18.
- 2.9 Market prices of gram, which ruled above MSP till November 2017, started declining and continue to rule below MSP till date (Chart 2.4). During current marketing season (April-June 2018), market prices of gram ruled below MSP in all major producing states, which may discourage farmers from growing gram in the next season (Chart 2.5 and Table 2.2). This trend essentially shows that a high MSP is not the only policy instrument to sustain higher production but it should be backed up by a robust procurement system to arrest the prices falling below MSP level, which emphasizes the importance of public procurement machinery and adequate preparatory measures for establishment of proper procurement system and storage facilities with active participation of state/state agencies. There is also a problem of disposal of stocks procured by government agencies. If these stocks are offloaded in the market during peak harvesting season, it further depresses market prices. Therefore, the Commission recommends that long-term sustainable procurement as well as disposal system of pulses procured by the government agencies need to be put in place through effective participation of state governments, producers' organizations. One of the options for disposal of stocks on continuous basis and support producer prices is to introduce pulses under Public Distribution System (PDS) in identified aspirational districts with effective participation of State government, for which a robust mechanism needs to be evolved. It would not only help in disposal of stocks but also in improving nutrition and human capital in these districts in the long run.

Chart 2.4: Domestic Prices vis-à-vis MSP of Gram



Note: Weighted market prices of AP, Chhattisgarh, Gujarat, Karnataka, MP, Maharashtra, Rajasthan, Telangana, UP and WB, which account for 90 percent of production

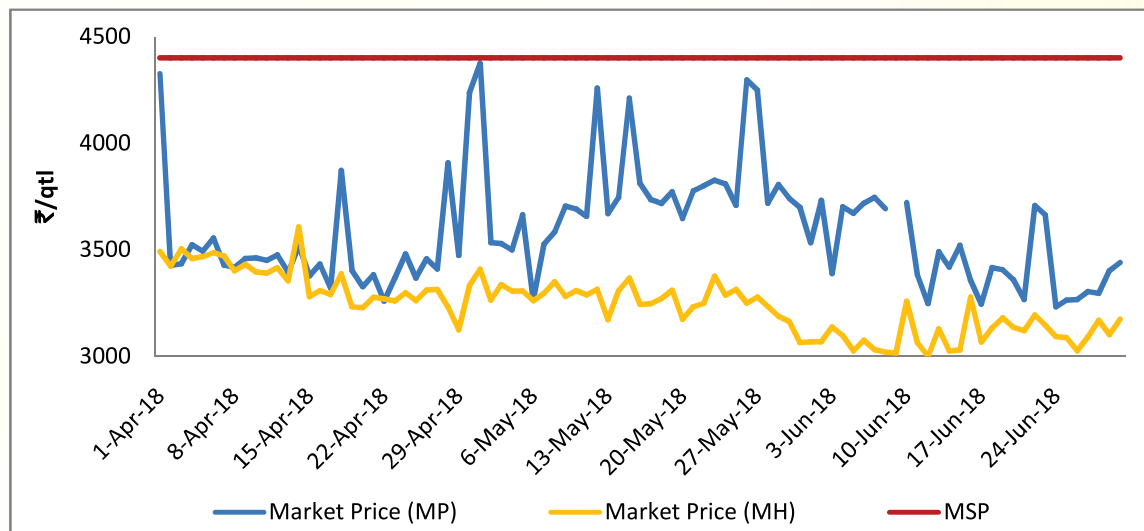
Source: AGMARKNET, Directorate of Marketing & Inspection (DMI) and Department of Consumer Affairs, MoCA, F&PD.

Table 2.2: Market Prices vis-a-vis MSP of Gram in Major Producing States in RMS 2018-19

States	No. of days market prices reported			No. of days market price were below MSP			Days (percent) when market price were below MSP (April-June)
	April	May	June	April	May	June	
Chhattisgarh	26	31	29	26	31	29	100.0
Gujarat	24	27	26	24	27	26	100.0
Karnataka	28	27	27	28	27	27	100.0
Madhya Pradesh	30	31	30	30	31	30	100.0
Maharashtra	30	31	30	30	31	30	100.0
Rajasthan	29	31	6	29	31	6	100.0
Telangana	24	28	2	21	27	2	92.6
Uttar Pradesh	30	31	30	27	31	30	96.7

Source: AGMARKNET, Directorate of Marketing & Inspection (DMI)

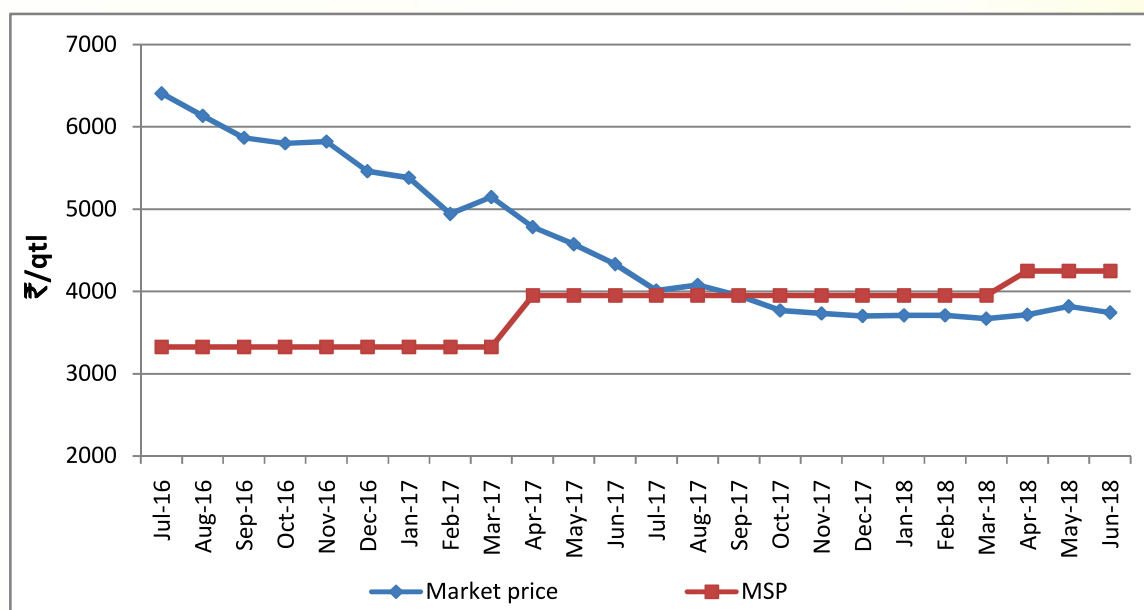
Chart 2.5: Comparison of Market Prices vs MSP of Gram in Madhya Pradesh and Maharashtra (RMS 2018-19)



Source: AGMARKNET, Directorate of Marketing & Inspection (DMI)

2.10 Market prices of lentil, the second important rabi pulse, showed a declining trend but were higher than MSP from July 2016 to June 2017 (Chart 2.6). Thereafter, prices started declining and during April to June 2018, market prices ruled below MSP. Monthly prices show a declining trend mainly due to low prices in Madhya Pradesh and Uttar Pradesh, which contribute around 64 percent of the total production (Annex Chart 2.2).

Chart 2.6: Market Prices vis-à-vis MSP of Lentil



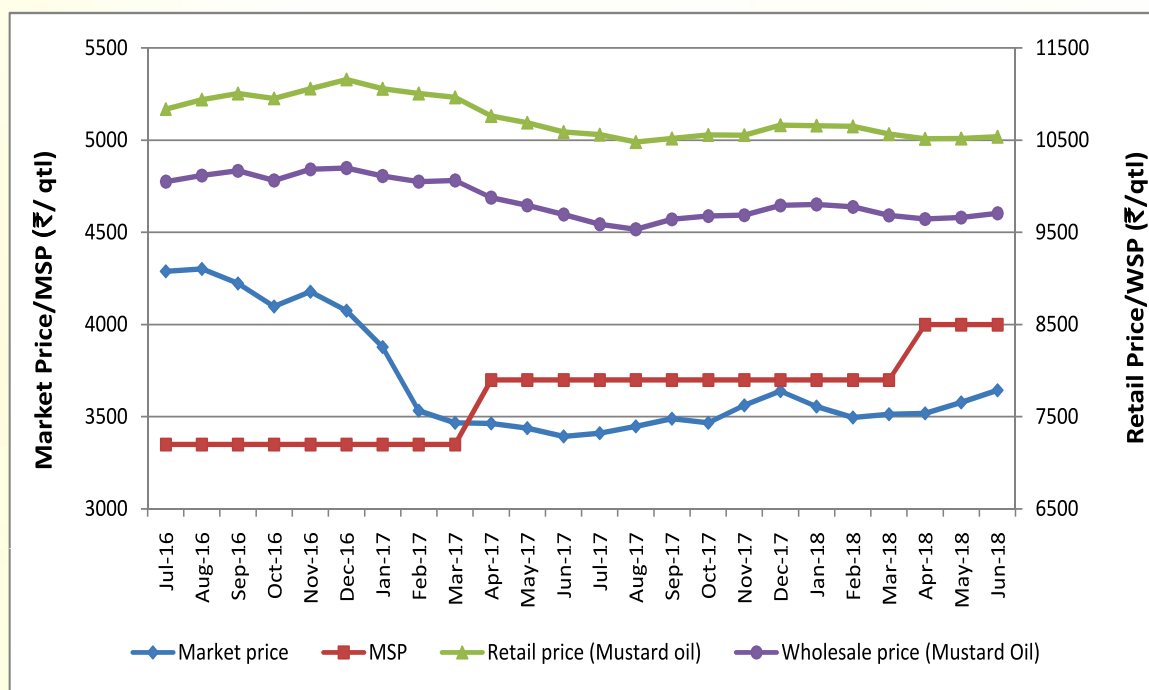
Note: Weighted average market prices of Chhattisgarh, Jharkhand, MP, UP and West Bengal, which account for 75 percent of production

Source: AGMARKNET, Directorate of Marketing & Inspection (DMI) and DES, DAC&FW

Rapeseed and Mustard

2.11 Rapeseed and Mustard which is the most important oilseed in the country showed declining price trend but prices were ruling above MSP from July 2016 to March 2017. However, prices fell below MSP and no improvement was observed in market prices (Chart 2.7). During April-June 2018, peak rabi marketing season, gap between market prices and MSP widened further, which necessitated procurement by the public agencies. As on 11.06.2018, NAFED procured 7.74 lakh tonnes of mustard, which marginally improved the price from ₹3514 per quintal in March to ₹3644 per quintal in June but was still below MSP (₹4000). There is a strong positive correlation between market prices and wholesale prices of R&M ($r=0.98$), and also market prices of R&M and retail prices of mustard oil ($r=0.70$). Market prices of R&M in all major producing states like Rajasthan, Haryana, Madhya Pradesh and Uttar Pradesh were ruling below MSP in RMS 2018-19 (Table 2.3). Persistence of low prices below MSP for two consecutive years discouraged farmers from growing R&M and area under the crop fell by 1.1 percent in 2017-18, and may further decrease in the next rabi season. Timely market intervention by public agencies is needed to stabilize market prices and ensure benefits of MSP operations to farmers. Price Deficiency Payment (PDP) Scheme could be a better alternative for R&M compared with procurement by government agencies. Chart 2.8 clearly illustrates that market prices were ruling below MSP in Uttar Pradesh and Rajasthan.

Chart 2.7: Domestic Prices vis-à-vis MSP of R&M



Note: Weighted average market prices of Chhattisgarh, Gujarat, Haryana, Jharkhand, MP, Rajasthan, UP and West Bengal, which constitute 93 percent of production

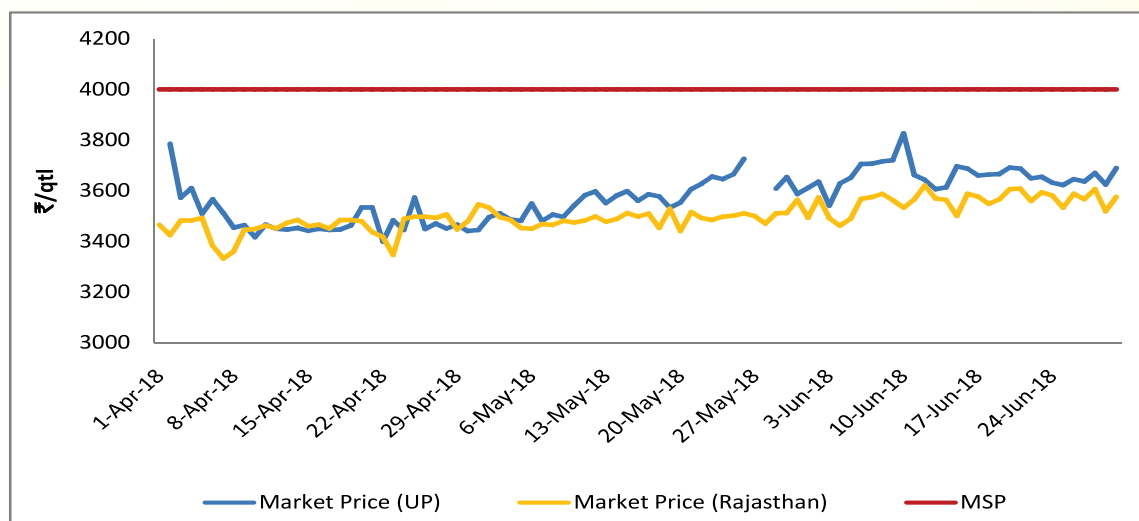
Source: AGMARKNET, Directorate of Marketing & Inspection (DMI), Department of Consumer Affairs, MoCA, F&PD.

Table 2.3: Market Prices vis-a-vis MSP of R&M in Major Producing States in RMS 2018-19

States	No. of days market prices reported			No. of days market price were below MSP			Days (percent) when market price were below MSP (April-June)
	April	May	June	April	May	June	
Chhattisgarh	7	11	19	7	11	19	100.0
Gujarat	27	26	26	27	26	26	100.0
Madhya Pradesh	30	27	29	30	26	29	98.8
Rajasthan	29	28	27	29	28	27	100.0
Haryana	24	24	13	19	20	13	85.3
Uttar Pradesh	30	31	29	30	31	29	100.0
West Bengal	30	28	29	30	28	28	98.8

Source: AGMARKNET, Directorate of Marketing & Inspection (DMI)

Chart 2.8: Comparison of Market Prices vs MSP of R&M in Uttar Pradesh and Rajasthan (RMS 2018-19)

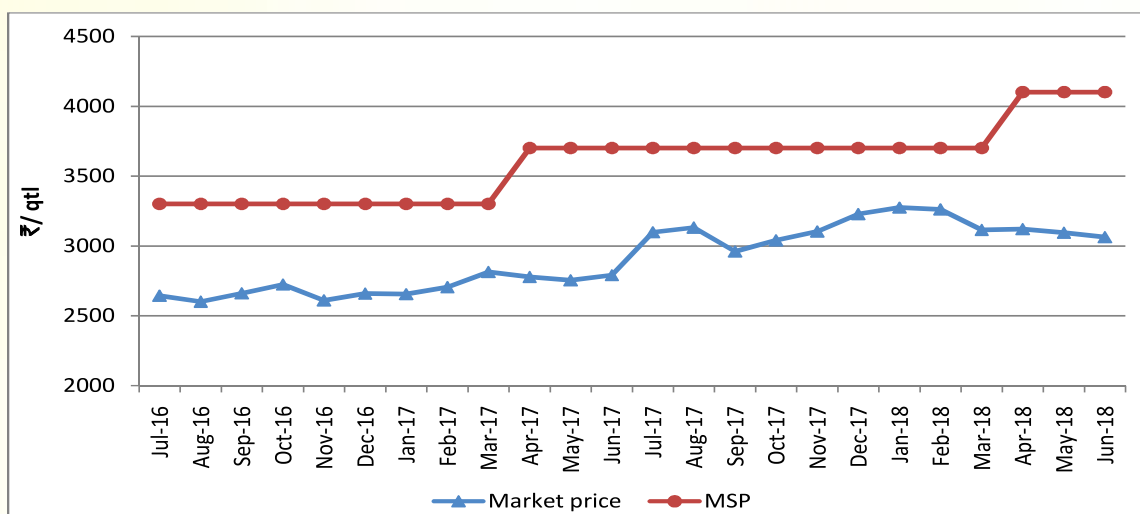


Source: AGMARKNET, Directorate of Marketing & Inspection (DMI)

Safflower

2.12 Although safflower oil is a premium-cooking oil, safflower production has continuously declined over the last ten years, from 2.25 lakh tonnes in 2007-08 to 0.45 lakh tonnes in 2017-18. In 2017-18, there was 44 percent decline in area, as result of which, production fell by 52 percent. Market prices of safflower have ruled below MSP from July 2016 to June 2018 (Chart 2.9). Due to very low productivity of safflower in the country, cost of production is very high, which makes it less competitive. Concerted efforts in Research and Development in safflower are needed to improve crop productivity and seed oil content to make it competitive and profitable.

Chart 2.9: Market Prices vis-à-vis MSP of Safflower



Note: Weighted average market prices of Karnataka and Maharashtra, which constitute 78 percent of production

Source: AGMARKNET, Directorate of Marketing & Inspection (DMI) and DES, DAC&FW

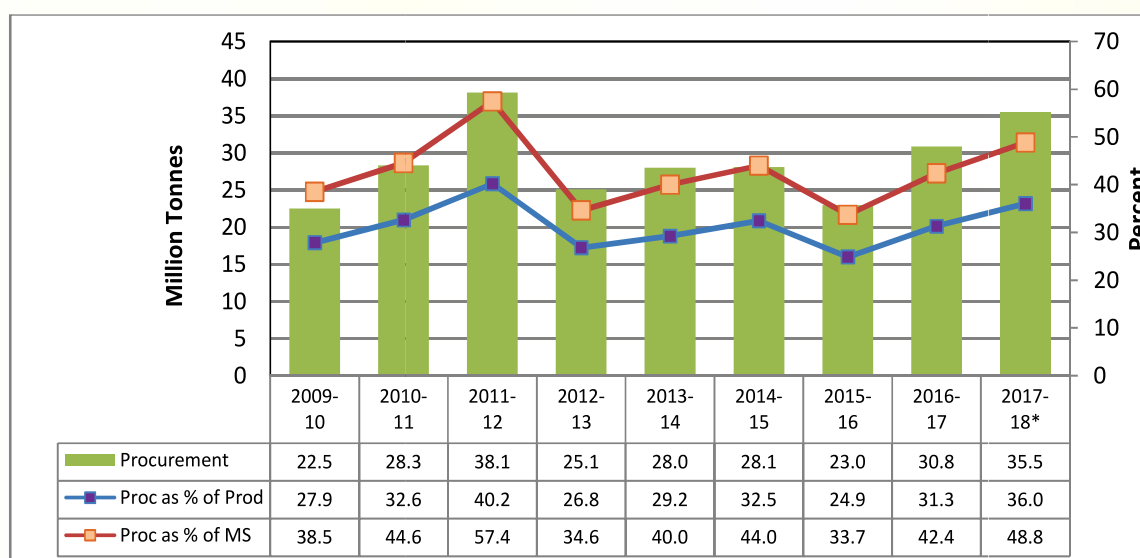
Market Intelligence and Crop Outlook

- 2.13 There are large spatial and temporal variations in prices of agricultural commodities in India. It is important to understand the large variation in prices implying producers getting different prices for the same commodity depending on their physical location. This area is largely neglected in the contentious debates on agricultural policy. An estimation of future prices based on past trends of prices, production, consumption patterns, etc. will facilitate smooth functioning of markets and better returns to farmers. Market outlook reports can facilitate temporal and spatial integration of markets and prices, thus strengthening the market intelligence network and reducing volatility in market prices. Timely dissemination of market prices to farmers through SMS and advice on where and when to sell will help farmers in getting remunerative prices and prevent distress sale.
- 2.14 The U.S. Department of Agriculture (USDA), Australian Bureau of Agricultural and Resource Economics, Directorate-General for Agriculture and Rural Development under the European Commission, etc. provide economic intelligence and the commodity outlooks for various stakeholders involved in agricultural value-chain. For example, the USDA has 29 agencies and offices with nearly 100,000 employees at more than 4,500 locations across the country and abroad to provide market intelligence and projections based on macroeconomic conditions, policy, weather, and developments in domestic and global agricultural markets. There is an urgent need to create such an agency in the country. Directorate of Marketing and Intelligence under the Ministry of Agriculture & Farmers Welfare can be restructured to play such a role. The Directorate of Economics & Statistics, DAC&FW should also use its network of Agro-Economic Research Centres and Units to collect, analyze and disseminate information based on farm level, sub-regional and state level studies.

Procurement Policy and Operations

- 2.15 The Food Corporation of India (FCI) is the central nodal agency designated for purchase of procurement of wheat at MSP while NAFED undertakes procurement of pulses and oilseeds. Earlier, procurement operations in case of Rabi crops were largely confined to wheat. However, in RMS 2017-18, NAFED has increased its presence in the market by procuring pulses and oilseeds.
- 2.16 The procurement of wheat has continuously increased since 2015-16, attaining a level of 35.5 million tonnes in 2017-18 which is marginally lower than 38.1 million tonnes achieved in 2011-12, highest ever achieved since 2009-10. However, since procurement operations are still going on, it appears that the procurement of wheat this year may be more than the one achieved in 2011-12. Procurement as percentage of production has increased from 31.3 percent in 2016-17 to 36 percent in 2017-18 and of marketable surplus from 42.4 percent to 48.8 percent during the period (Chart 2.10).

Chart 2.10: Wheat Procurement as Percent of Production and Marketed Surplus



Note: MSR is available upto 2014-15, hence repeated in 2015-16 to 2017-18

*Procurement for 2017-18 as on 06.07.2018

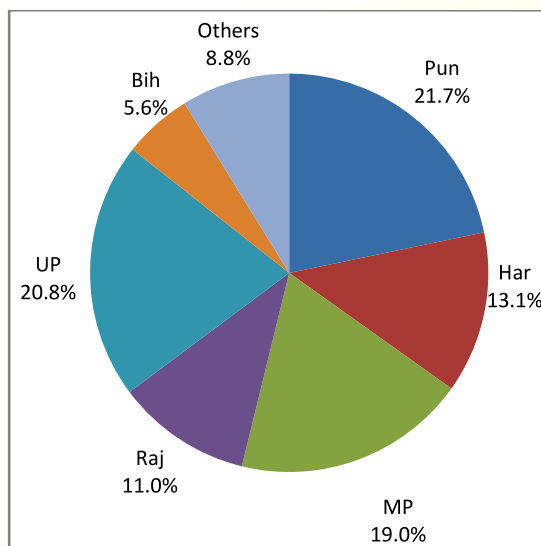
Source: DES, DAC&FW and DFPD

- 2.17 Another issue, which CACP has highlighted in its earlier reports and continues even now, is the low procurement in some of the major growing states like Bihar, Rajasthan and Uttar Pradesh. Uttar Pradesh has made significant progress due to strong commitment of the State Government and improved its share in total procurement from 4.4 percent in TE2014-15 to 10.7 percent in TE2017-18. Uttar Pradesh has procured more than 5 million tonnes of wheat during 2017-18. However, compared to its share in total marketed surplus, which is highest (20.8 percent) among major producing states, share in procurement is still low (Chart 2.11). During TE2017-18, out of the total wheat procurement of about 29.8 million tonnes, 39.2 percent was contributed by Punjab, 25.7 percent by Haryana and 20.2 percent by Madhya

Pradesh. These three states accounted for 85.1 percent of total wheat procurement in the country. The share of Madhya Pradesh in total procurement has decreased from 25.6 percent TE2014-15 to 20.2 percent in TE2017-18 while Haryana and Uttar Pradesh have improved their share. The share of Bihar in total wheat production is about 4.8 percent but its share in procurement is negligible (Chart 2.12) and market prices are also below MSP. Therefore, special attention needs to be given to increase procurement of wheat in the State.

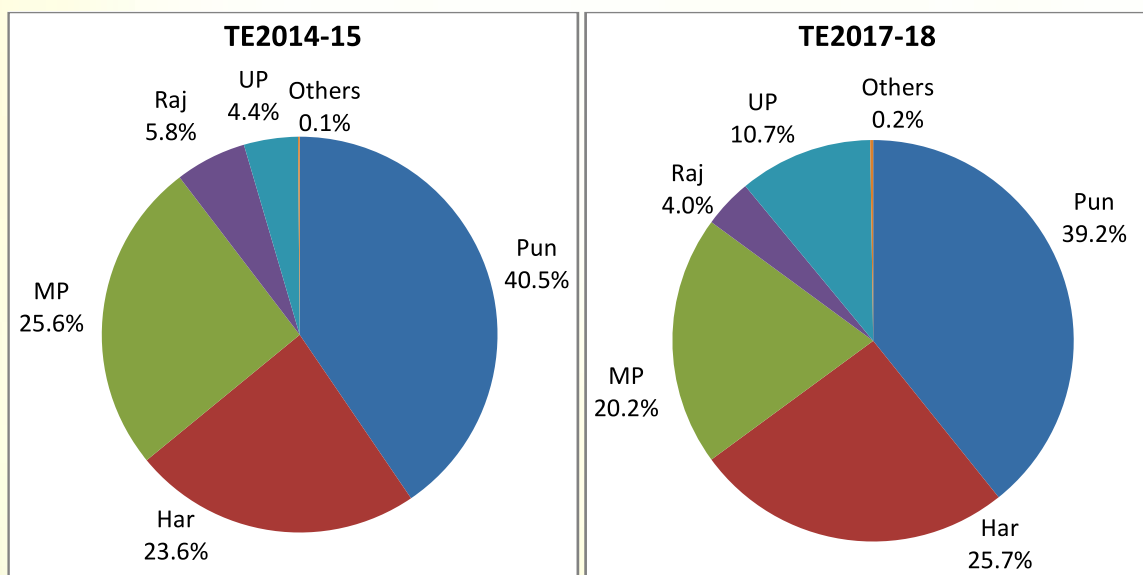
- 2.18 It may be pertinent to mention that a large number of procurement centers have been setup in Bihar and Uttar Pradesh, but procurement has not been adequate, indicating low capacity utilization and infrastructure weaknesses (Chart 2.13).

Chart 2.11: State-wise Share in Marketed Surplus of Wheat (TE2017-18)



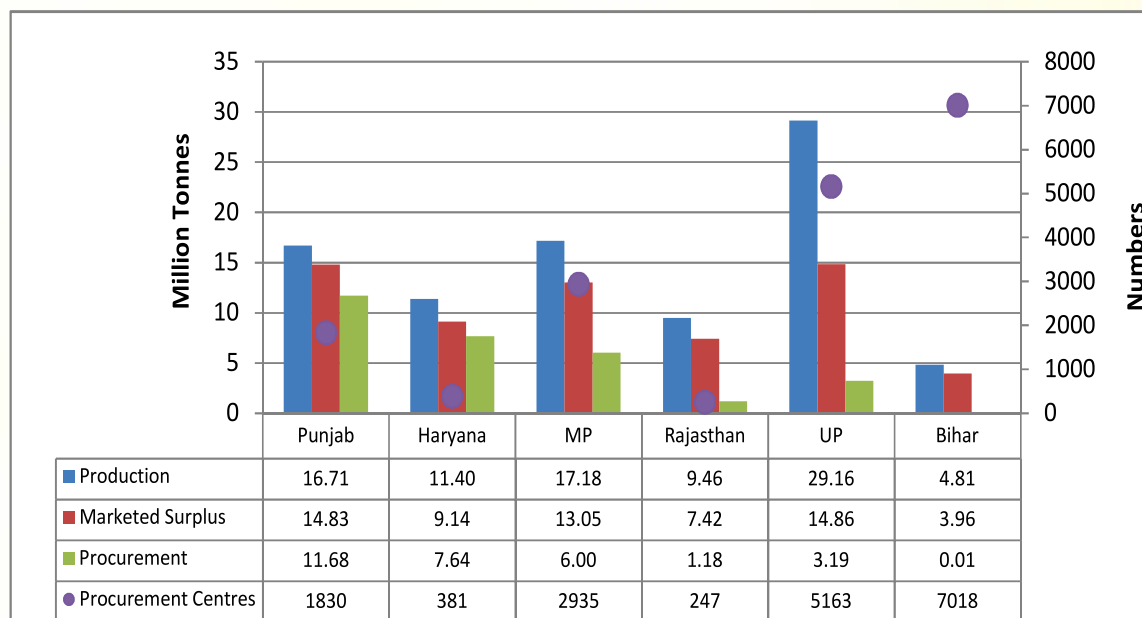
Source: DES, DAC&FW

Chart 2.12: State-wise Share in Procurement of Wheat



Source: FCI

Chart 2.13: State-Wise Production, Marketed Surplus, Procurement and Procurement Centres of Wheat in TE2017-18

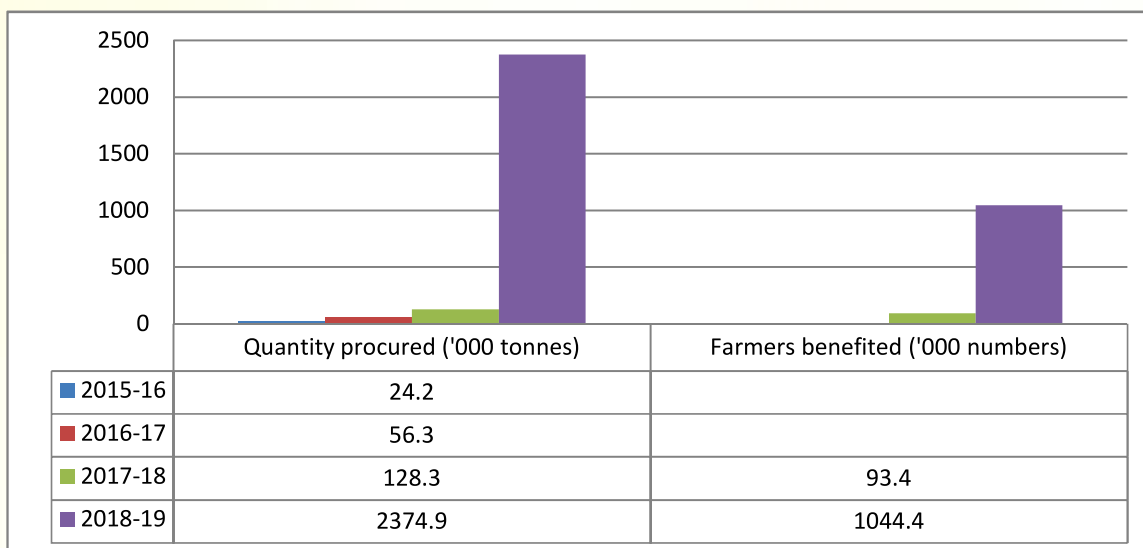


Source: DES, DAC&FW and FCI

Pulses and Oilseeds

- 2.19 The country achieved a record production of pulses during 2017-18 (24.51 million tonnes), sufficient to meet domestic requirement. However, weak marketing system, led to a fall in market prices. NAFED has increased its presence in market in 2016-17 and 2017-18 for procurement of pulses and procured 1.28 lakh tonnes of gram in 2016-17 and reached 23.7 lakh tonnes (as on 11.06.2018) in 2018-19 (Chart 2.14). It was reported that about 66 percent of gram procurement was done in Madhya Pradesh and 6.09 lakh farmers benefited from procurement (Annex Table 2.1). NAFED procured 4.19 lakh tonnes of gram from Rajasthan, which benefited 1.63 lakh farmers. Similarly, procurement of masur as on 11.06.2018 was 2.27 lakh tonnes and about 98 percent of procurement of masur was from Madhya Pradesh, benefiting 1.59 lakh farmers (Annex Table 2.1). NAFED has opened around 1420 procurement centre for gram and 515 procurement centers for masur. In spite of such large procurement no significant impact has been made on the price recovery, therefore there is a need to involve the agencies like FCI in procurement operations to extend coverage.
- 2.20 During discussions with the farmers and officials of State Government, it was reported that the sowing and harvesting period of pulses varied from state to state. In view of this, to give the benefit of MSP to farmers, CACP recommends that the procurement period in case of pulses in the respective States should be fixed as per harvesting calendar of the State.

Chart 2.14: Procurement of Gram by NAFED and Farmers Benefited from Procurement

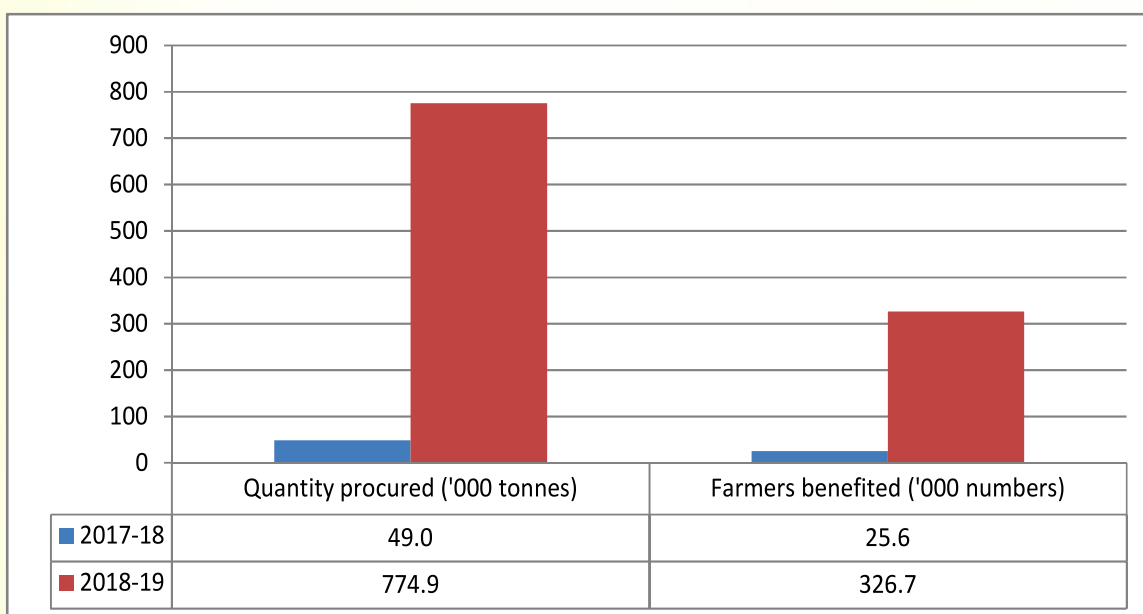


Note: Procurement for RMS 2018-19 as on 11.06.2018

Source: NAFED

2.21 As on 11.06.2018, NAFED had procured 7.75 lakh tonnes of mustard seed, out of which 52 percent was procured from Rajasthan followed by Haryana (28 percent), Madhya Pradesh (15 percent) and Gujarat (5 percent). Procurement of mustard seeds has benefited over one lakh farmers in Haryana and about 1.5 lakh farmers in Rajasthan (Chart 2.15 and Annex Table 2.2).

Chart 2.15: Procurement of Mustard by NAFED and Farmers Benefited from Procurement



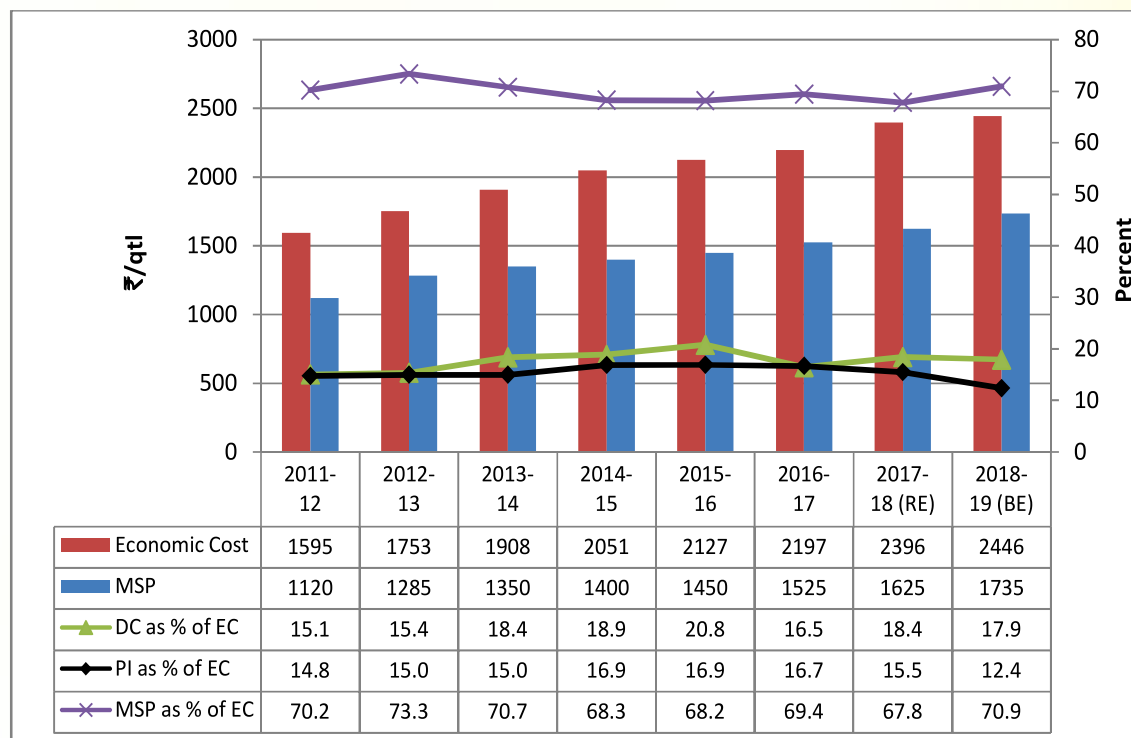
Note: Procurement for RMS 2018-19 as on 11.06.2018

Source: NAFED

Economic Cost of Wheat and Statutory Cesses/Fees

2.22 Economic cost has three main components - pooled cost of grains, procurement incidentals and distribution costs. Procurement incidentals and distribution costs accounted for about 34.2 percent of economic cost during last five years. The share of procurement incidentals in total economic cost has declined during the last five years from 16.9 percent in 2014-15 to 12.4 percent in 2018-19 (BE). Distribution cost in total economic cost also decreased from 20.8 percent in RMS 2015-16 to 17.9 percent in RMS 2018-19 with lowest of 16.5 percent in RMS 2016-17 due to lower procurement of wheat in RMS 2016-17 (Chart 2.16). Procurement incidentals decreased from ₹371.8 per quintal in RMS 2017-18 to ₹303.2 per quintal in RMS 2018-19 primarily due to exemption of agricultural commodities from VAT after introduction of Goods and Service tax (GST). There was a significant reduction of statutory cesses/fees in all states in 2017-18 as agriculture produce and foodgrains are fully exempted from GST. However, Punjab has increased rural development cess of 2 percent to 3 percent and subsumed infrastructure development cess under GST. Statutory cesses/fees on wheat in major wheat growing States ranged from 3.15 percent in Rajasthan to 8.5 percent in Punjab during 2017-18 (Table 2.4), which adds to the economic cost of wheat. The states should be discouraged from imposing high statutory levies/taxes and also announcement of bonus over and above MSP as it distorts the market and cropping pattern.

Chart 2.16: Economic Cost of Wheat and Share of Different Components of Economic Cost



Note: PI-Procurement Incidentals, DC-Distribution Cost, EC- Economic Cost

Source: Food Corporation of India

Table 2.4: Statutory Cesses/Fees (percent) Levied on Wheat by Major States

States	RMS 2016-17	RMS 2017-18	RMS 2018-19
Punjab	14.50	14.50	8.50
Haryana	11.50	11.50	6.50
Madhya Pradesh	9.20	8.86	3.75
Uttar Pradesh	8.36	8.16	4.05
Rajasthan	8.46	3.26	3.15

Source: FCI

Awareness Creation about MSP and FAQ

2.23 For MSP to be an effective instrument of price policy and function as safety net, there must be a system of procurement whenever market prices fall below MSP and farmers must also be aware of the MSP as well as procurement agencies. However, awareness about MSP and procurement agencies is low in many regions and crops. During CACP's interactions with the farmers it was pointed out that the agricultural produce brought to the market is at times rejected as it does not meet the FAQ norms. There is a need to have transparent and scientific system of measuring quality standards rather than rejecting the produce on subjective judgment. In order to strengthen MSP operations, MSP needs to be backed up by effective procurement, scientific and transparent FAQ standards and awareness creation by various agencies to enable more number of farmers to take its advantage. This calls for giving wide publicity about MSP and procurement agencies by the State Governments in regional/vernacular languages, electronic and print media and through pamphlets, and announcements in the villages regarding MSP of commodities at least 15 days before the procurement starts so as to reach out to farmers in far off areas. In addition, farmers need to be trained and provided required infrastructure to meet FAQ standards so as to minimize post-harvest losses, avoid rejection of produce and better prices to farmers.


Recapitulation

2.24 During RMS 2018-19, market prices of all rabi crops ruled below MSP in major producing states. This trend essentially shows that a high MSP is not the only policy instrument to sustain higher production but it should be backed up by an effective procurement system to arrest the prices falling below MSP. This emphasizes the importance of public procurement machinery and adequate preparatory measures for establishment of proper procurement system with active participation of state/state agencies. Private sector participation needs to be encouraged and incentivized to create competitive markets.

2.25 Along with robust procurement, there is a need for proper disposal of stocks procured by government agencies. If these stocks are offloaded in the market

during harvesting season, it would further depress market prices. Therefore, the Commission recommends that long-term sustainable procurement as well as disposal system for nutri-cereals and pulses procured by the government needs to be put in place through effective participation of state governments, Farmers Producers' Organizations (FPOs). One of the options for disposal of stocks on continuous basis and support producer prices is to introduce pulses under Public Distribution System (PDS) in identified aspirational districts with effective participation of State governments. It would not only help in disposal of stocks but help in improving nutrition and human capital in these districts. Similarly, nutri-cereals can be distributed under PDS in traditionally nutri-cereal consuming States.

- 2.26 During CACP's interactions with the farmers, it was pointed out that the agricultural produce brought to the market is at times rejected as it does not meet the FAQ norms based on subjective judgment. There is need to have transparent and scientific system of measuring quality standards rather than rejecting produce on subjective judgment. Also, wide publicity about MSP and procurement agencies by the State Governments in regional/vernacular languages, electronic and print media and through pamphlets, and announcements in the villages about MSPs of important commodities at least 15 days before the procurement starts is required.



Chapter 3

Crop Productivity and Input Management

Chapter 3

3.1 Improvements in agricultural productivity growth are required to meet the growing demand for food, feed and fibre and these may be achieved by using natural resources sustainably and more efficiently. Enhancing agricultural productivity is also one of the key elements to accomplish the goal of doubling farmers' income. Over the last few decades agricultural productivity in almost all crops in the country has shown a steadily rising trend though, slightly sluggish. Also, in the recent period productivity remained very low compared with world levels. Systemic problems like lack of access to assured irrigation, new technologies, quality inputs and services including institutional credit still remain prominent in Indian agriculture. Therefore, it is important to remove such bottlenecks in order to reduce farmer distress, improve farm incomes and ensure food security for India's burgeoning population. In view of the above, this chapter reviews performance of productivity situation in Indian agriculture both at the national and state level and the challenges it faces.

Decadal Productivity Growth Trends

3.2 The decadal compound annual growth rates of area, production and productivity of Rabi crops for 1990s (1991-92 to 2000-01), 2000s (2001-02 to 2010-11) and 2010s (2011-12 to 2017-18) are given in Table 3.1. The growth rate in productivity of wheat has shown a continuously declining trend during the last three decades. Growth rate in productivity of wheat has become 0.53 percent in the present decade which is less than one third of the growth rate achieved during 1990s (1.69 percent). Along with this, growth rate in area and production of wheat has also fallen sharply. While growth rate in area was only 0.13 percent in 2010s, production merely increased at the rate of 0.65 percent. Since, wheat is the most important rabi cereal, trends in area, production and productivity of wheat are also reflected in the performance of rabi cereals as a whole. Productivity of rabi cereals fell significantly in 2010s (0.76 percent) after being consistently above 1.80 percent in the previous two decades

mainly due to fall in productivity of wheat. For barley, there has been a significant reduction in the area under cultivation in 2010s (-0.34 percent). Combined with a declining rate of growth in productivity, it has meant that barley production has only increased by 0.18 percent in 2010s as compared to 1.53 percent in 2000s.

- 3.3 In case of gram, growth rate in area, production and productivity recorded impressive increases in 2000s but, in 2010s all three have shown declining trends. While, growth rate in area has fallen from 4.01 percent in 2000s to 2.91 percent in 2010s, growth in production and productivity has fallen from 5.58 percent to 3.38 percent and 1.51 percent to 0.46 percent, respectively. In case of lentil, production has increased significantly during 2010s i.e. by 4.26 percent from -0.11 percent in 2000s. This increase has been achieved despite a fall in area under cultivation, due to an increase in productivity from 4.76 percent in 2010s as compared to -0.61 percent in 2000s. This augurs well for Indian agriculture. As far as overall performance of rabi pulses is concerned, there was a surprising dip in production (4.17 percent) in 1990s, due to a sharp dip in area (5.41 percent) of rabi pulses except gram and lentil.
- 3.4 Though area under R&M declined by -0.65 percent during 2010s, production posted a positive growth rate of 1.49 percent due to higher growth rate in yield (2.15 percent). But safflower witnessed significant reversals in productivity growth rate in 2010s (-1.28 percent) when compared to 2000s (4.22 percent). Along with fall in productivity, area under safflower cultivation also fell drastically (-13.93 percent) thus depressing the production by 15.03 percent. Safflower is considered a wholesome oil because of its high polyunsaturated fatty acid level and it commands a premium price among edible oils. Therefore, deceleration in area, production and productivity of safflower is a worrying trend which needs to be reversed at the earliest. Productivity of rabi oilseeds in general has seen wide fluctuations in the last three decades. In 1990s productivity growth rate was merely 0.46 percent, it increased to 2.81 percent in 2000s before falling to 1.86 percent in 2010s. In view of the above, it is important that productivity growth rate may be stabilized for oilseeds.
- 3.5 To summarize, the latest decade has not been the best for Indian agriculture. Area, production and productivity have collectively declined for all rabi crops with the exception of lentil. Urgent corrective actions are required to reverse the situation since India will need more food than ever to meet its pressing needs for food security.

Table 3.1: CAGR in Area, Production and Productivity of various Rabi Crops (percent)

Crop/Year	1990s	2000s	2010s	All Period
Area				
Wheat	1.40	1.34	0.13	0.92
Barley	-2.21	0.06	-0.34	-1.27
Rabi Cereals	1.44	1.27	0.14	0.68
Gram	0.24	4.01	2.91	1.66

Crop/Year	1990s	2000s	2010s	All Period
Lentil	2.78	0.49	-0.48	0.69
Rabi Pulses	-5.41	2.30	2.33	-0.12
Rabi Food Grains	-0.49	1.52	0.72	0.44
R &M	-1.80	2.58	-0.65	-0.08
Safflower	-5.15	-4.59	-13.93	-6.81
Rabi Oilseeds	-2.80	1.23	-1.76	-1.26
Production				
Wheat	3.11	2.51	0.65	2.02
Barley	-0.71	1.53	0.18	0.35
Rabi Cereals	3.37	3.12	0.91	2.14
Gram	1.19	5.58	3.38	2.76
Lentil	3.00	-0.11	4.26	1.54
Rabi Pulses	-4.17	3.65	3.59	1.14
Rabi Food Grains	2.57	3.17	1.17	2.03
R &M	-1.16	4.84	1.49	1.66
Safflower	-5.69	-0.56	-15.03	-5.96
Rabi Oilseeds	-2.35	4.07	0.06	0.58
Productivity				
Wheat	1.69	1.16	0.53	1.10
Barley	1.53	1.47	0.53	1.64
Rabi Cereals	1.90	1.83	0.76	1.45
Gram	0.95	1.51	0.46	1.08
Lentil	0.21	-0.61	4.76	0.85
Rabi Pulses	1.31	1.32	1.23	1.26
Rabi Food Grains	3.07	1.63	0.44	1.58
R &M	0.65	2.20	2.15	1.74
Safflower	-0.57	4.22	-1.28	0.91
Rabi Oilseeds	0.46	2.81	1.86	1.86

Source: CACP using data from Directorate of Economics and Statistics, Department of Agriculture Cooperation & Farmers Welfare

Annual Productivity Growth

3.6 Table 3.2 shows annual growth rates for rabi crops for the last five years. Growth rate of area under all Rabi crops declined in 2017-18 compared with 2016-17. For wheat, R&M and Safflower there was a negative growth in area under cultivation. Sharpest fall was observed in Safflower where growth rate in area fell by 43.9 percent vis-à-vis 2016-17. Similar decline was observed in production for all Rabi crops. Particular attention needs to be paid to safflower cultivation as it has seen large fluctuations in production. While production of safflower declined in 2014-15 (-20.5 percent) and 2015-16 (-29.2 percent), it was followed by a sharp increase in 2016-17 (77.2 percent) before declining again in 2017-18 (-52.0 percent). Productivity growth has also remained subdued in 2017-18 for most Rabi crops except lentil (20.1 percent). Increase in productivity growth in lentil has helped in offsetting the impact of decline in area leading to an overall increase of 23.0 percent in production in 2017-18.

Table 3.2: Annual Growth Rate of Rabi Crops, 2012-13 to 2017-18 (percent)

Crop/Year	2013-14	2014-15	2015-16	2016-17	2017-18
Area					
Wheat	1.6	3.3	-3.3	1.2	-3.5
Barley	-3.1	5.0	-16.7	11.3	3.1
Rabi Cereals	3.3	2.1	-3.7	1.3	-3.7
Gram	16.5	-16.9	1.8	14.6	9.8
Lentil	-5.8	9.5	-13.1	14.3	2.5
Rabi Pulses	11.9	-8.9	0.3	10.9	3.4
Rabi Food Grains	5.7	-9.1	2.0	8.2	2.9
R & M	4.5	-12.7	7.4	5.7	-1.1
Safflower	-3.1	-1.6	-31.0	13.1	-43.9
Rabi Oilseeds	2.9	-12.0	-2.3	4.0	-0.9
Production					
Wheat	2.5	-9.7	6.7	5.6	0.1
Barley	4.5	-11.9	-10.9	21.6	2.3
Rabi Cereals	5.5	-8.6	2.8	6.6	1.7
Gram	7.9	-23.0	-3.7	32.9	19.0
Lentil	-10.3	1.7	-5.7	25.4	23.0
Rabi Pulses	6.7	-13.9	-5.5	25.5	14.4
Rabi Food Grains	5.7	-9.1	2.0	8.2	2.9
R & M	-1.9	-20.2	27.0	16.5	1.6

Crop/Year	2013-14	2014-15	2015-16	2016-17	2017-18
Safflower	4.5	-20.5	-29.2	77.2	-52.0
Rabi Oilseeds	-0.2	-18.1	3.2	14.0	2.1
Yield					
Wheat	0.9	-12.6	10.3	5.5	3.7
Barley	7.8	-16.1	7.0	9.2	-0.8
Rabi Cereals	2.2	-10.5	6.7	5.2	5.6
Gram	-7.4	-7.4	-5.5	16.0	8.3
Lentil	-4.8	-7.1	8.5	9.7	20.1
Rabi Pulses	-4.6	-5.4	-5.8	13.2	10.6
Rabi Food Grains	0.2	-8.3	4.9	4.3	4.8
R & M	-6.1	-8.6	18.2	10.2	2.7
Safflower	7.9	-19.2	2.6	56.6	-14.5
Rabi Oilseeds	-3.0	-7.0	5.6	9.6	3.1

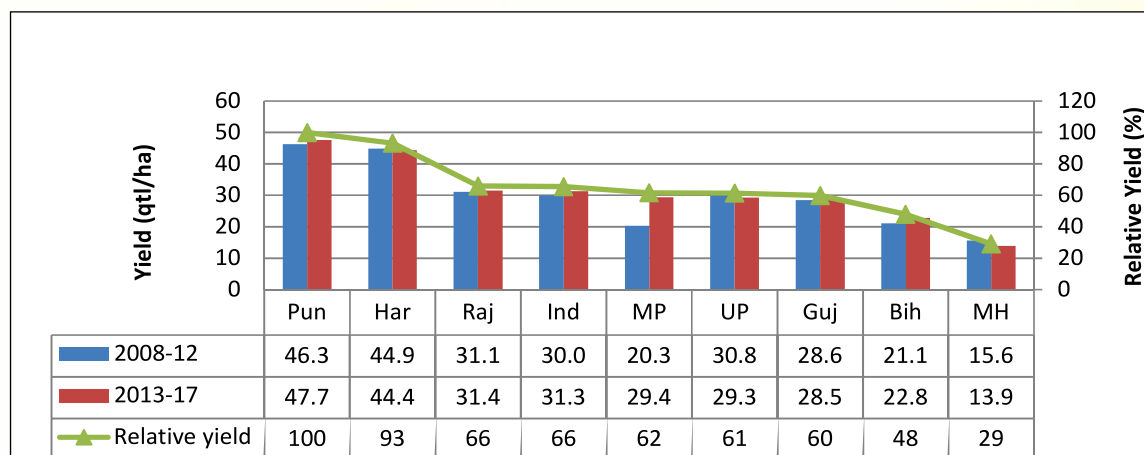
Source: CACP using data from Directorate of Economics and Statistics, Department of Agriculture Cooperation & Farmers Welfare.

Crop Productivity and Yield Gap Analysis in Major Producing States

- 3.7 To analyze inter-state productivity trends during last 10 years, 5-year Olympic average yield per hectare in major producing states has been compared for the period: 2008-2012 and 2013-2017 in this section (Olympic average is calculated by excluding the highest and lowest yield from the most recent 5-year period and averaging the remaining 3 values). Further, as is well known there also exists a vast potential to improve intra-state yields in Indian agriculture through proper research and extension services. Therefore, in Charts 3.1- 3.10 we analyze state-wise productivity trends along with the state-wise yield gaps for major rabi crops. Yield gaps have been analyzed for wheat, gram, lentil and R&M in major producing states using Front Line Demonstration (FLD) data provided by various research institutes. For this analysis three kinds of yield gaps have been considered namely, Yield Gap (A), Yield Gap (B) and Yield Gap (C). Yield Gap (A) is the difference between potential farm yield (yield achieved under Front Line Demonstration (FLD), where best scientific and management practices are followed) and realized farm yields of improved technology under farmer's practices. Yield Gap (B) compares state average yield with realized farm yield of improved technology under farmer's practices. Yield Gap (C) compares state average yield with potential yield achieved under FLD. Yield Gap (A) is due to various socio-economic constraints like input availability, credit, knowledge and institutions while, Yield Gap (B) is due to non-availability of technology. Yield Gap (C) is due to combination of both biological and socio-economic constraints. Larger the yield gap, more is the potential of the state to improve its yields.

- 3.8 **Wheat:** As depicted in Chart 3.1, most of the major wheat producing states have experienced stagnation in productivity in the last 10 years. The only exception has been Madhya Pradesh, where productivity has witnessed an impressive growth of nearly 45 percent in 2013-17 vis-à-vis 2008-12. Many factors have contributed to this increase such as; expansion of irrigation facilities and improved Seed Replacement Rates (SRR). For instance, under Government's "Per Drop More Crop" programme, irrigation facilities were extended to 21,228 hectares of agricultural area in 2017-18 (up by 11 percent from 2016-17). Similarly, SRR for wheat in Madhya Pradesh increased from 30.6 percent in 2016-17 to 42.1 in 2017-18. However, productivity levels are still less than half of Punjab and Haryana and even much lower than all-India average. Further, among the major states, Uttar Pradesh, Gujarat and Maharashtra have experienced marginal decline in productivity levels (-4.8 percent, -0.1 percent and -11.4 percent, respectively). Wheat productivity has also shown high inter-state variations. While in Punjab and Haryana yield levels have constantly been around 45 quintals per hectare, in Maharashtra yield levels have historically remained around 15 quintals per hectare (about one third of Punjab) without showing any visible improvement. Low productivity level leads to high costs of production, thereby making farmers less competitive. In view of this, it is pertinent that the low yielding states may follow the best practices pursued by the high yielding states to achieve convergence in productivity growth.

Chart 3.1: State-wise Productivity Trends (Wheat)

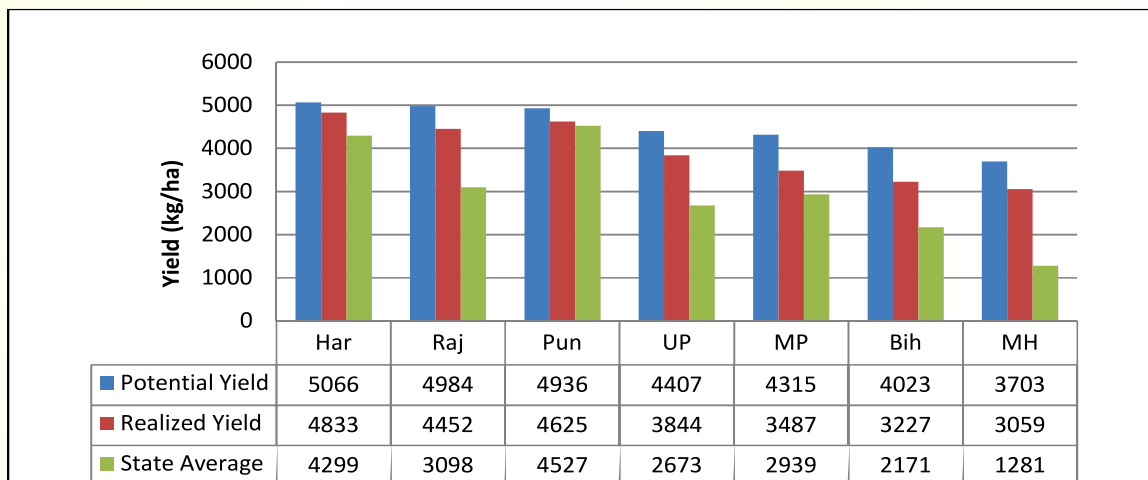


Source: DES, Ministry of Agriculture & Farmers Welfare

- 3.9 Chart 3.2 below shows the yield gap analysis for wheat. As can be seen in the chart, although Yield Gap (A) was miniscule for high-yielding states like Haryana (5 percent) and Punjab (6 percent) but for Bihar which is a traditionally low-yielding state, yield gap (A) was the highest (20 percent). Also, even though Madhya Pradesh has experienced impressive increases in productivity in recent years there still exist large yield gaps. Yield Gap (A) and Yield Gap (B) were 19 percent and 16 percent respectively for Madhya Pradesh whereas, Yield Gap (C) remained at 32 percent. Therefore, this shows that productivity in Madhya Pradesh has potential for further improvement if proper interventions are carried out. As far as other states are concerned, the gap between realised yield and state average

yield (Yield Gap (B)) exceeded 50 percent in Maharashtra (58 percent). Yield Gap (B) was the lowest in Punjab (2 percent). Yield Gap (C) remained below 10 percent in Punjab (8 percent), while for Maharashtra it remained the highest (65 percent).

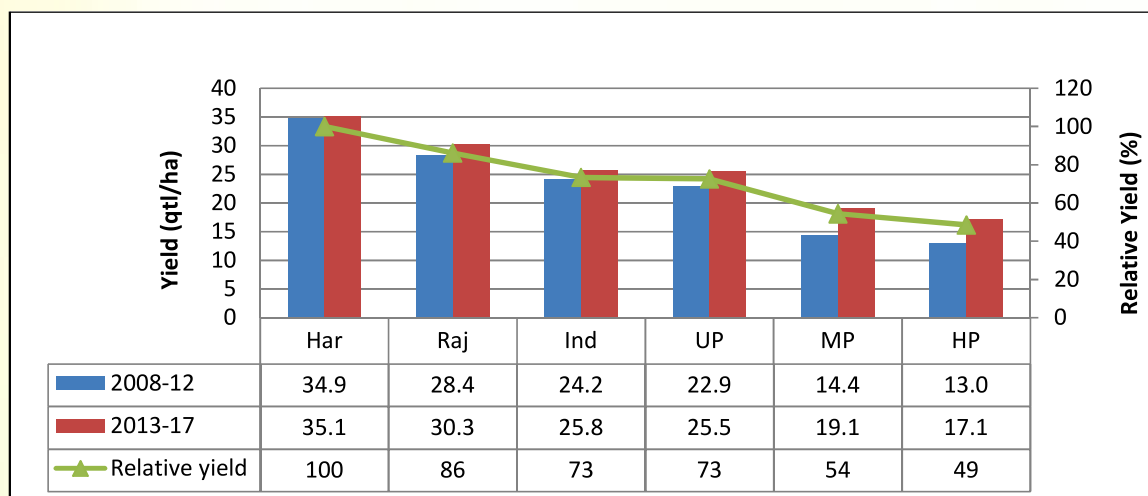
Chart 3.2: Yield Gap Analysis for Wheat (TE2016-17)



Source: Indian Institute of Wheat and Barley Research, Karnal; DES, Ministry of Agriculture & Farmers Welfare

- 3.10 **Barley:** Chart 3.3 shows productivity trends for barley in major producing states. As can be seen, productivity for barley has seen an increasing trend in the last 10 years. Maximum increase in productivity was seen in Madhya Pradesh (32.7 percent) followed by Himachal Pradesh (31.6 percent). However, for Haryana which has the highest barley productivity in India, rise was very marginal (0.8 percent). Although, Madhya Pradesh and Himachal Pradesh have shown good improvement, the productivity levels still remain significantly below all-India level (25.8 quintals per hectare).

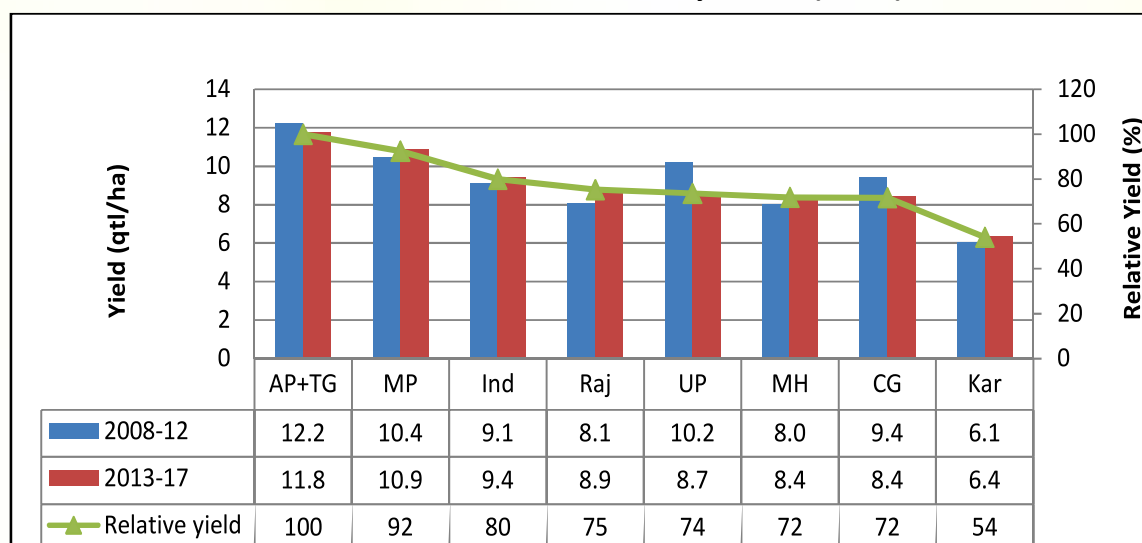
Chart 3.3: State-wise Productivity Trends (Barley)



Source: DES, Ministry of Agriculture & Farmers Welfare

- 3.11 **Gram:** As shown in Chart 3.4, the all-India average yield for gram increased marginally from 9.1 quintals per hectare (2008-12) to 9.4 quintals per hectare (2013-17). Among the major producing states, Andhra Pradesh (11.7 quintals per hectare), Madhya Pradesh (10.9 quintals per hectare) and Bihar (10.4 quintals per hectare) recorded productivity levels greater than the all-India average. On the other hand, situation in Uttar Pradesh and Chhattisgarh is particularly concerning because, there has been a steady decline in productivity in these states (-15.2 percent and -10.8 percent, respectively) despite the fact that they are placed below the all-India average. If convergence in growth rates is to be achieved at all-India level particular focus needs to be paid to increase productivity in states having yield levels below the all-India average.

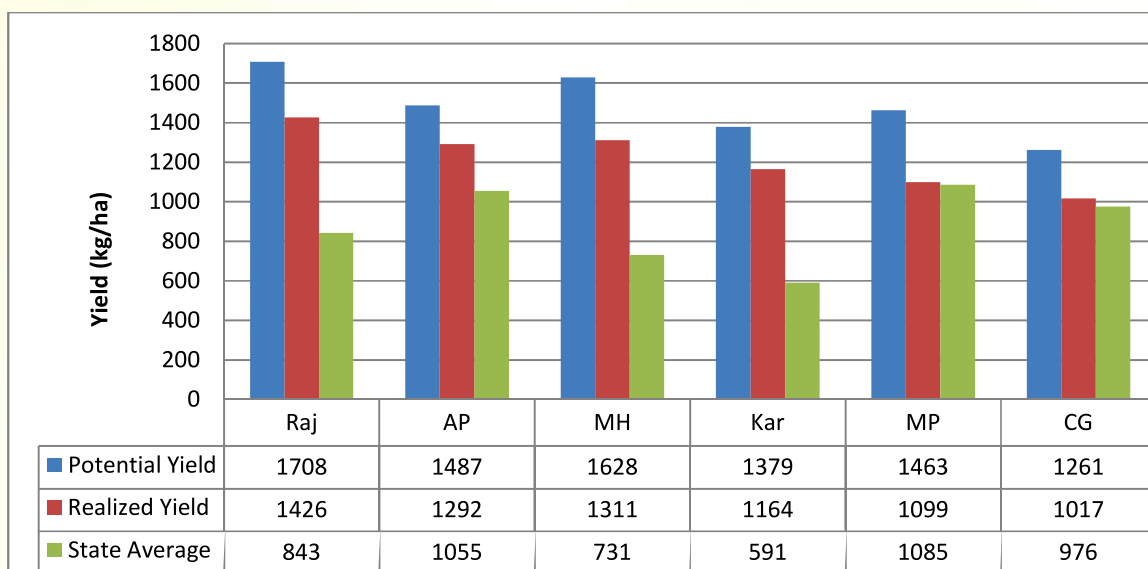
Chart 3.4: State-wise Productivity Trends (Gram)



Source: DES, Ministry of Agriculture & Farmers Welfare

- 3.12 Chart 3.5 shows the yield gap analysis for gram. Yield Gap (A) for gram varied in a relatively narrow range of 13 percent to 25 percent in major producing states. Yield Gap (A) was the highest in Madhya Pradesh (25 percent) and lowest in Andhra Pradesh (13 percent). Variations in Yield Gap (B) were comparatively larger. While Yield Gap (B) was below 5 percent in Madhya Pradesh (1 percent) and Chhattisgarh (4 percent), it was as high as 49 percent in Karnataka. Yield Gap (C), which measures the difference between potential yields and state average yields remained on the higher side for most of the states. Among the major producers, Yield Gap (C) was highest in Karnataka (57 percent). High prevalence of Yield Gap (B) and Yield Gap (C) in Karnataka indicates that state average yields can be improved significantly by suitably addressing the socio-economic constraints faced by the farmers and making technology more accessible. This will help in bringing yields in Karnataka, which at present are the lowest in major producing states, nearer to all-India levels.

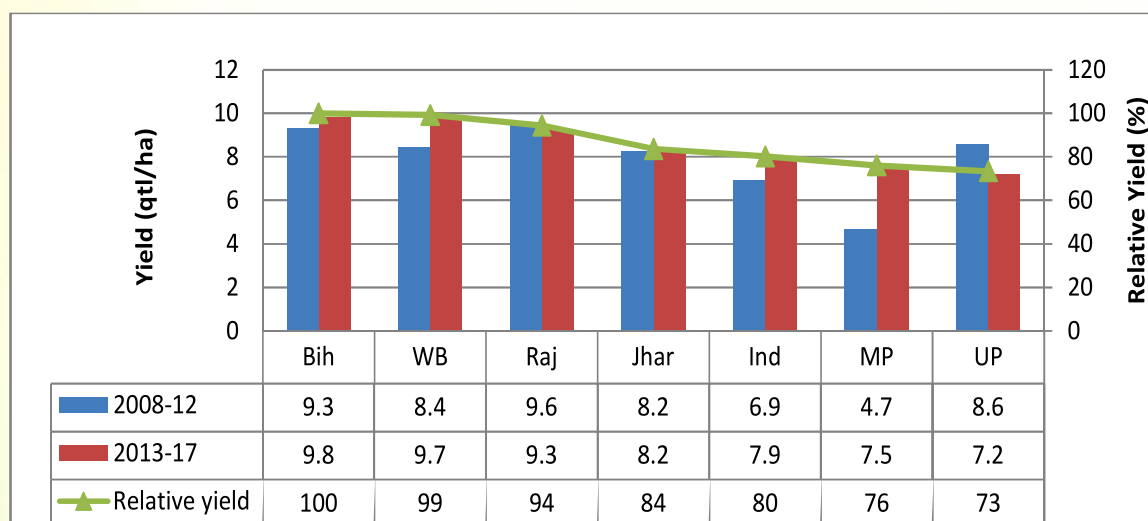
Chart 3.5: Yield Gap Analysis for Gram (TE2016-17)



Source: Indian Institute of Pulses Research, Kanpur; DES, Ministry of Agriculture & Farmers Welfare

3.13 Lentil: Chart 3.6 depicts state-wise productivity trends for lentil. As can be observed, there has been a significant increase in lentil productivity at all-India level (14.3 percent) which is an encouraging sign for the Indian pulses sector. Majorly, Madhya Pradesh (60.0 percent), Assam (43.8 percent) and West Bengal (15.3 percent) have driven the rise in productivity levels. Further, it may be noted that among the above mentioned states, Assam and Madhya Pradesh have had historically low levels of productivity, therefore, high productivity growth rate in these states are leading to convergence in productivity levels across India. However, Uttar Pradesh has been an outlier as yields in Uttar Pradesh have fallen from 8.6 quintals per hectare in 2008-12 to 7.2 quintals per hectare in 2013-17. Thus, it is important to focus on the productivity of lentil in Uttar Pradesh.

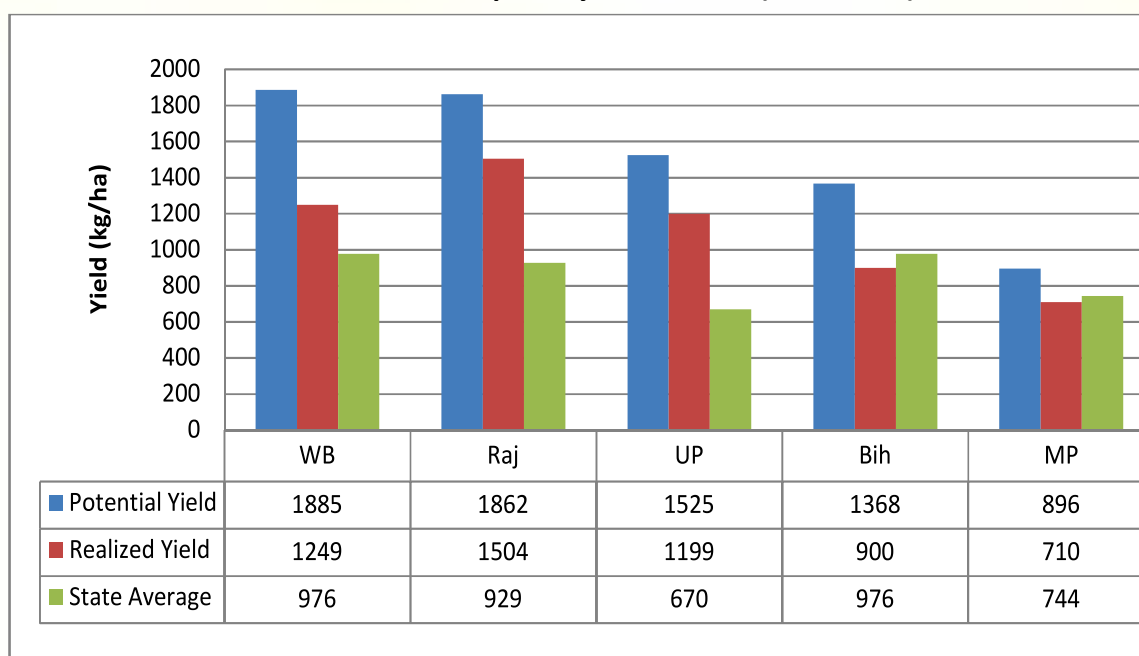
Chart 3.6: State-wise Productivity Trends (Lentil)



Source: DES, Ministry of Agriculture & Farmers Welfare

3.14 Yield gap analysis for lentil is shown in Chart 3.7. Yield Gap (A) which shows differences between potential yields and realized yields varied from 19 percent in Rajasthan to 34.2 percent in Bihar. The variations were much larger in Yield Gap (B). While Yield Gap (B) i.e. the difference between realized yields and state average yields was negative for Bihar (-8.5 percent) and Madhya Pradesh (-4.7 percent), it reached a high of 44.1 percent in Uttar Pradesh. Other states with significant differences between realized yields and state average yields were Rajasthan (38.3 percent) and West Bengal (21.9 percent). Since Uttar Pradesh, Rajasthan and West Bengal account for nearly 40 percent of India's lentil production therefore, the above analysis shows that there is a vast potential to increase India's production of pulses further, specially lentil by appropriate interventions in these states.

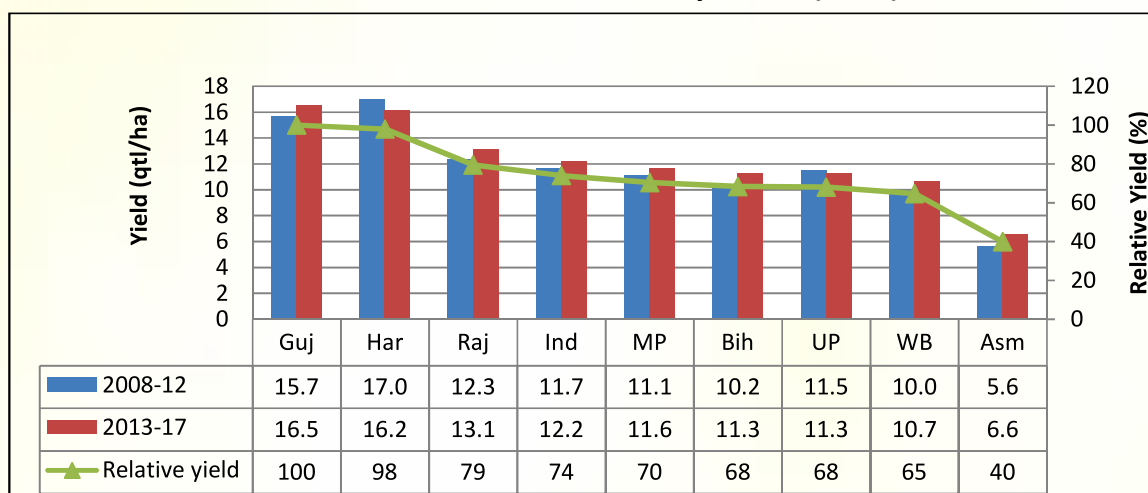
Chart 3.7: Yield Gap Analysis for Lentil (TE2016-17)



Source: Indian Institute of Pulses Research, Kanpur; DES, Ministry of Agriculture & Farmers Welfare

3.15 **R&M:** For rapeseed & mustard which is the second largest oilseeds crop in the country, state-wise productivity trends are shown in Chart 3.8. A steady rise in productivity has been observed in all major states except Haryana and Uttar Pradesh where there was a decline (-5.0 percent and -2.0 percent, respectively). The highest growth rate in productivity was observed in Assam (17.6 percent) and Bihar (10.7 percent). Another, concern which needs to be addressed at the earliest is that only three states have productivity levels higher than the national average (Gujarat, Haryana and Rajasthan). Productivity levels in the remaining states need to be increased through necessary interventions.

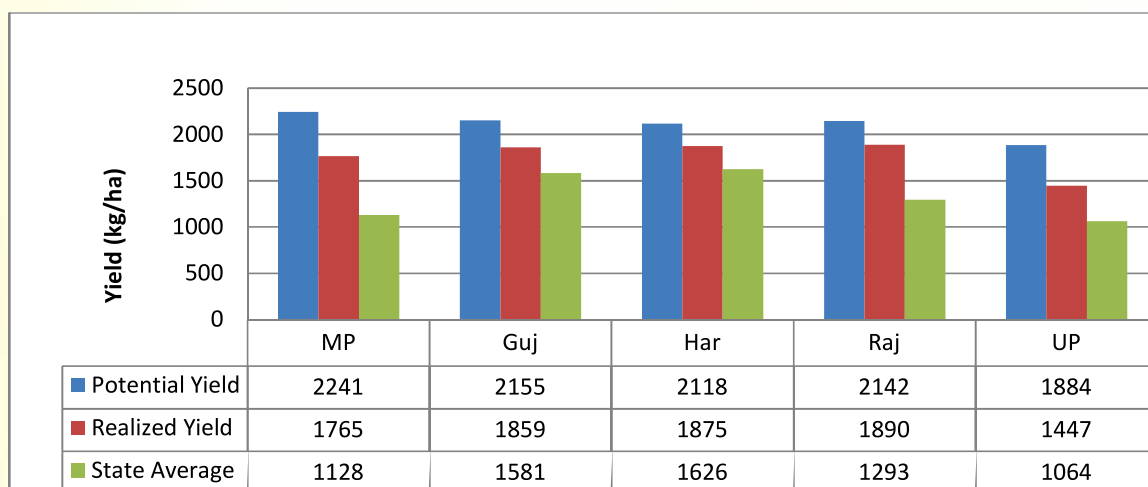
Chart 3.8: State-wise Productivity Trends (R&M)



Source: DES, Ministry of Agriculture & Farmers Welfare

3.16 Yield Gap analysis for R&M is shown in Chart 3.9. For R&M, gap between potential yield and realized yield was lowest for Haryana (11 percent) and highest for Uttar Pradesh (23 percent). On the other hand, Yield Gap (B) remained in the range of 13 percent to 36 percent. Among the major states, Yield Gap (B) exceeded 30 percent in Rajasthan (32 percent) and Madhya Pradesh (36 percent). As far as Yield Gap (C) is concerned, it exceeded 50 percent in Madhya Pradesh. In Rajasthan and Uttar Pradesh, Yield Gap (C) was 40 percent and 44 percent respectively. Yield Gap (C) remained lowest in Haryana (23 percent).

Chart 3.9: Yield Gap Analysis for R&M (TE2016-17)

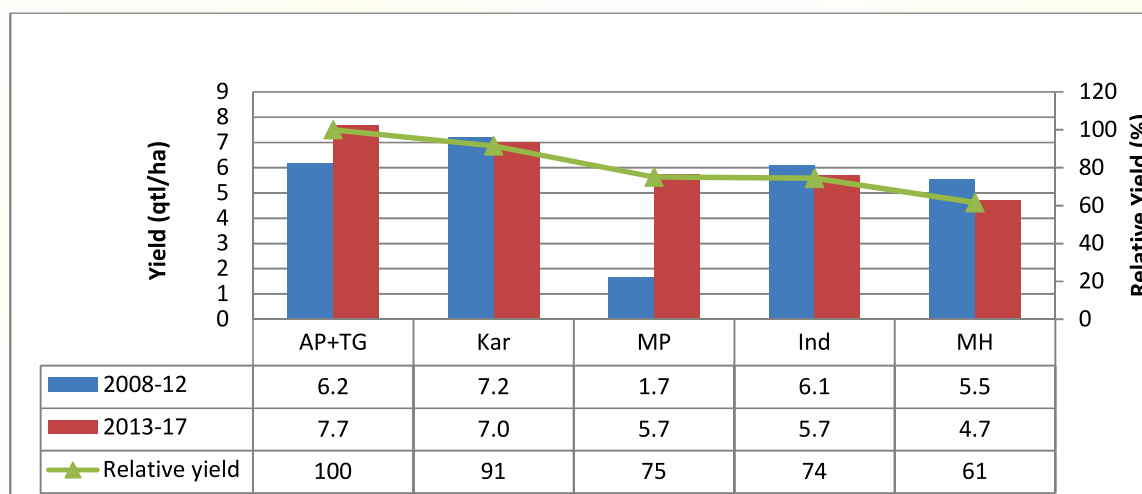


Source: Directorate of Rapeseed-Mustard Research, Rajasthan

3.17 **Safflower:** Chart 3.10 shows productivity changes in major safflower producing states in the last 10 years. Safflower productivity has fallen at all-India level from 6.1 quintals per hectare in 2008-12 to 5.7 quintals per hectare in 2013-17. Even though productivity has risen phenomenally in Madhya Pradesh in the period 2013-17 (245 percent) but it has not proved sufficient to arrest an overall fall in productivity

growth of safflower because area under safflower cultivation in Madhya Pradesh is relatively less. There was a decline in productivity by 15.0 percent in Maharashtra. Decline in Maharashtra is particularly worrying since Maharashtra accounts for nearly 40 percent of total area under safflower cultivation.

Chart 3.10: State-wise Productivity Trends (Safflower)



Source: DES, Ministry of Agriculture & Farmers Welfare

State-level Productivity Growth Rates

- 3.18 Table 3.3 analyses the variations in growth performance of productivity of rabi crops at the state level. It is clearly visible that growth rate of yields has decelerated in most crops in 2010s when compared to 2000s with the exception of lentil where growth rate in yields increased from -0.6 percent to 4.8 percent and rapeseed & mustard where the growth rate remained constant.
- 3.19 Productivity growth for wheat turned negative in most of the major producing states in 2010s. This has led to a downward drag in growth rates at all-India level from 1.2 percent to 0.5 percent. The only exceptions were Madhya Pradesh and Rajasthan, where productivity growth rates showed a positive (5.7 percent and 0.3 percent, respectively).
- 3.20 In case of Barley, Uttarakhand continued with the trend of negative productivity growth rates in 2010s as in 2000s. In addition, Haryana also experienced negative productivity growth (-0.7 percent) in 2010s. Madhya Pradesh was the only state which recorded increase in productivity growth rate (from -0.4 percent in 2000s to 5.2 percent in 2010s).
- 3.21 For pulses, declining rate of growth in productivity in Karnataka (-2.0 percent), Chhattisgarh (-3.4 percent) and Andhra Pradesh (-6.3 percent) contributed to the decline in productivity growth rate at all-India level for gram from 1.5 percent to 0.5 percent. On the other hand, for lentil, Madhya Pradesh registered a substantial increase in productivity growth rate from 1.8 percent in 2000s to 16.3 percent in 2010s. This was the major reason behind the impressive rate of growth in yield for lentil in 2010s (4.8 percent).

3.22 In oilseeds, rate of growth in productivity for rapeseed & mustard remained almost constant at all-India level (2.2 percent). However, growth rate in Rajasthan (3.5 percent) and Assam (3.3 percent) became higher than the national average in 2010s contrary to 2000s. Whereas, the reverse happened for Haryana (2.1 percent), UP (1.7 percent) and Bihar (0.5 percent). In case of safflower, major reduction in productivity growth rate was observed in Maharashtra (-2.5 percent) and Karnataka (-0.7 percent), which led to an overall decline in growth rate of productivity (-1.3 percent) despite very high rate of growth in Madhya Pradesh (10.7 percent). This happened because, area in Maharashtra and Karnataka together contribute to about 80 percent of total cultivation of safflower.

Table 3.3: State-wise Productivity Growth of Major Rabi Crops (2001-02 to 2017-18)

Crop/ Year	CAGR (2001-02 to 2010-11) (All- India)	2001-02 to 2010-11		CAGR (2011-12 to 2017-18) (All- India)	2011-12 to 2017-18	
		<National Average	>National Average		<National Average	>National Average
Wheat	1.2 %	Pun (0.6), Bih (1.1)	UP (1.5), Har (1.3), MP (1.5), MH (3.3), Guj (2.7)	0.5%	Bih (0.0), Pun (-0.1), MH (-0.8), Guj (-1.1), Har (-1.5), UP (1.8)	MP (4.7), Raj (0.7)
Barley	1.5 %	UP (-0.8), MP (-0.4), UK (-0.9)	Raj (2.2), Har (2.9)	0.5%	UP (0.0), Har (-0.7), UK (-1.5)	MP (5.2), Raj (1.4)
Gram	1.5%	UP (-1.1), Raj (0.1), MP (1.1)	AP+TG (2.3), CG (3.4), Kar (2.8), MH (5.7)	0.5%	UP (-1.7), Kar (-2.0), CG (-3.4)	Raj (3.4), AP+TG (2.1), MP (1.3), MH (0.7)
Lentil	-0.6%	Bih (-1.5), Raj (-3.0)	MP (1.8), WB (1.5), Jhar (1.1), UP(-0.0)	4.8%	Raj (1.8), UP (0.4), Bih (-2.8), Jhar (-3.3)	MP (16.3)
R&M	2.2%	WB (2.1), Raj (1.9), Asm(1.1)	Bih (3.6), Har (3.3), MP (3.2), UP (2.5)	2.2%	Har (2.1), WB (1.7), UP (1.7), Bih (0.5)	Raj (3.5), Asm (3.3), MP (2.4)
Saf- flower	4.2%	MH (3.9), Kar (3.8), MP (-2.3)	AP+TG (8.5)	-1.3%	MH (-2.5)	MP (10.7), AP+TG (3.2), Kar (-0.7)

Source: CACP using DES Data.

District Level Productivity of Major Rabi Crops

3.23 In order to assess the performance of productivity at district level at different time periods (TE2006-07 and TE2015-16), area under different productivity bands at district level for major crops in main producing states is analyzed. In this analysis, districts having at least one percent share in total production in the respective states have been considered. The changes in number of districts and area under different yield bands for various rabi crops in TE2006-07 and TE2015-16 are presented in Tables 3.4(a) to 3.4 (c).

3.24 **Wheat:** For wheat, four yield bands have been considered viz., <2 t/ha, 2-3 t/ha, 3-4 t/ha and >4 t/ha. It is evident from the table that the number of districts and percentage of area in the highest band of >4 t/ha has increased in all the major wheat growing states, whereas, number of districts and percentage of area in the lowest band (<2 t/ha) has declined in all the states except Uttar Pradesh where the number of districts and share of area has increased in the lowest band. In the States of Punjab and Haryana there are no districts in the yield band of <3 t/ha. In Madhya Pradesh the highest share of area is under yield band of 2-3 t/ha. However, the important thing to note is that in Madhya Pradesh number of districts with yield <2 t/ha has fallen drastically in the last 10 years (from 22 to 2). As a result, only about 2 percent of area under wheat cultivation in Madhya Pradesh has yields of less than 2 t/ha. The reasons for this turn around have been discussed in the earlier sections. In Rajasthan, for the first time 3 districts (14.9 percent area) generated yields greater than 4 t/ha in TE2016-17. Increase in share of districts in higher yield bands in all major producing states is a positive trend. However, special attention needs to be paid to improve yields in Uttar Pradesh.

Table 3.4: District-level Productivity Trends

State/Year	(a) Wheat							
	<2 tonnes/ha		2-3 tonnes/ha		3-4 tonnes/ha		> 4 tonnes/ha	
	No. of districts	Area (%)	No. of districts	Area (%)	No. of districts	Area (%)	No. of districts	Area (%)
Punjab								
TE2006-07	0	0	0	0	4	15.7	14	84.3
TE2015-16	0	0	0	0	2	7.6	19	91.9
Haryana*								
TE2006-07	0	0	0	0	9	41.9	10	57.3
TE2015-16	0	0	0	0	7	28.4	13	71.3
Madhya Pradesh*								
TE2006-07	22	57.0	15	32.8	1	2.6	0	0.0
TE2015-16	2	4.3	18	45.7	16	35.9	3	5.4

State/Year	(a) Wheat							
	<2 tonnes/ha		2-3 tonnes/ha		3-4 tonnes/ha		> 4 tonnes/ha	
	No. of districts	Area (%)	No. of districts	Area (%)	No. of districts	Area (%)	No. of districts	Area (%)
Rajasthan								
TE2006-07	2	6.1	11	36.8	12	51.9	0	0.0
TE2015-16	1	1.4	8	22.3	12	55.2	3	14.9
Uttar Pradesh								
TE2006-07	2	0.9	32	56.8	15	21.9	0	0.3
TE2015-16	7	12.8	21	34.5	21	32.5	1	1.2

Note : *Data for Haryana and Madhya Pradesh for 2015-16 not available.

Source: Computed by CACP using data of Directorate of Economics and Statistics, Department of Agriculture Cooperation & Farmers Welfare.

3.25 Gram: In case of gram and R & M, yield bands considered are <0.5 t/ha, 0.5-1 t/ha and >1 t/ha. The leading gram growing states are Madhya Pradesh, Maharashtra, Rajasthan, Karnataka and Andhra Pradesh. It can be observed from Table 3.4 (b) that in all the States except Madhya Pradesh, the number of districts and share of area under higher yield bands increased between TE2006-07 and TE2015-16. For Madhya Pradesh, there was infact a rise in the number of districts with yield less than 0.5 t/ha from 0 to 2. Maharashtra and Rajasthan showed the most encouraging results as the coverage of area under the highest band increased manifold (from 17.9 percent to 34.2 percent in Rajasthan and 0 to 15.2 percent in Maharashtra).

State/Year	(b) Gram					
	<0.5 tonnes/ha		0.5- 1 tonnes/ha		>1 tonnes/ha	
	No. of districts	Area (%)	No. of districts	Area (%)	No. of districts	Area (%)
Andhra Pradesh						
TE2006-07	1	15.5	1	24.0	4	60.3
TE2015-16	0	5.4	1	33.4	4	60.8
Karnataka						
TE2006-07	5	45.6	5	49.2	0	0.0
TE2015-16	3	28.6	9	69.7	0	0.0
Rajasthan						
TE2006-07	2	26.2	12	52.1	6	17.9
TE2015-16	2	21.6	7	26.6	12	34.2

(b) Gram						
State/Year	<0.5 tonnes/ha		0.5- 1 tonnes/ha		>1 tonnes/ha	
	No. of districts	Area (%)	No. of districts	Area (%)	No. of districts	Area (%)
Maharashtra						
TE2006-07	3	11.8	22	86.4	0	0.0
TE2015-16	5	23.1	16	59.0	3	15.2
Madhya Pradesh*						
TE2006-07	0	0.0	14	46.3	16	43.5
TE2015-16	2	8.0	17	47.1	16	36.0

Note : *Data for Madhya Pradesh for 2015-16 not available.

Source: Computed by CACP using data of Directorate of Economics and Statistics, Department of Agriculture Cooperation & Farmers Welfare.

3.26 **R&M:** Rajasthan, Haryana, Madhya Pradesh, Uttar Pradesh and West Bengal contribute about 80 percent of the total R&M production in the country. The number of districts and share of area has shifted from medium yield band (0.5-1 t/ha) to high yield band (>1 t/ha) in all the states except Uttar Pradesh. Only one district in Madhya Pradesh and Uttar Pradesh were in the lowest yield band in TE2015-16. In case of West Bengal, area under the highest yield band increased by nearly three times between TE2006-07 and TE2015-16.

(c) Rapeseed & Mustard						
State/Year	<0.5 tonnes/ha		0.5- 1 tonnes/ha		>1 tonnes/ha	
	No. of districts	Area (%)	No. of districts	Area (%)	No. of districts	Area (%)
Haryana*						
TE2006-07	0	0.0	1	7.5	9	88.8
TE2015-16	0	0.0	0	0.0	10	96
Rajasthan						
TE2006-07	0	0	6	23.8	19	72.5
TE2015-16	0	0	5	15.7	21	81.7
Madhya Pradesh*						
TE2006-07	0	0.0	8	42.6	4	44.1
TE2015-16	1	3.1	7	35.3	8	50.8
Uttar Pradesh						
TE2006-07	0	0.0	12	28.6	15	51.8
TE2015-16	1	4.4	14	33.7	15	40.0

(c) Rapeseed & Mustard						
State/Year	<0.5 tonnes/ha		0.5- 1 tonnes/ha		>1 tonnes/ha	
	No. of districts	Area (%)	No. of districts	Area (%)	No. of districts	Area (%)
West Bengal						
TE2006-07	1	3.8	10	75.7	3	21.0
TE2015-16	0	0.8	7	30.7	7	67.07

Note : *Data for Haryana for 2014-15 and 2015-16 not available, Data for Madhya Pradesh for 2015-16 not available.

Source: Computed by CACP using data of Directorate of Economics and Statistics, Department of Agriculture Cooperation & Farmers Welfare.

Drivers of Yield Growth

3.27 Better quality seeds, fertilizers, irrigation, and better management practices are important drivers for increasing the productivity. By assuring timely availability of first four factors and better extension services, crop productivity can be enhanced significantly.

Seed Availability and Seed Replacement Rates

3.28 Availability of quality seeds suitable for different agro-climatic conditions and at affordable prices is critical for realizing higher productivity. However, lack of quality seeds continues to be one of the greatest impediments to raise productivity level in many crops. Therefore, production and distribution of quality seeds is essential to realize higher yields. Table 3.5 shows the details of production/availability of breeder, foundation and certified/ quality seeds from 2013-14 to 2017-18. As can be seen in the table, production of breeder seeds has increased marginally in 2017-18 over 2016-17 while, production of foundation seeds has witnessed a decline. This is in sharp contrast to the situation in 2016-17 wherein production of all three types of seeds had increased manifold. Overall, the data in last 5 years depicts a fluctuating trend in production of breeder, foundation and certified/ quality seeds. Therefore, there is an urgent need to maintain a sustained increase in production and timely availability of certified seeds to improve agricultural productivity.

Table 3.5: Production/Availability of Breeder, Foundation and Certified Seeds (MT)

Year	Breeder Seeds	Foundation Seeds	Certified/Quality Seeds
2013-14	8229	174307	3473130
2014-15	8621	157616	3517664
2015-16	9036	149542	3435248
2016-17	11071.44	220907	3802904
2017-18	11232.75	195415	4194111

Source: M/o Agriculture & Farmers Welfare

- 3.29 With availability of quality seeds, Seed Replacement Rate (SRR) has improved in major crops but is still low in some crops and regions. Therefore, there is a need to improve SRR with appropriate varieties. Tables 3.6 (a) to (c) show the SRR trends for wheat, gram and R&M in the major states during last three years.
- 3.30 It is quite evident from the data that there is a positive relationship between SRR and productivity level. For example, two states with the highest wheat yields levels viz. Punjab and Haryana had the best SRR at 47.0 percent and 54.0 percent, respectively (Table 3.6 (a)). It may also be observed that Bihar has the lowest wheat productivity in the major producing states and the lowest SRR (17.8 percent). Therefore, in order to give a boost to wheat productivity in Bihar, efforts are needed to improve availability of quality seeds to achieve better yields.

Table 3.6(a): SRR for Wheat in Major Producing States (percent)

States	2015-16	2016-17	2017-18 (P)
Uttar Pradesh	35.2	36.8	43.9
Madhya Pradesh	27.6	30.6	42.1
Punjab	39.0	49.0	47.0
Haryana	51.7	54.0	54.0
Rajasthan	32.5	33.8	32.6
Bihar	27.1	20.3	17.8

Note : P-Provisional

Source: Response to CACP questionnaire by States

- 3.31 New initiatives such as Seed Hubs, Seed Village Programme, increased availability of breeder seed through ICAR/SAUs, etc. have resulted in better SRR and higher productivity of lentil during the last couple of years. It is evident from Table 3.6 (b) that SRR in lentil has shown an increasing trend across all the states. SRR nearly doubled in Madhya Pradesh (from 5.3 percent in 2015-16 to 10.5 percent in 2017-18) and Uttar Pradesh (from 11.1 percent in 2015-16 to 23.1 percent in 2017-18) while, SRR in Bihar rose from 1.3 percent in 2015-16 to 9.2 percent in 2017-18. This increase in SRR explains the impressive growth in productivity registered in pulses in recent years.

Table 3.6(b): SRR for Lentil in Major Producing States (percent)

State	2015-16	2016-17	2017-18 (P)
Madhya Pradesh	5.3	9.0	10.5
Uttar Pradesh	11.1	12.6	23.1
Bihar	1.3	7.3	9.2
West Bengal	32.9	33.0	33.2

Note : P-Provisional

Source: Response to CACP questionnaire by States

- 3.32 Table 3.6(c) shows SRR in major producing states for R&M for which data is available. As can be seen, Rajasthan has the best SRR for R&M among major states. Further, in the recent years SRR in Rajasthan has seen an increasing trend for R&M, which had a direct impact on productivity in Rajasthan as yield increased from 12.3 quintals per

hectare in 2008-12 to 13.1 quintals per hectare in 2013-17. Similar rising trend was observed in Madhya Pradesh and West Bengal. However, in Uttar Pradesh, SRR for R&M has fallen significantly during the last three years, from 79.2 percent in 2015-16 to 38.3 percent in 2017-18. This declining trend in SRR needs to be reversed as Uttar Pradesh produces nearly 10 percent of R&M.

Table 3.6(c): SRR for R&M in Major Producing States (percent)

State	2015-16	2016-17	2017-18 (P)
Rajasthan	74.8	78.5	90.3
Madhya Pradesh	48.6	54.0	55.2
Uttar Pradesh	79.2	56.3	38.3
West Bengal	51.1	52.0	58.5

Note : P-Provisional

Source: Response to CACP questionnaire by States

Fertilizer Use

- 3.33 Fertilizers have played an important role in increased crop productivity, especially in cereals but low fertilizer use in some states and excessive consumption along with imbalanced use of N, P and K may lead to a loss of fertility in the soil over a period of time, affecting efficiency of fertilizer use and crop productivity.
- 3.34 Trends in fertilizer consumption during 2012-13 to 2017-18 are presented in Table 3.7 (a). Consumption of fertilizers mainly N, which witnessed a decline during 2015-16 and 2016-17 due to reduced fertilizer demand owing to low rainfall, recorded some improvement during 2017-18. An assessment of AeFDS (Aadhaar enabled Fertilizer Distribution System) Pilot by Micro Save for NITI Aayog has reported that neem coating of Urea and improved fertilizer distribution system through AeFDS has reduced diversion of Urea.
- 3.35 As far the N,P,K ratio is concerned, it has traditionally been in favour of Urea due to distorted pricing policy and far away from the ideal level of 4:2:1. This has reduced responsiveness of agricultural productivity to fertilizer usage. It is important that fertilizers be used judiciously in order to enable sustainable growth in yields. Table 3.7 (a) shows the trends in N,P,K ratio for Rabi season in the last 6 years. It is evident from the Table that N,P,K ratio, although still skewed has improved marginally over the last six years. In 2012-13 rabi season, N,P,K ratio had reached a high of 8.6:3.3:1, it is expected to be 6.5:2.6:1 in 2017-18 showing more balanced use of fertilizers.

Table 3.7(a): Trends in Fertilizer Consumption and N,P,K Ratio during Rabi Season (MT)

Fertilizers	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18 (E)
N	8.93	8.53	9.02	8.72	8.59	8.83
P ₂ O ₅	3.42	3.04	3.11	3.45	3.46	3.56
K ₂ O	1.03	1.08	1.27	1.23	1.31	1.35
Total (N+P₂O₅+K₂O)	13.38	12.65	13.40	13.40	13.35	13.74
N:P:K Ratio	8.6:3.3:1	7.9:2.8:1	7.1:2.5:1	7.1:2.8:1	6.6:2.6:1	6.5:2.6:1

Note : E-Estimated

Source: Fertilizers Association of India

- 3.36 Although, there is a visible improvement in N,P,K ratio at all- India level but wide inter-state variations still persist. Table 3.7 (b) gives an idea of large inter-state variations in different states for N,P,K ratio. For example, in 2016-17, N,P,K ratio was nearly ideal in Andhra Pradesh (4:1.9:1) but highly skewed in favour of urea in Rajasthan (88.9:23.6:1). In case of West Bengal N,P,K ratio has roughly remained constant over the past 3 years. Adequate policy interventions are required in order to ensure convergence in N, P, K ratio in various states.

Table 3.7(b): N,P,K Ratio for Major States

States	2014-15	2015-16	2016-17
Haryana	41.1:9.9:1	49.4:12.3:1	26.5:6.8:1
Madhya Pradesh	24:10.7:1	20.4:8.5:1	17.2:7.4:1
Uttar Pradesh	14:3.5:1	12:4.6:1	13.5:5.8:1
Rajasthan	68.6:17.6:1	76.4:20.3:1	88.9:23.6:1
Punjab	50.5:14.2:1	19.7:6.6:1	53.9:15.7:1
Andhra Pradesh	5.3:2.2:1	5.3:2.7:1	4:1.9:1
Maharashtra	3:1.5:1	2.6:1.9:1	3:1.8:1
Karnataka	2.9:1.3:1	3.9:2:1	2.8:1.9:1
West Bengal	2.5:1.3:1	2.6:1.5:1	2.6:1.5:1

Source: Replies to CACP questionnaire by various States

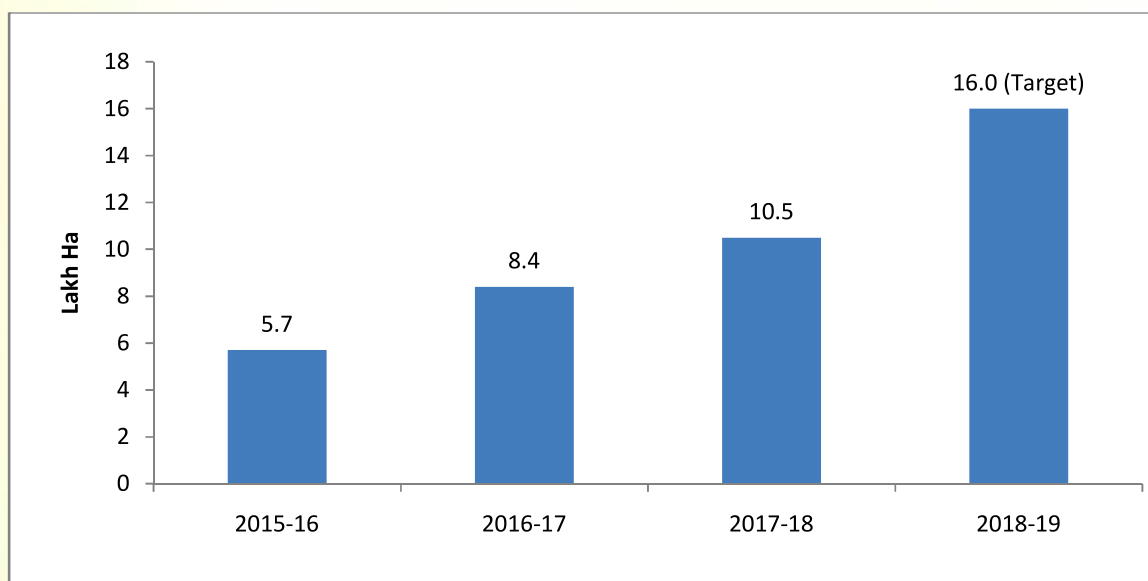
- 3.37 In view of the importance of fertilizers for Indian agriculture and the problems arising from their imbalanced use as highlighted above, the government has taken major initiatives in the recent past to ensure proper use of fertilizers. Some of the steps taken in this regard include: a) introduction of Nutrient Based Subsidy (NBS) in 2010, b) policy of Neem coating of Urea, c) distribution of Soil Health Cards (SHCs) and d) introduction of Direct Benefit Transfers (DBT) in fertilizer sector. Of particular importance has been the policy of introduction of DBT in fertilizers and soil health card scheme. The government introduced pilots for Aadhaar enabled Fertilizer Distribution system (AeFDS) on (28th March, 2016) in 16 districts (three additional districts were included in pilot phase on 27th January, 2017) across India. Subsequently, the Scheme was expanded to all states from 1st March, 2018. However, it has been reported that introduction of DBT in fertilizer sector has led to delay in subsidy payments to fertilizer manufacturers due various reasons such as non-generation of DBT bills due to system failures, authentication failures due to poor internet connectivity and poorly maintained PoS devices. In view of this, it is important that the policy of DBT in fertilizers be streamlined to address problems faced by farmers and fertilizer companies.
- 3.38 From the above discussion it can be concluded that although, the recent interventions have had some impact in correcting the N,P,K imbalance at all-India level however, there is a need to strengthen and restructure the policies further to reduce inter-state variations in fertilizer consumption, imbalance in N,P,K ratio and ensure timely availability of fertilizers in all states.



Irrigation

- 3.39 Irrigation is considered as the leading input in boosting agricultural production and productivity but, only less than half of area is irrigated in the country. For the year, 2014-15 gross irrigated area as a percentage of total cropped area for India stood at 48.6 percent. Therefore, there exists massive potential to improve crop productivity through expansion of irrigation and improvement in water use efficiency. Recognizing this potential, Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) was launched on 1st July, 2015 extending the coverage of irrigation (Har Khet Ko Paani) and improving water use efficiency (More crop per drop). PMKSY not only focusses on creating sources for assured irrigation, but also creating protective irrigation by harnessing rain water at micro level through 'Jal Sanchay' and 'Jal Sinchan'. Recently, Cabinet Committee on Economic Affairs approved a PMKSY- Corpus for Micro Irrigation Fund for ₹5000 crore (₹2000 crore for 2018-19 & ₹3000 crore for 2019-20) to be created with NABARD. The main objective of the fund is to facilitate the States in mobilizing the resources for expanding micro-irrigation.
- 3.40 Chart 3.11 below shows the all-India coverage of area under micro irrigation. As can be observed from the chart, significant progress has been made to cover area under micro-irrigation since the time PMKSY was introduced. In 2015-16, all-India coverage under micro-irrigation stood at 5.7 lakh hectares, which has nearly doubled to 10.5 lakh hectares in 2017-18. Further, the area is targeted to reach 16 lakh hectares in 2018-19. Such rapid expansion of area under micro-irrigation can lead to twin benefits. Firstly, it will lead to an increase in agricultural productivity. Secondly, it can lead to significant saving of water which is increasingly becoming a scarce resource. The Commission is of the view that allocation for micro-irrigation should be enhanced and micro-irrigation should be made mandatory for water-intensive crops like sugarcane.

Chart 3.11: Area Covered Under Micro-Irrigation

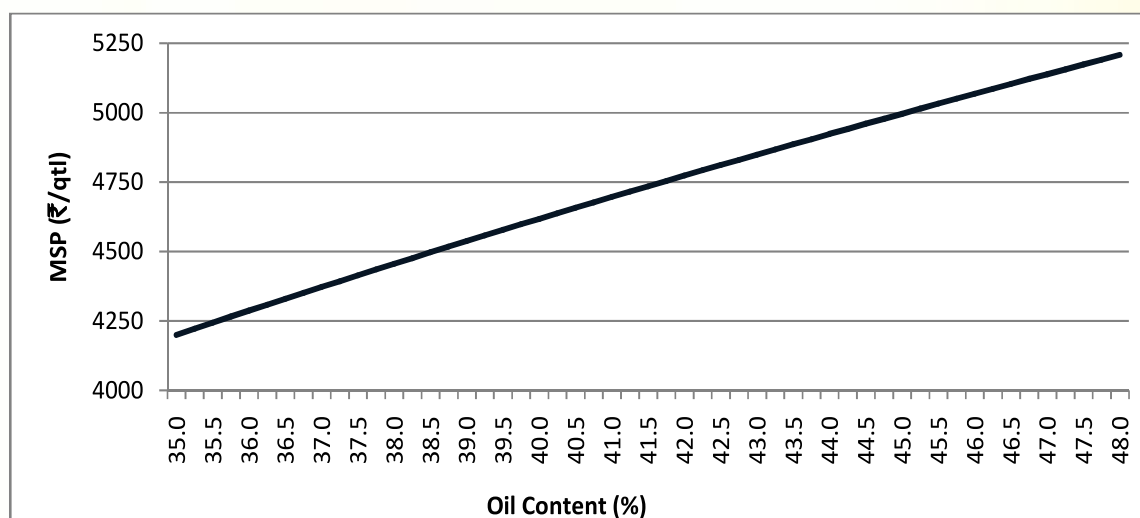


Source: M/o Agriculture & Farmers' Welfare

Linking MSP with Oil Content in Rapeseed and Mustard

- 3.41 There are variations in oil content of different varieties of R&M and therefore a uniform MSP may not be desirable. Thus, in order to increase area under R&M, MSP of R&M seed should be linked with its oil content. Commission is of the opinion that farmers be incentivized for higher 'oil content'. On the basis of detailed discussions held with various stakeholders such as R&M cultivators, processors, scientists of ICAR, the Commission recommends that the MSP of R&M be linked to the basic 'oil content' of 35 percent in R&M seeds and farmers be incentivized for every 0.25 percent point increase in its 'oil content' beyond this level.
- 3.42 To determine the incentive for higher 'oil content', one quintal of R&M seed will give 35 kg of oil and 65 kg of oil cake. Adjusting the value of cake, the cost of R&M seed (oil without cake) would be ₹3077 which will contain 35 kg of oil. Thus, the MSP will increase by ₹19.34 per quintal for every 0.25 percent point increase in oil content (Chart 3.12). Cost per unit of oil content slowly decreases with increase in 'oil content' (Annex Table 3.1). Taking average oil content between 35 percent and 48 percent, the average cost for every 0.25 percent point works out to ₹19.34 per quintal. Hence Commission recommends that MSP of R&M seeds should be increased by ₹19.34 per quintal for every 0.25 percent point increase in 'oil content' over and above the base oil content of 35 percent in R&M seed.

Chart 3.12: MSP based on Oil Content of R&M




Recapitulation

- 3.43 As highlighted in earlier reports as well, falling productivity levels across India in the present decade are a reason to worry. Fall in productivity of rabi cereals is particularly concerning since cereals are a constituent of staple diet in many regions and therefore important for food security. Moreover, there are large inter-state variations in productivity for all major rabi crops. These inter-state variations need to be reduced to achieve convergence of yields at all-India level. FLD analysis of major rabi crops shows that this convergence can be achieved by ensuring



timely availability of various farm inputs, improvements in technology and better farm management practices. All this can be achieved through effective policy interventions.

- 3.44 Analysis of various drivers of yield growth shows that significant progress has been made by various states to improve yields. For example, many states have significantly improved their SRR, particularly for lentil. However, a few states have lagged behind. Therefore, to minimize inter-state variations in yields it needs to be ensured that various government programmes have a uniform impact across India. Also, visible gains are being made in expansion of micro-irrigation. In view of the looming water crisis all over the country, it is important that the thrust on micro-irrigation be continued to meet the ambitious target of bringing 16 lakh hectares of total agricultural area under micro-irrigation by 2018-19.



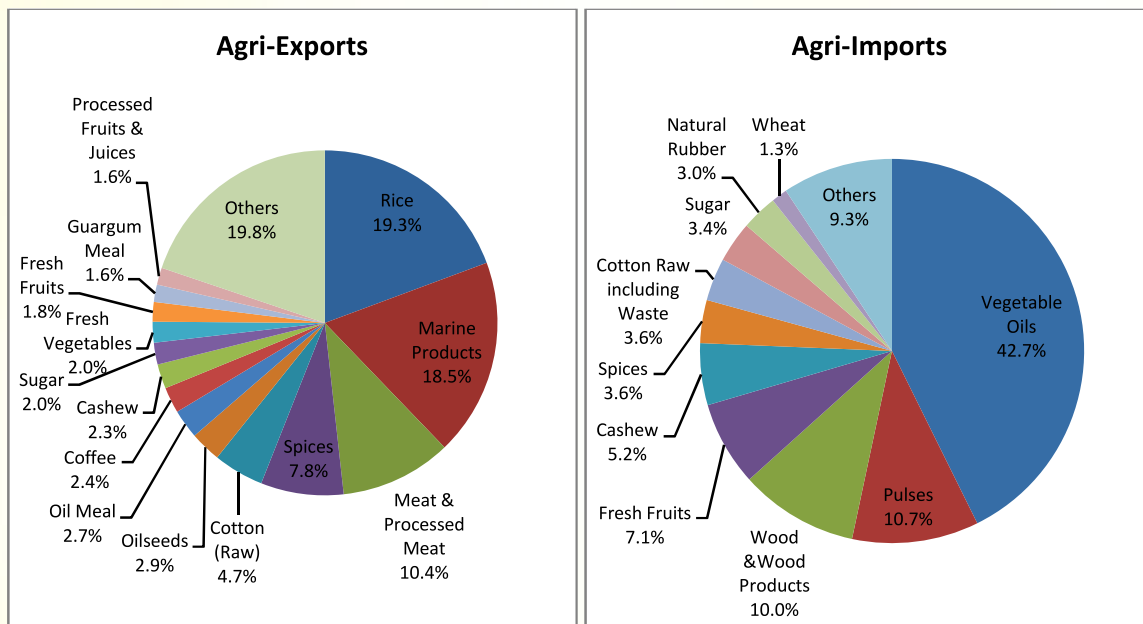
Chapter 4

Trade Competitiveness of Indian Agriculture

Trade Performance

- 4.1 As per World Trade Organization (WTO), the share of India's agri-exports in global agri-exports has increased from 1.1 percent in 2001 to 2.5 percent in 2014. Then onward it displayed a decelerating tendency and dropped to 2.2 percent in 2015 and further declined to 2.1 in 2016. However, the share of agri-imports to global agri-imports has increased from 0.7 percent in 2001 to 1.5 percent in 2014 which further increased to 1.8 percent in 2016. India's total agri-exports increased from US\$ 6.3 billion in 2001 to US\$ 43.5 billion in 2014 but declined by about 22 percent to US\$ 33.9 billion in 2016. Total agri-imports of India, went up by 62 percent from US\$ 17.9 billion in 2010 to US\$ 29 billion in 2016. As per DGCIS, the share of India's agri-exports in its total exports declined from 13 percent in 2015-16 to 12.6 percent in 2016-17 and later on increased to 13.2 percent in 2017-18 due to increase in the export of rice, marine products, cotton (raw), oil meal, coffee and cashew whereas the share of agri-imports in total imports increased from 6.6 percent in 2015-16 to 7.2 percent in 2016-17 and then dropped to 5.9 percent in 2017-18, due to decline in pulses import by 5 percent compared to 2016-17. Major agri-export commodities are rice, marine products, meat & processed meat, spices, cotton (raw), oilseeds & oil meals, coffee, cashew, sugar, fresh vegetables and fruits, guar gum meal and processed fruits and juices which account for four-fifths of the total agri-exports. The main commodities that India import include edible oils, pulses, wood & wood products, fresh fruits, cashew, spices, cotton raw, sugar, natural rubber and wheat, which account for more than 90 percent of total agri-imports (Chart 4.1). Though the country continues to be a net exporter of agri-commodities, trade surplus has declined from ₹159 thousand crore in 2013-14 to ₹48.3 thousand crore in 2016-17 whereas it increased to ₹82 thousand crore in 2017-18 due to decline in agri-import share by 5.2 percent and increase in agri-export share by 13.2 percent. Rabi crops being dealt with, in this chapter are wheat, barley, gram, lentil (masoor), rapeseed & mustard.

Chart 4.1: Share of Major Agri-Commodities in Total Agri-Exports and Agri-Imports in 2017-18



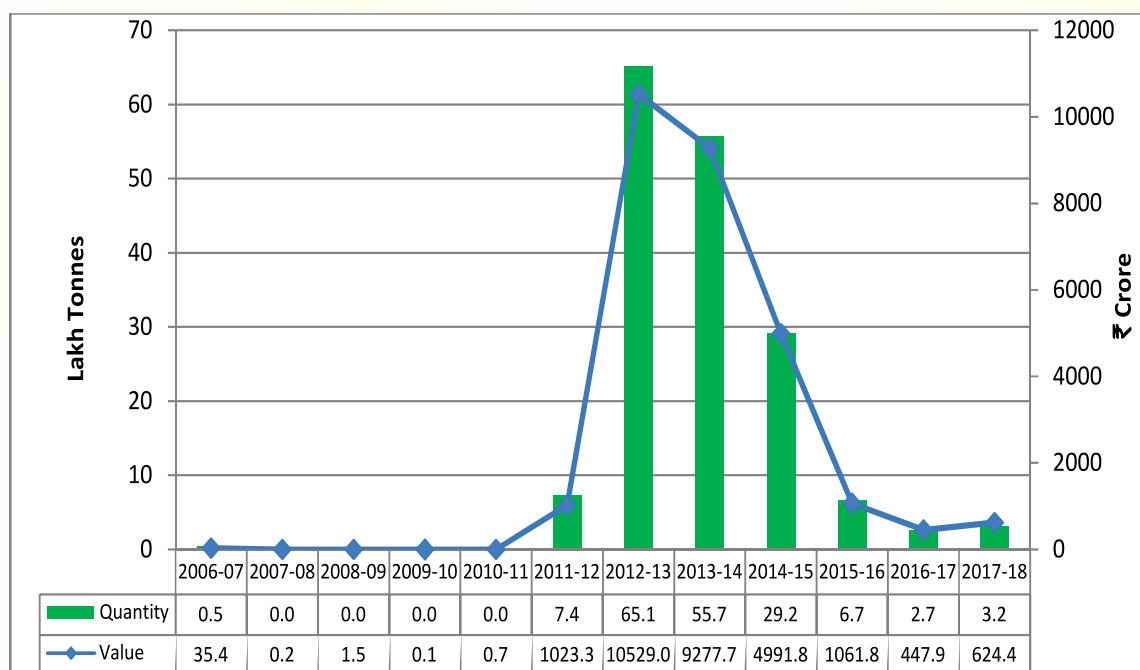
Source: Directorate General of Commercial Intelligence and Statistics

Wheat

- 4.2 As per USDA, the global production of wheat was 748.3 million tonnes in TE2017-18, out of which 179.3 million tonnes (23.6 percent) was traded. In 2017-18, European Union (EU) is the largest producer with a share of 20 percent followed by China (17.1 percent) and India (13 percent). Russia is the fourth major producer and also the largest exporter of wheat with a share of 21.5 percent followed by EU and USA (both equally at 13.1 percent share of world exports). Other major exporters are Canada (12.4 percent) and Ukraine (9.4 percent). Indonesia is the largest importer with a share of 6.8 percent followed by Egypt (6.5 percent), Algeria (4.4 percent). Wheat exports are more concentrated than imports, as the share of top five exporters in world exports is at around 70 percent while top five importers account for less than one-fourth of total imports.
- 4.3 The Government of India had prohibited exports of wheat from Central Pool in August, 2003 because of fall in wheat production in 2002-03. Exports on private account were also prohibited in February, 2007, so there were no exports during 2007-08 to 2010-11. The ban on export of wheat was lifted in September, 2011 when export of 20 lakh tonnes was allowed under Open General License (OGL) by private parties out of privately held stocks through Electronic Data Interchange (EDI) enabled ports. From February, 2012, unrestricted export of wheat under OGL was allowed. India's exports of wheat were at a record level of 65.1 lakh tonnes during 2012-13. However, thereafter exports witnessed a steady decline due to stiff competition from Australian and Ukrainian wheat. Other factors that contributed to the decline in exports were higher domestic prices, low production in the country

during 2014-15 and 2015-16 and falling global prices (from US\$287/MT in March 2014 to about US\$160/MT in December 2016). There was an increase of 18.52% in wheat exports in 2017-18 due to increase in production in the corresponding year (Chart 4.2).

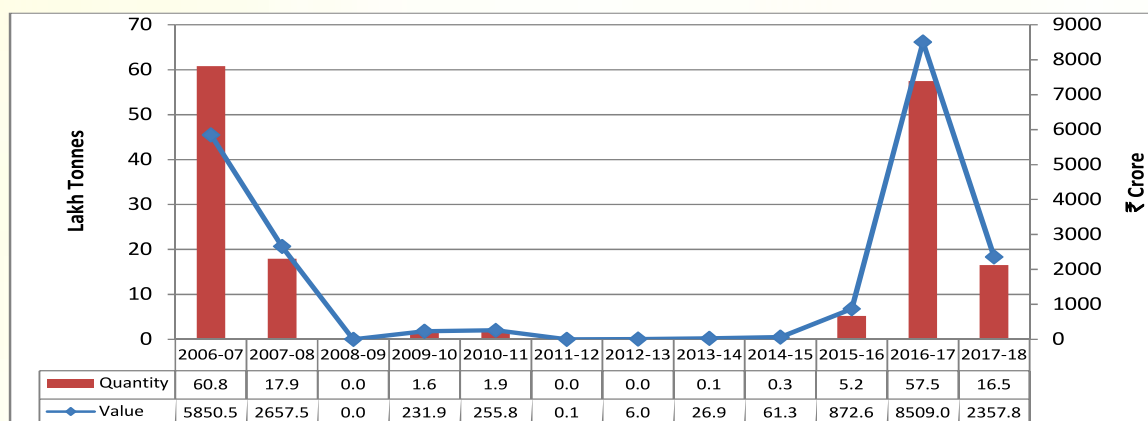
Chart 4.2: India's Exports of Wheat, 2006-07 to 2017-18



Source: Directorate General of Commercial Intelligence and Statistics

- 4.4 India has been an occasional importer of wheat depending upon the demand and supply situation at home. When the actual wheat stocks with the Central Pool went below the minimum buffer norm in 2006-07, the Government imported 60.8 lakh tonnes of wheat during 2006-07 and 17.9 lakh tonnes during 2007-08 (Chart 4.3). No imports of wheat have been made for the Central Pool thereafter. However, 5.2 lakh tonnes of wheat was imported by the private parties mainly from Australia during 2015-16. In order to control prices and to meet the demand, the Government reduced import duty on wheat from 25 percent to 10 percent in September 2016 and thereafter to zero percent in December 2016. During 2016-17 India imported over 5.7 million tonnes of wheat valued at ₹8509 crore, the highest quantity during last 10 years. However, due to record production of over 98 million tonnes in 2016-17 and to protect interest of wheat growers, government imposed 10 percent import duty in March, 2017 and further raised it to 20 percent in November, 2017 which restricted wheat imports in the country. India has imported around 1.6 million tonnes of wheat valued at ₹2358 crore mainly from Australia, Russia and Ukraine in 2017-18, significantly lower than 2016-17. As per the 2017-18 third advance estimates, the production of wheat is expected to be 98.61 million tonnes and in order to curb cheaper imports due to depressed global prices and to protect the domestic growers, the government has raised the customs duty on wheat from 20 per cent to 30 per cent in May, 2018.

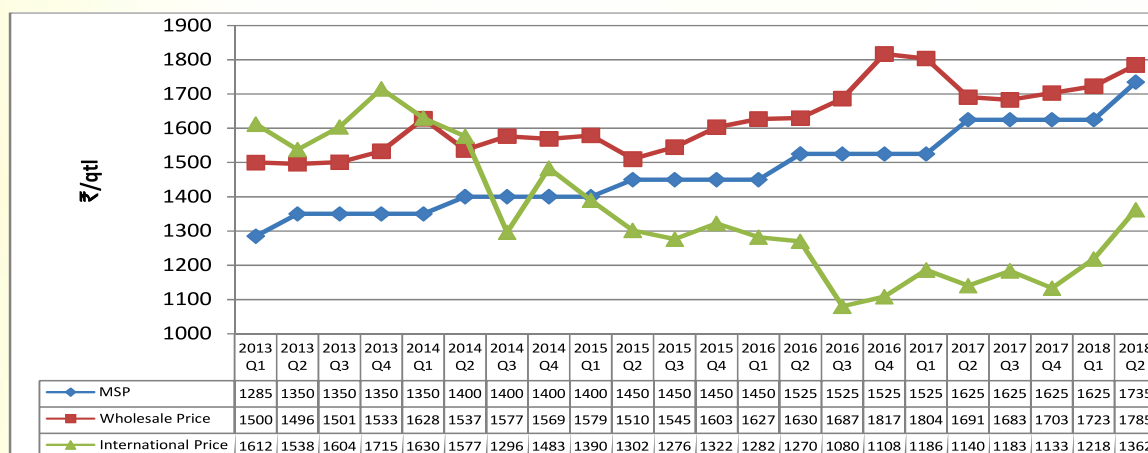
Chart 4.3: India's Imports of Wheat, 2006-07 to 2017-18



Source: Directorate General of Commercial Intelligence and Statistics

- 4.5 It may be seen from Chart 4.4 that during the period from 2013(Q₁) to 2014(Q₂), the domestic wholesale prices of wheat were consistently lower than international prices. India benefitted from higher international prices and was able to export record quantity of 65.1 lakh tonnes in 2012-13 and 55.7 lakh tonnes in 2013-14, respectively. However, during the period from 2015(Q₁) to 2018(Q₂), the domestic prices as well as MSP of wheat were higher than international prices and that led to decline in exports during this period. The international wheat prices are expected to increase marginally due to higher food use and strong import demand from Asia and Africa. During 2018-19, global wheat production is forecasted to be lower than the 2017-18 record. However, due to high stocks in major exporting countries, it became difficult for India to increase exports despite bumper crop in 2016-17 and 2017-18 and excess stocks with central pool.

Chart 4.4: MSP, Domestic and International Prices of Wheat, 2013 (Q₁) to 2018 (Q₂)



Note: 1. International Prices are of the variety (US), No. 2, Soft Red Winter, export price delivered at the US Gulf port for prompt or 30 days shipment.

2. Wholesale Prices are weighted average wholesale price of Bihar, Haryana, MP, Punjab, Rajasthan and UP, which cover 97 percent of production.

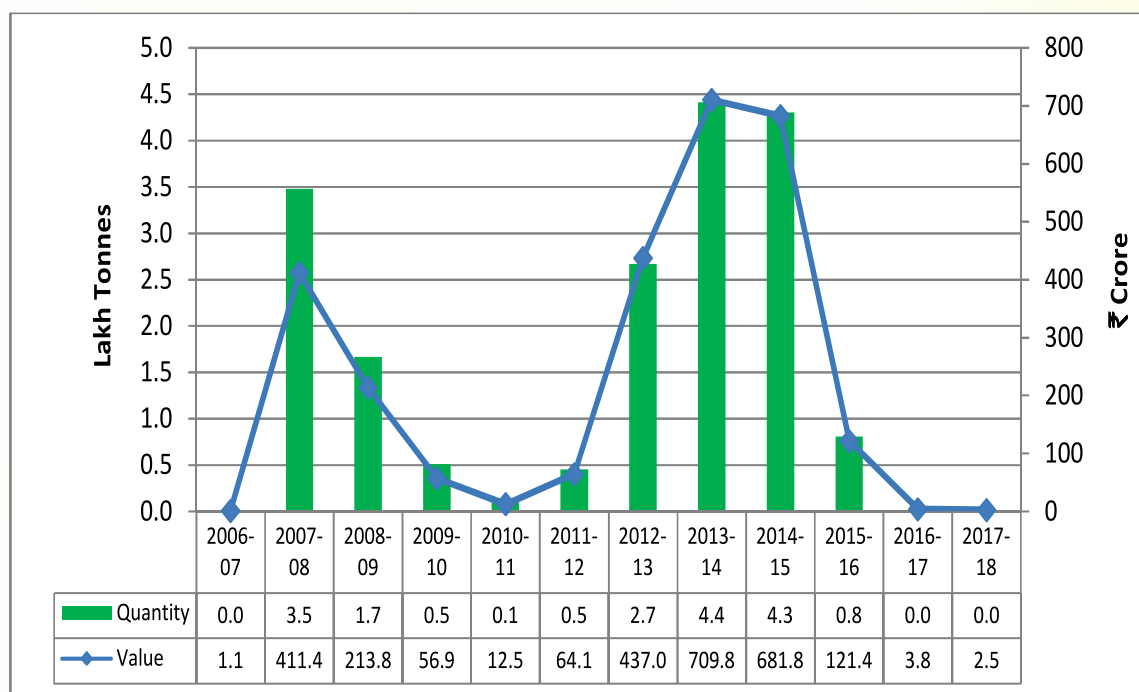
3. International prices of quarter 2018 (Q2) are of April & May months only.

Source: DES, Ministry of Agriculture & Farmers Welfare for domestic wholesale prices and World Bank for International prices.

Barley

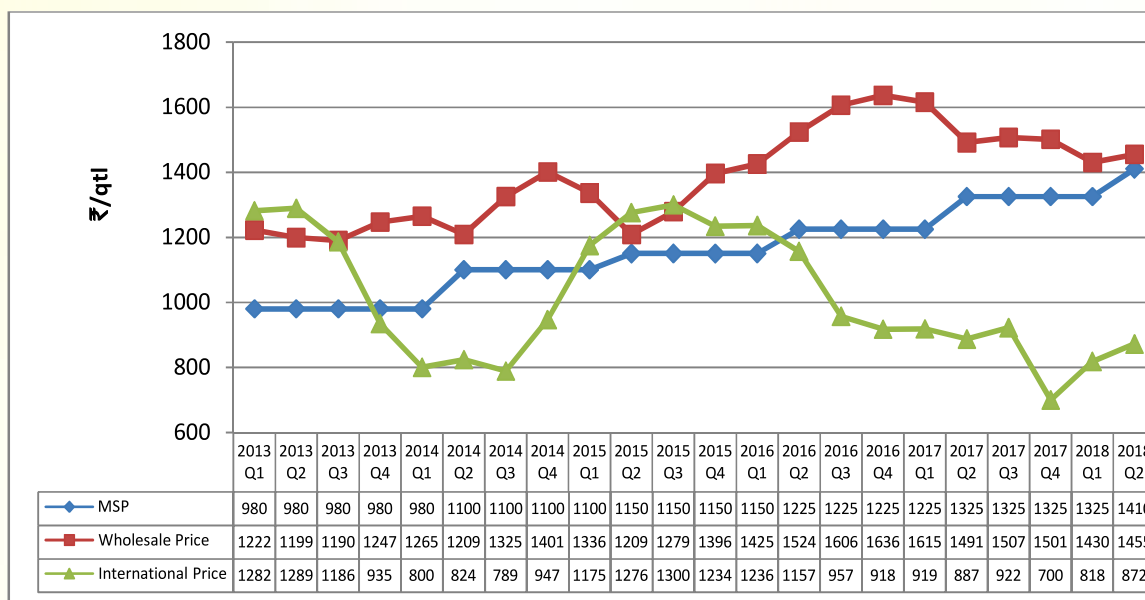
- 4.6 As per USDA, the global production of barley was 146.4 million tonnes in TE2017-18, out of which 28.5 million tonnes (19.5 percent) was traded. EU is the largest producer of barley (59 million tonnes) with a share of 41.3 percent, followed by Russia (14.1 percent) and Ukraine (6.1 percent). EU is also the largest exporter of barley (6.2 million tonnes) with a share of 22 percent, followed by Australia (20.5 percent), Russia (19.1 percent). China is the largest importer of barley (28.9 percent) followed by Saudi Arabia (28.2 percent), Iran (10.2 percent). Top three exporters and importers both account for near about two-third of world exports as well as imports.
- 4.7 India is a small player in world barley markets. India's exports of barley have increased from very negligible quantities in the recent past to a high of 4.4 lakh tonnes in 2013-14 before marginally declining to 4.3 lakh tonnes in 2014-15. However, exports of barley declined again to a negligible 0.8 lakh tonnes in 2015-16 and barley exports have remained insignificant till 2017-18 (Chart 4.5). Quantitative restrictions on exports of barley were removed in March, 2002 while import restrictions were removed in November 2002. Domestic wholesale prices, international prices and MSP of barley are given in Chart 4.6. Though domestic wholesale prices are generally higher than the international prices, India exports small quantities of barley to countries like UAE, Bahrain, Bhutan, Nepal, Vietnam, Jordan and Libya where it enjoys freight advantage over major barley exporting countries like EU, Australia and Russia.

Chart 4.5: India's Exports of Barley, 2006-07 to 2017-18



Source: Directorate General of Commercial Intelligence and Statistics

Chart 4.6: MSP, Domestic and International Prices of Barley, 2013(Q₁) to 2018 (Q₂)



Note: 1. International Prices are of the variety (US) feed, No. 2, spot, 20 days To-Arrive, delivered Minneapolis from May 2012 onwards; during 1980 - 2012 April Canadian, feed, Western No. 1, Winnipeg Commodity Exchange, spot, World Bank wholesale farmers' price.

2. Wholesale Prices are weighted average wholesale price of Haryana, Rajasthan and UP, which cover 79 percent of production.

3. International prices of quarter 2018 (Q2) are of April & May months only.

Source: DES, Ministry of Agriculture & Farmers Welfare for domestic wholesale prices and World Bank for International prices.

Pulses

4.8 As per UN Comtrade, Canada was the largest exporter of pulses (5.4 million tonnes) with a share of 32.5 percent followed by Australia (20.8 percent), Myanmar (8.3 percent), USA (8.1 percent) and Russia (7.5 percent) in 2017. India is the largest importer with a share of about 43.6 percent followed by Pakistan (9.6 percent), Turkey (4.8 percent) and USA (4.2 percent). As per DGCIS, pulses imports in the country have nearly tripled during last 10 years, from 22.7 lakh tonnes in 2006-07 to 66 lakh tonnes in 2016-17 (Chart 4.7) and declined to 56.3 lakh tonnes in 2017-18 due to increase in the area coverage and productivity of all major pulses. Peas constituted the largest share (46 percent) in total imports of pulses, followed by chickpea (17.1 percent) and lentil (15.9 percent) in TE 2017-18 (Table 4.1). Canada, Australia and Myanmar are major exporters of pulses to India and accounted for close to two-third of total imports in the country in TE2017-18. Other important suppliers are Russia, USA, Tanzania, Mozambique and Sudan. The share of Myanmar in total imports has declined significantly from 28.7 percent in TE2008-09 to 9.5 percent in TE2017-18. On the other hand, share of Australia has increased from 7.3 percent to 18.4 percent in the corresponding period. Canada is the largest exporter of peas and lentils to India while Australia supplies 82.2 percent of chickpeas and Myanmar supplies more than two-third of urad and moong.

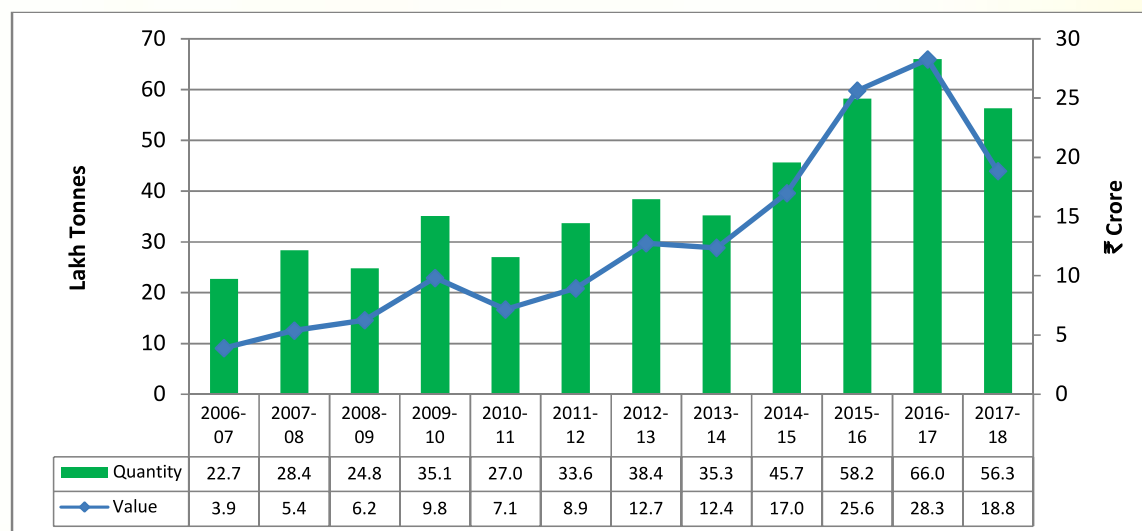
Table 4.1: Share and Key Originating Countries of India's Pulses Imports TE2017-18

(Quantity in Lakh Tonnes)

Name of Pulse	Import Quantity	Percentage share in total pulses imports	Key Origin (percent)
Peas	27.7	46.0	Canada (51.5), Russia (15.7), Ukraine (8.0)
Chickpea	10.3	17.1	Australia (82.2), Tanzania (3.3), Myanmar (1.4)
Lentil	9.6	15.9	Canada (79.2), Australia (13.2), USA (7.5)
Urad & Moong	5.0	8.3	Myanmar (68.8), Tanzania (7.4), Australia (7.2)
Tur	3.7	6.1	Myanmar (57.4), Mozambique (32.2), Sudan (10.4)
Others	3.9	6.5	-
Total	60.2	100	Canada (36.5), Australia (18.4), Myanmar (9.5). {All 3 combined 64.4%}

Source: DGCIS

Chart 4.7: India's Imports of Pulses, 2006-07 to 2017-18



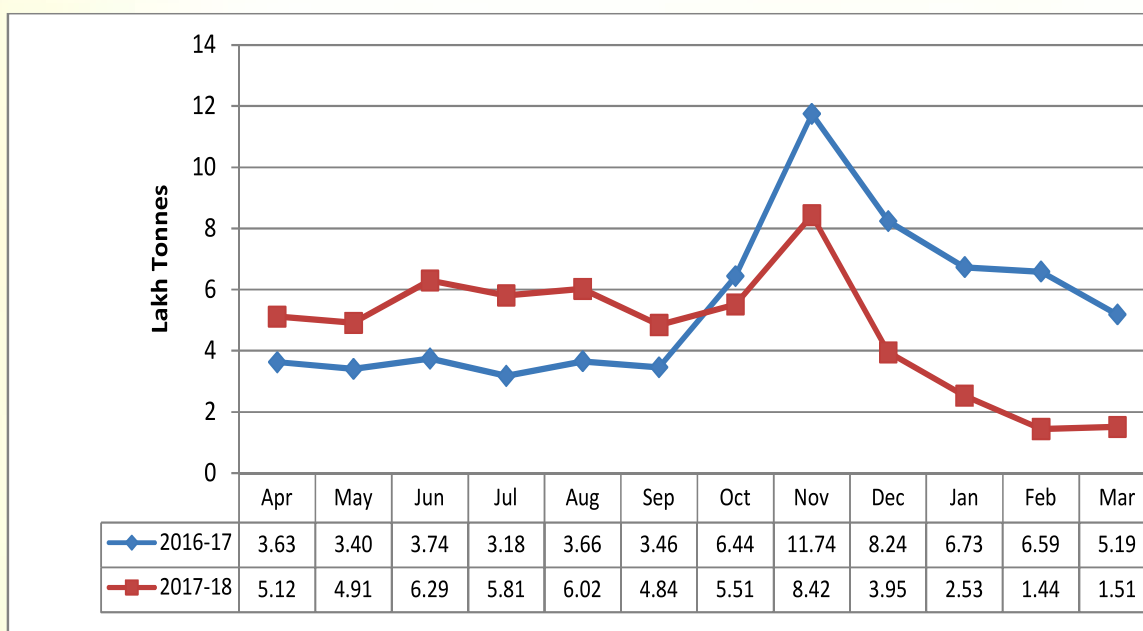
Source: Directorate General of Commercial Intelligence and Statistics

- 4.9 Import duty on pulses was brought down from 10 percent to zero percent in June, 2006 and continued to be zero percent since then. However due to record production in 2016-17 and 2017-18, domestic prices of chickpea, tur and moong fell below MSP in many markets. With a view to ensure that the farmers get remunerative prices, the government has imposed import duty and put quantitative restrictions

on imports of pulses. Government imposed quantitative restrictions on import of tur, moong and urad in August 2017. An import duty of 10 per cent was imposed on tur in a bid to check falling domestic prices and to support farmers. Also, import duty on lentil was raised to 30 percent in December 2017, which was further raised to 40 percent in February 2018. In anticipation of a bumper crop (chickpeas) and falling prices, the government increased the import duty on chana from 40 percent (February, 2018) to 60 percent in March 2018. Exports of pulses were prohibited in June, 2006, initially for a period of six months which was extended from time to time and latest being in March, 2014. However, in November 2017 the Government revised the export policy and removed prohibition on export of all types of pulses to ensure that farmers have greater choice in marketing their produce and in getting better remuneration for their produce. Export market would provide an alternative market for the surplus production.

- 4.10 Chart 4.8 shows the import seasonality in pulses. As seen in this chart, Imports of peas and tur tend to rise from the month of September and reach a peak in November/December. It is important to underline the fact that this peak import season of pulses coincides with the peak arrival season for domestic Kharif pulses as well. High imports of pulses during this period in 2017-18 and high domestic production led to fall in domestic prices. Therefore, it is observed that there is a need to restrict imports as well as offloading of domestic stocks held by Government agencies during peak domestic market arrivals, depending upon domestic and international demand – supply and price situation. The decision to impose 60 percent import duty on chickpea was taken in March, 2018 and by that time most of farmers had already sold their produce. This underscores need for timely decision and action on imposition of required duties by the Government.

Chart 4.8: Month-wise Imports of Pulses, 2016-17 and 2017-18

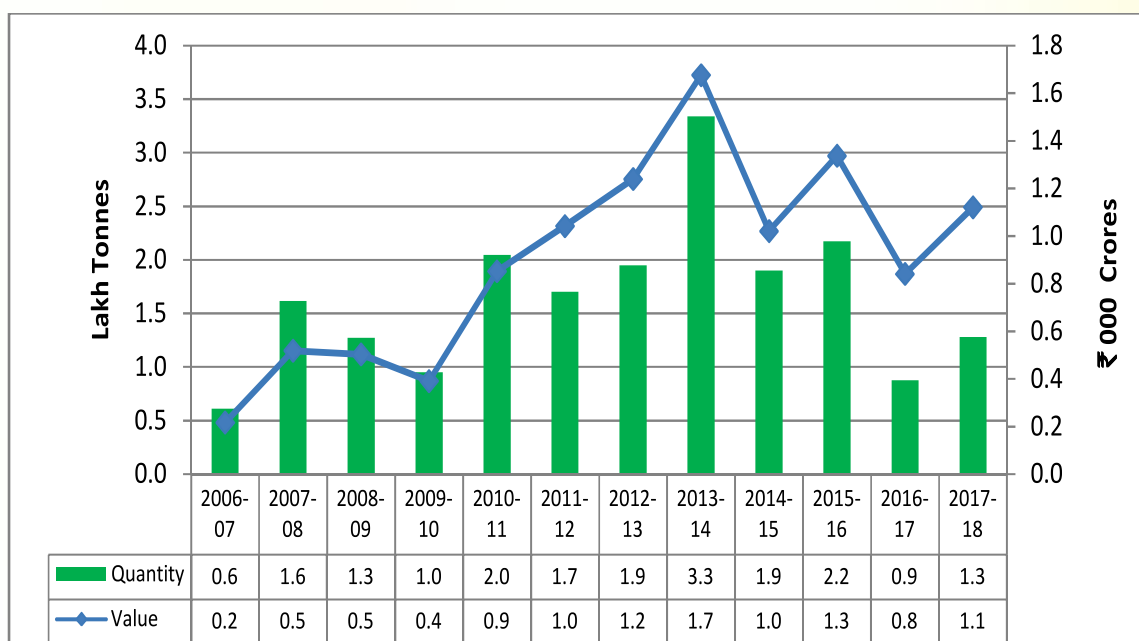


Source: Directorate General of Commercial Intelligence and Statistics

Gram (Chickpea)

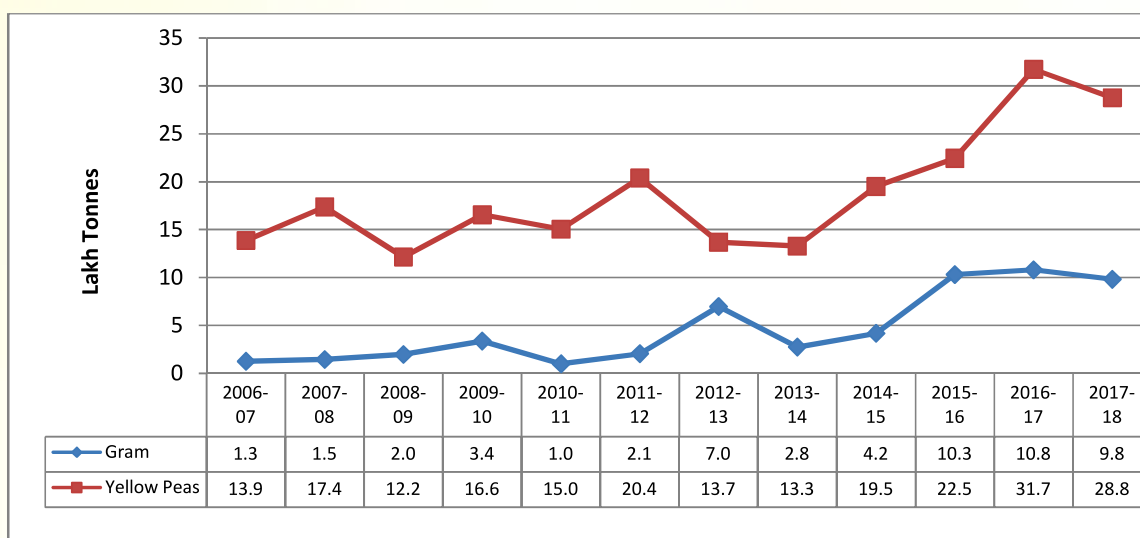
4.11 India imports as well as exports small quantities of gram. Chickpeas contribute the single largest share in India's export basket of pulses accounting for 86.2 percent and 85.1 percent in 2014-15 and 2015-16, respectively which declined to 64 percent in 2016-17 due to high domestic demand. India's exports (mostly kabuli chana) have increased from about one lakh tonnes in 2009-10 to 3.3 lakh tonnes in 2013-14 and then declined to 1.9 lakh tonnes in 2014-15. Exports of gram were 2.2 lakh tonnes in 2015-16 and fell to less than one lakh tonnes in 2016-17, rising again to 1.3 lakh tonnes in 2017-18 (Chart 4.9). In order to incentivise exports and restrict imports, Government of India increased the import duty on kabuli chana to 60% and announced 7% export incentives for Bengal gram (chana) in March, 2018 under the Merchandise Export from India Scheme (MEIS) for a period of three months till June 20, 2018. However, imports of gram have increased from 1.3 lakh tonnes in 2006-07 to 7 lakh tonnes in 2012-13 before declining to 2.8 lakh tonnes in 2013-14 due to bumper production during 2013-14. Imports of gram increased to 4.2 lakh tonnes in 2014-15 and reached a peak of 10.8 lakh tonnes in 2016-17 and declined to 9.8 lakh tonnes in 2017-18 due to increased domestic production and low prices in domestic markets (Chart 4.10). Yellow peas being a good substitute for gram, India imports large quantities of yellow peas that peaked at 31.7 lakh tonnes in 2016-17 and dropped to 28.8 lakh tonnes in 2017-18. In a bid to manage declining prices of pulses, peas import were restricted for 3 months from 1st April to June 30 2018 and during this period maximum one lakh tonne peas import was allowed that too including the quantity already imported thus far. In June 2018, government extended the import restriction on peas till 30th September 2018.

Chart 4.9: India's Exports of Gram (Chickpea) 2006-07 to 2017-18



Source: Directorate General of Commercial Intelligence and Statistics

Chart 4.10: India's Imports of Gram (Chickpea) & Yellow Peas, 2006-07 to 2017-18

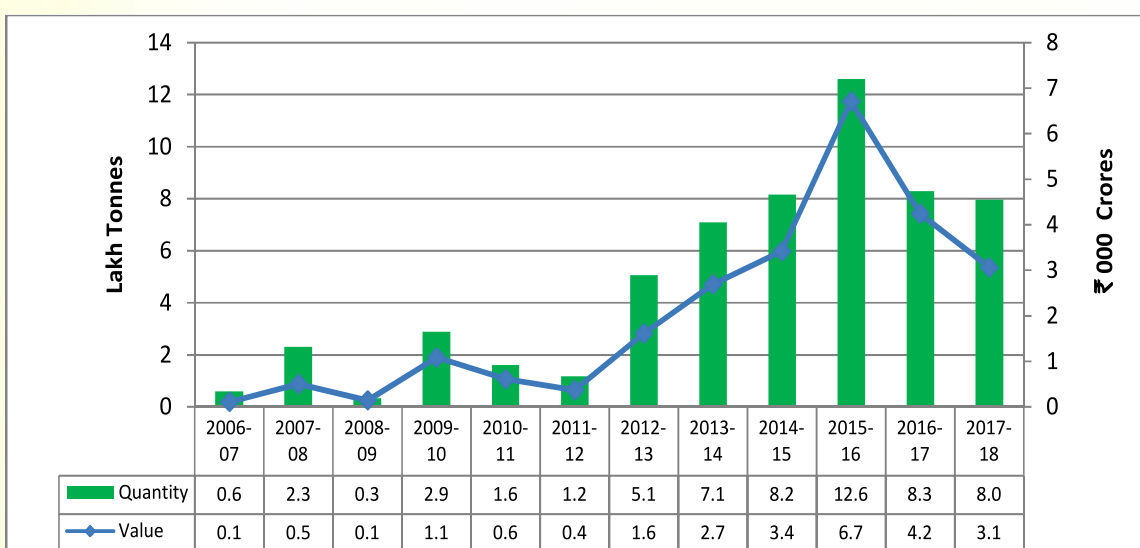


Source: Directorate General of Commercial Intelligence and Statistics

Lentil (Masoor)

4.12 India's exports of lentils used to be nearly half of total pulses exports prior to 2006-07 and is negligible as of now with a share in total pulses export only 11.4 percent in 2016-17 and 6.25 in 2017-18, following restriction imposed on its exports. Whereas imports have increased from 0.6 lakh tonnes (2.6% of pulses imported) in 2006-07 to 12.6 lakh tonnes (21.65 % of pulses imported) in 2015-16 due to high demand for it in the market and varying levels of domestic production, but declined to 8 lakh tonnes (14.14 % of pulses imported) in 2017-18 due to higher domestic production (Chart 4.11).

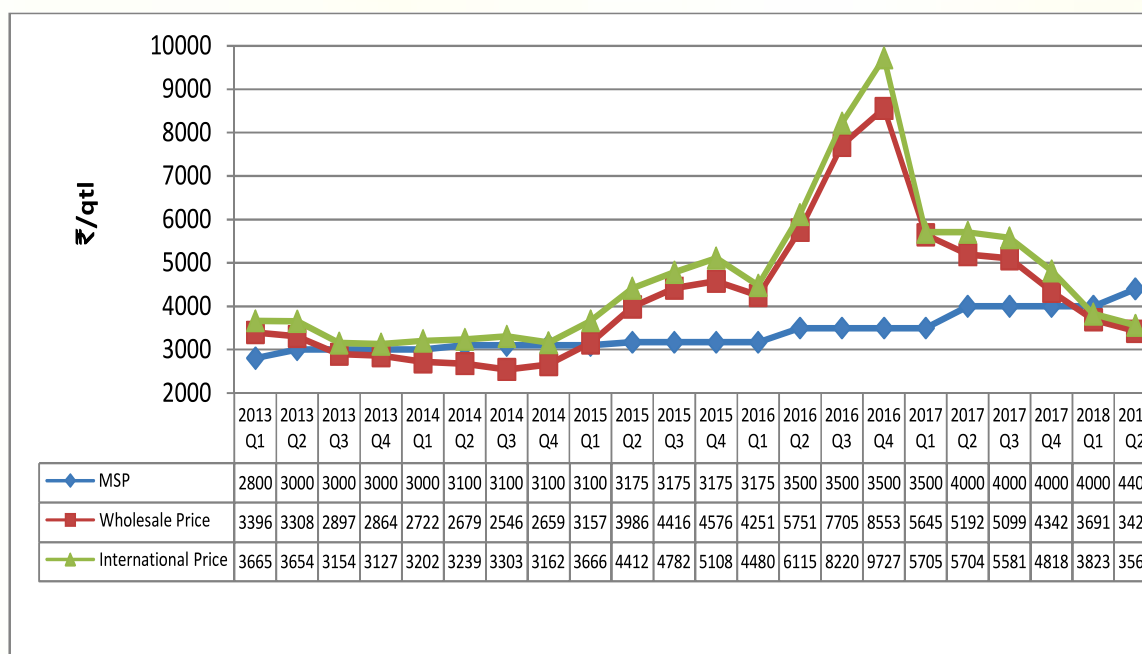
Chart 4.11: India's Imports of Lentil, 2006-07 to 2017-18



Source: Directorate General of Commercial Intelligence and Statistics

4.13 During the last five years, domestic wholesale prices of gram (Chart 4.12) have been lower than international prices whereas domestic wholesale prices of masoor (Chart 4.13) which were generally lower than world prices during 2014 (Q₃ & Q₄) and 2015 (Q₃), became higher than international prices till 2018 (Q₁), thereafter both seem to converge. Lower world prices have adversely affected domestic lentil growers (Chart 4.13). MSP of masoor has been lower in general than domestic and international prices for the last five years but it has risen above both the prices in 2018. While gram prices, both domestic as well as international, which have been above MSP, went below MSP during 2013(Q₃) to 2014(Q₄), on account of record production in the country, during 2013-14. Since 2017 onwards there is continuous fall in domestic as well as international prices of gram and in 2018 they dipped below MSP. In order to promote pulses production, producers need to be protected through appropriate tariff levels when international prices are low, exports could be promoted to neighbouring countries in such eventualities and India need to have timely and effective procurement policy when market prices fall below MSP.

Chart 4.12: MSP, Domestic and International Prices of Gram, 2013(Q₁) to 2018(Q₂)



Note: 1. International Prices are C&F Prices at Mumbai port.

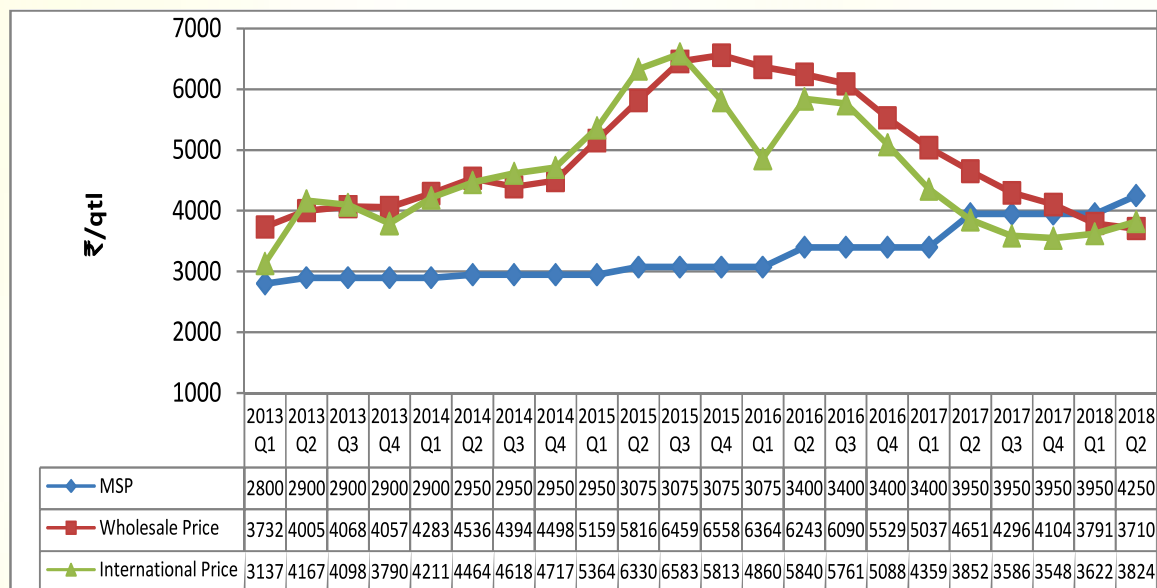
2. Wholesale Prices are weighted wholesale price of AP, Bihar, Karnataka, MP, Maharashtra, TN, UP and WB.

3. MSPs are inclusive of Bonus

4. International prices of quarter 2018 (Q2) are average prices of only two months (April & May)

Source: DES, Ministry of Agriculture & Farmers Welfare for domestic wholesale prices and Agriwatch for International prices.

**Chart 4.13: MSP, Domestic and International Prices of Lentil (Masoor),
2013 (Q₁) to 2018 (Q₂)**



Note: 1. International Prices are C&F Prices at Mumbai port.

2. Wholesale Prices are weighted average wholesale price of Bihar, MP, UP and West Bengal.

3. MSPs are inclusive of Bonus

4. International prices of quarter 2018 (Q2) are average prices of only two months (April & May)

Source: DES, Ministry of Agriculture & Farmers Welfare for domestic wholesale prices and Agriwatch for International prices.

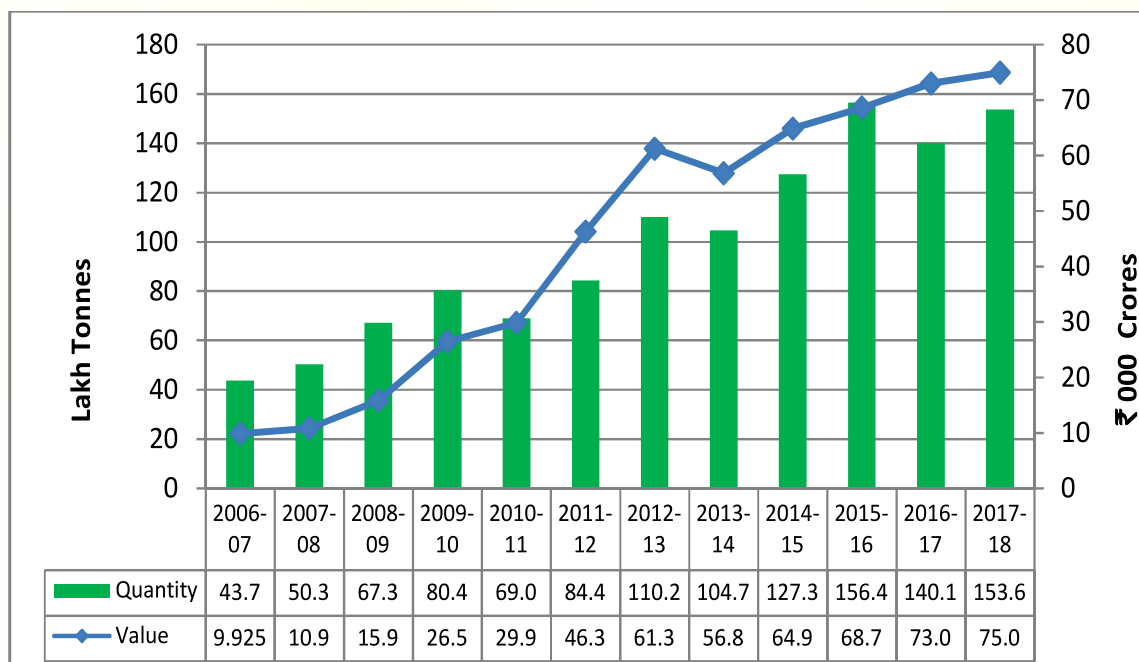
Edible Oils and Oilseeds Complex

4.14 Given high domestic demand for edible oils, stagnation in oilseed production in the country, higher imports of edible oils and reduction in exports of oil meals is a major cause of concern for oilseed sector. As per USDA, global production of major oilseeds was 557.1 million tonnes in TE2017-18 out of which 166.4 million tonnes (29.9 percent) was traded. USA is the largest producer (131 million tonnes) with a share of 22.9 percent. Other major producers are Brazil (21.1 percent) and China (10.5 percent). Brazil and USA accounted for around three-fourth of the total global exports, with a share of 42 percent and 32.8 percent, respectively. The other major exporter is Canada (9.7 percent). China is the single largest importer of oilseeds (102.2 million tonnes) with a share of 58.2 percent, followed by EU (11.3 percent), and Mexico (3.9 percent).

4.15 According to USDA, global production of vegetable oils was 188.2 million tonnes during TE2017-18, out of which 41.5 percent was traded. Indonesia is the largest producers (43.8 million tonnes) with a share of 22.1 percent, followed by China (14.8 percent), Malaysia (11.6 percent) and EU (9.6 percent). Indonesia (37.4 percent) and Malaysia (22.7 percent) account for about 60 percent of global exports. India is the largest importer of vegetable oils with a share of about 21.8 percent, followed by EU (13 percent), and China (10.2 percent).

- 4.16 As per DGCIS, India's imports of edible oils have increased from 43.7 lakh tonnes (valued at 9.9 thousand crore) in 2006-07 to a record of 156.4 lakh tonnes (₹68.7 thousand crore) in 2015-16. However, imports declined by about 10 percent to 140.1 lakh tonnes in 2016-17 but increased subsequently to 153.6 lakh tonnes (valued at ₹75 thousand crore) in 2017-18 (Chart 4.14). In last decade, import of edible oils has increased by more than 250 percent indicating a huge drain on foreign exchange reserves as well as adverse impact on domestic growers. Therefore, there is a need to take concrete steps to enhance domestic production to reduce import reliance and achieve self-sufficiency.

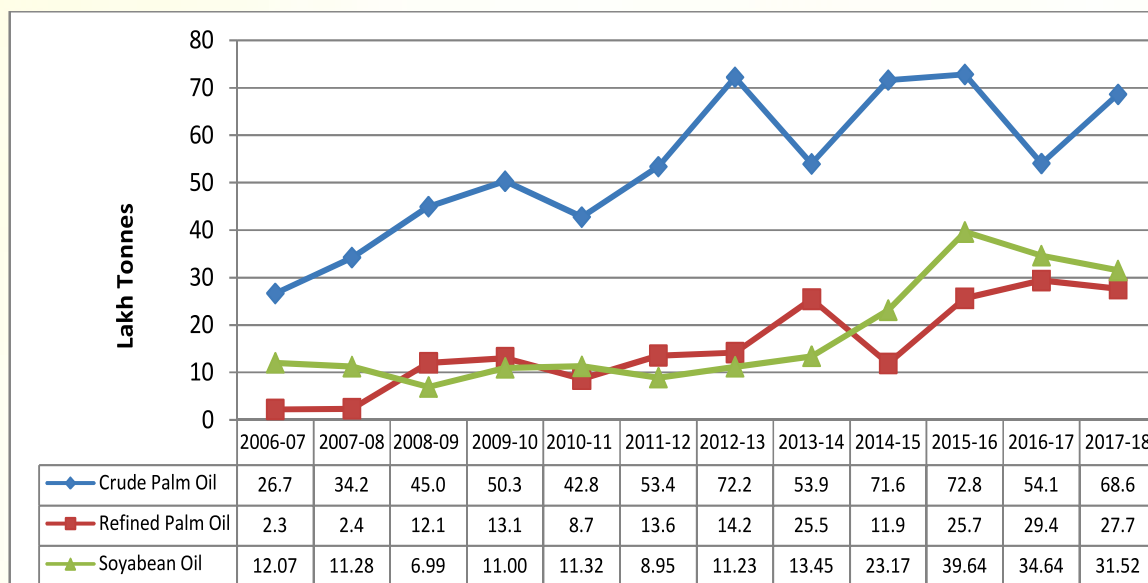
Chart 4.14: India's Imports of Edible Oils, 2006-07 to 2017-18



Source: Directorate General of Commercial Intelligence and Statistics

- 4.17 A look at the secular edible oil imports of India reveal an emerging structural change in the edible oil imports. The share of soft oils such as soybean, sunflower etc. has gradually increased over the years while share of palm oil has declined. Combined crude palm kernel oils and crude palm oil fractions doubled during 2006-07 and 2017-18. Whereas soybean crude oil W/N degummed and soybean edible grade imports tripled during the same period. In the refined category, combined imports of RBD palm oil, RBD Palmolein, other refined palm oil and refined palm kernel oil and its fractions also recorded extremely high level of growth of over 10 fold during this period (Chart 4.15). It is evident from the chart that imports of refined palm oil and soft oils have increased faster compared with crude palm oil.

Chart 4.15: India's Imports of Soft and Hard Oils, 2006-07 to 2017-18

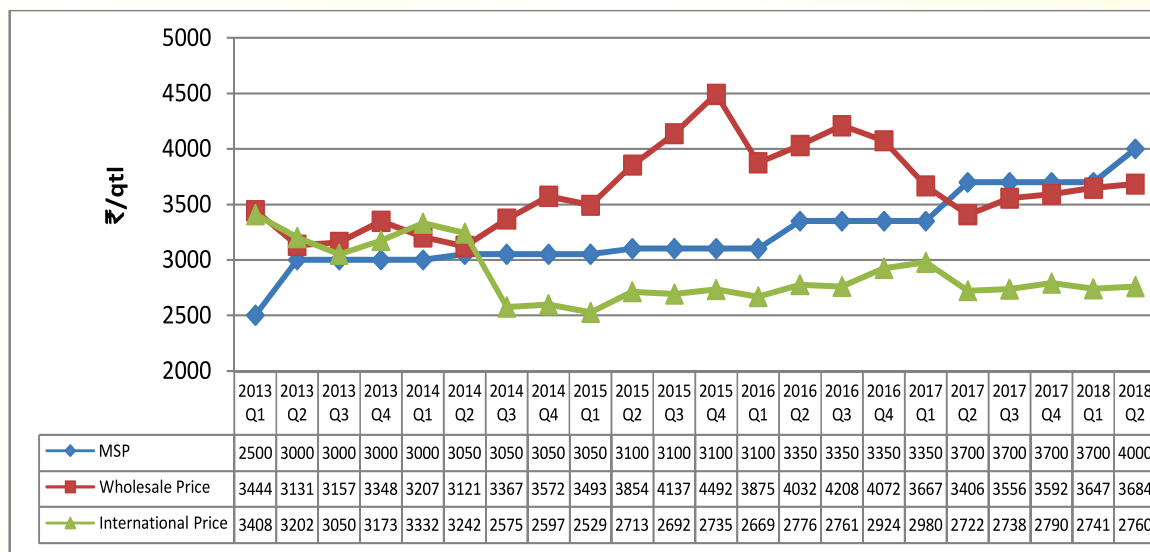


Source: DGCIS

Rapeseed and Mustard (R&M) Oilseeds

- 4.18 As per USDA, global production of R&M was 71.9 million tonnes, out of which 21.7 percent (15.6 million tonnes) was traded. EU is the largest producer of R&M with a share of 29.8 percent, followed by Canada (28.9 percent), China (19.4 percent) and India (7.9 percent). Canada is the largest exporter of R&M, with a share of 69.1 percent, while China is the largest importer, with a share of 27.7 percent, followed by EU (26.5 percent) and Japan (14.9 percent).
- 4.19 Exports and imports of R&M oilseeds have been negligible for last two years in the country. As per DGCIS, India's exports of R&M were 28 thousand tonnes in TE 2015-16. During the period from 2013(Q₁) to 2014(Q₂), domestic wholesale prices of R&M have generally followed the trend of international prices. However, during the period from 2014(Q₃) to 2017(Q₂), domestic wholesale prices of R&M have been consistently higher than international prices. MSP of R&M seed has been lower than domestic wholesale prices but after 2017(Q₂), it has moved above domestic prices. MSP was also higher than international prices during the period from 2014(Q₃) to 2018(Q₂) [Chart 4.16].

Chart 4.16: MSP, Domestic and International Prices of R&M Oilseeds, 2013 (Q₁) to 2018(Q₂)



Note: 1. International Prices are R&M Oilseed, Hamburg CIF.

2. Wholesale Prices are Weighted average wholesale price of Gujarat, Haryana, Rajasthan, UP and West Bengal, which cover 76 percent of production, MSPs are inclusive of Bonus.

3. International prices of quarter 2018 (Q₂) are of April & May months only.

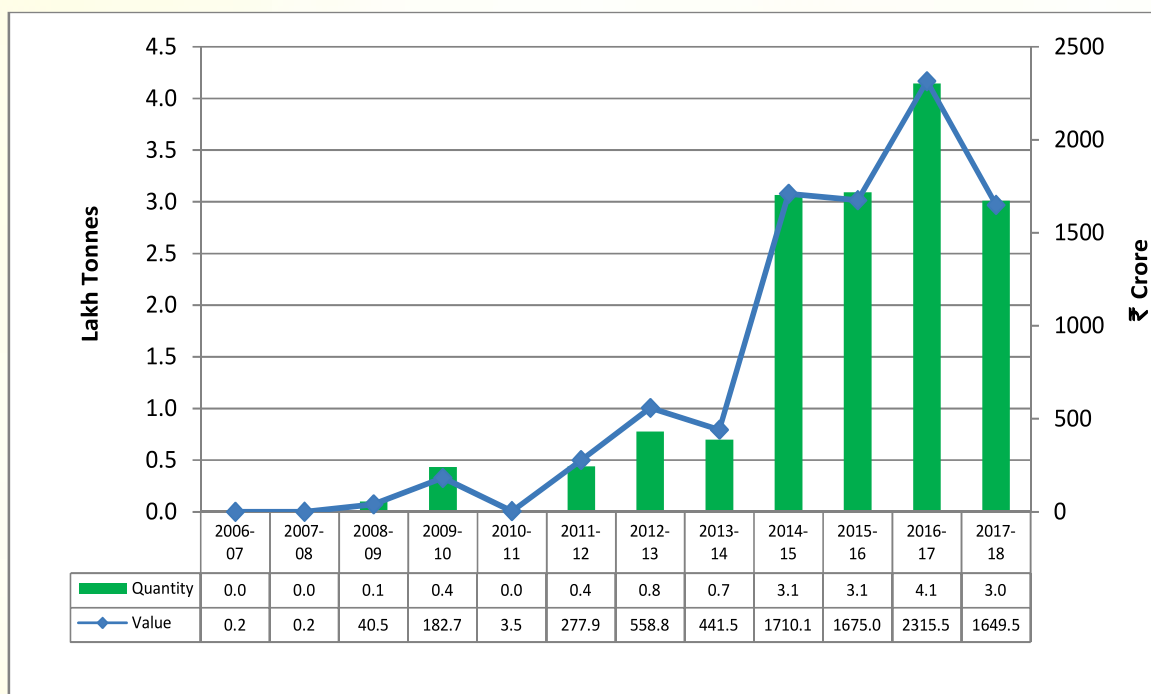
Source: DES, Ministry of Agriculture & Farmers Welfare for domestic wholesale prices and World Bank for International prices.

Rapeseed and Mustard (R&M) Oil

4.20 As per USDA, global production of R&M oil was 28.3 million tonnes in TE2017-18, out of which about 15.6 percent was traded. EU is the largest producer of R&M oil (10.5 million tonnes) with a share of 36.4 percent followed by China (25.1 percent), Canada (14 percent) and India (6.8 percent). Canada is the largest exporter of R&M oil with a share of 68.8 percent, followed by EU (6 percent). China is the largest importer of R&M oil with a share of 15.9 percent, followed by India (8.4 percent) and EU (3.4 percent).

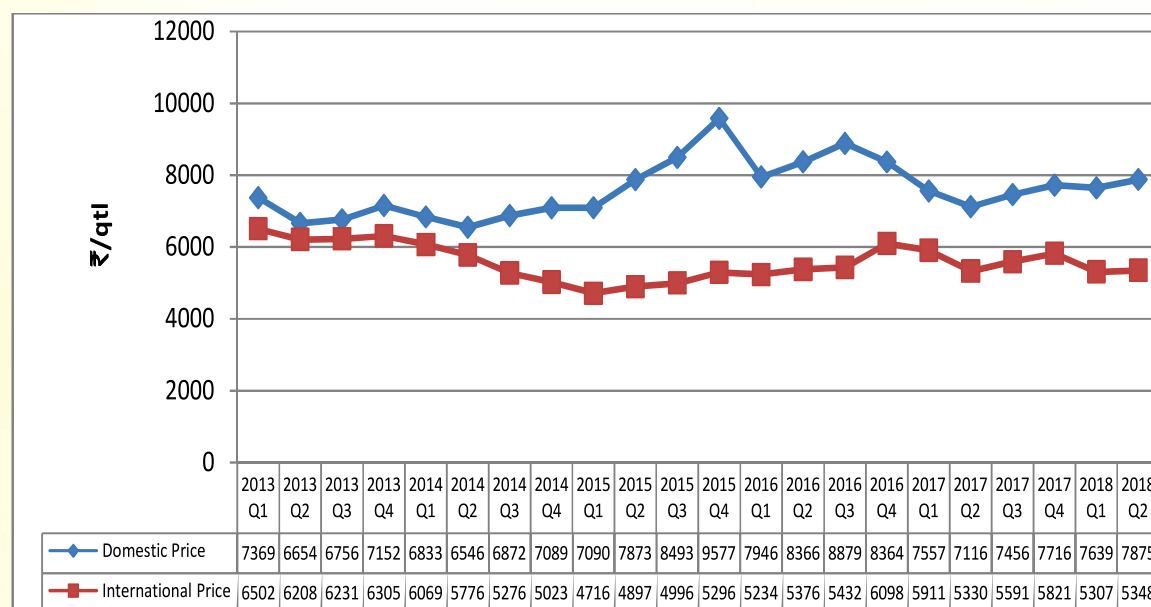
4.21 India's exports of R&M oil are negligible but imports of R&M oil have increased during the last three years. Imports of R&M oil rose from 70 thousand tonnes in 2013-14 to 3.1 lakh tonnes in 2014-15 and 2015-16 which further increased to 4.1 lakh tonnes in 2016-17 but declined to 3 lakh tonnes in 2017-18 (Chart 4.17). The domestic prices of R&M oil have continuously been higher than international prices from 2013 (Q₁) to 2018 (Q₂) [Chart 4.18]. Domestic prices of R&M oil experienced increasing trend from 2014 (Q₂) to 2015 (Q₄) and significantly fell during 2016 (Q₁), but again increased in the next two quarters. However, prices showed a downward trend in both domestic and world market till 2017 (Q₂) but domestic prices rose again in next two quarters while world prices declined.

Chart 4.17: India's Imports of R&M Oil, 2006-07 to 2017-18.



Source: Directorate General of Commercial Intelligence and Statistics

Chart 4.18: Domestic and International Prices of R&M Oil, 2013 (Q₁) to 2018 (Q₂)



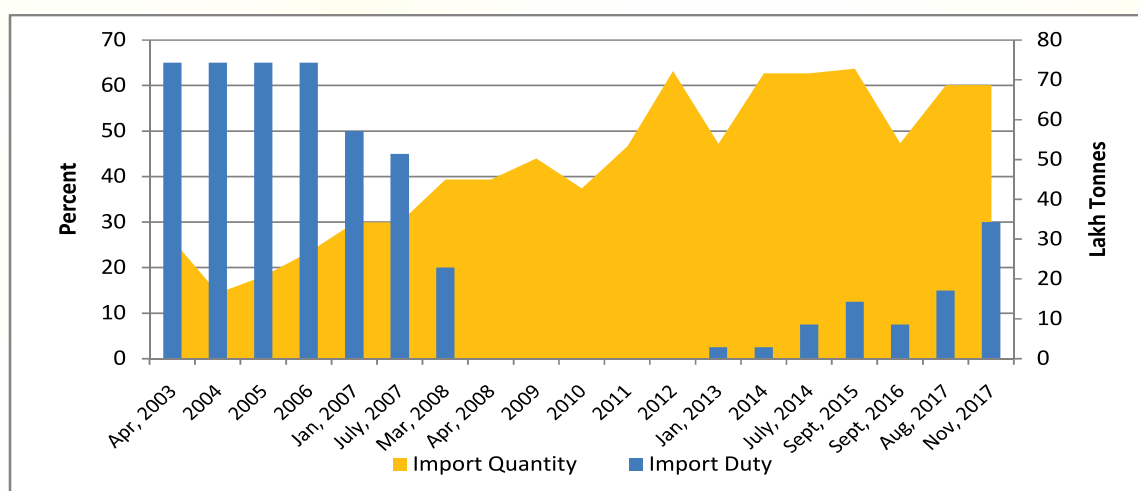
Note: 1. International Prices are Rotterdam, Dutch FOB Ex-Mill; Oil World.

2. International prices of quarter 2018 (Q₂) are of the April month only and wholesale prices are average prices of two months (April & May)

Source: Solvent Extractors Association of India (SEAI) for domestic prices and World Bank for International prices

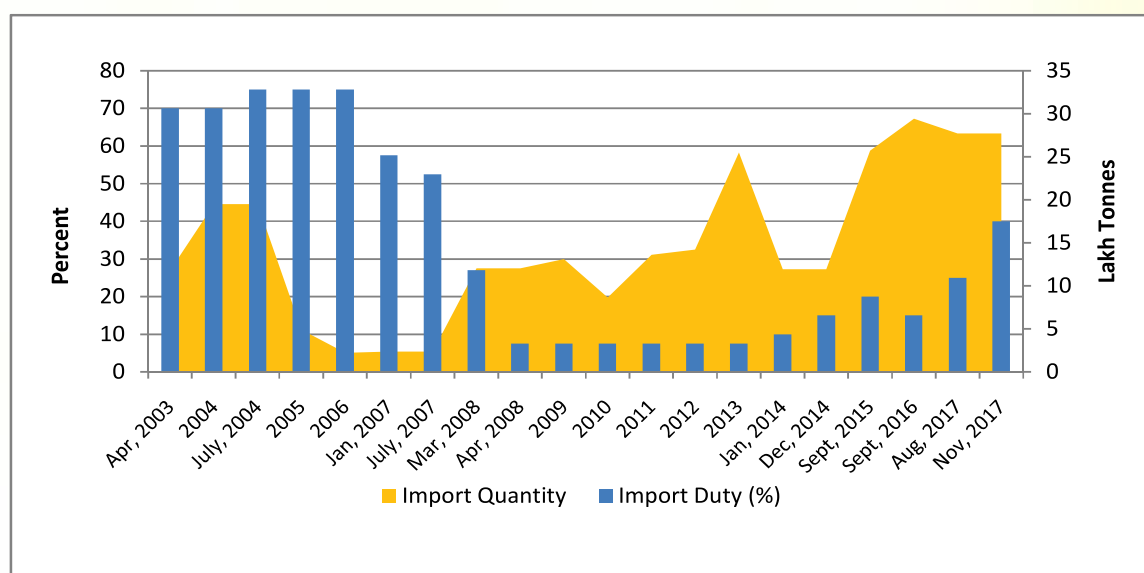
4.22 As it has been mentioned earlier, the annual import bill of edible oils has increased several fold over the time period, as India has not been able to increase oilseeds production as per the domestic demand, so edible oils import is imperative for a few years to come. In this scenario, it will be desirable for India to import crude edible oil instead of refined edible oils. The advantage of importing crude edible oil is that it can help in generating domestic employment by improving capacity utilization of domestic refinery industry, which has very low capacity utilisation. The Commission suggests that duty differential between crude and refined should be sufficiently large to encourage import of crude oil and discourage refined oil. Relationship between import duties and import quantities are depicted in Chart 4.19, Chart 4.20, and in Chart 4.21.

Chart 4.19: Imports and Duties of Crude Palm Oils and Fractions, 2003 to 2017



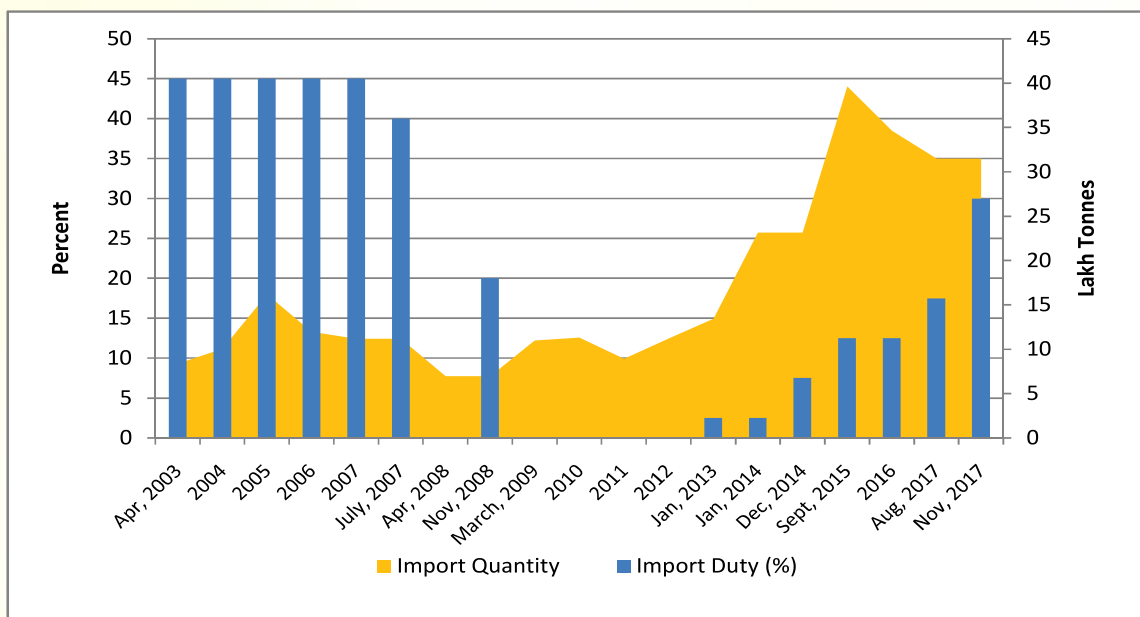
Source: DGCIS for import quantity and CBEC for import duty

Chart 4.20 Imports and Duties of Refined Palm Oils and Fractions, 2003 to 2017



Source: DGCIS for import quantity and CBEC for import duty

Chart 4.21 Imports and Duties of w/n De-Gummed Soy Oil, 2003 to 2017



Source: DGCIS for import quantity and CBEC for import duty

4.23 On analysing exports of total oilcake in last 10 years it has been observed that export of total oilcakes has declined from 46 lakh tonnes (2006-07) to around 19 lakh tonnes (2017-18), a decline of around 59 percent. Prospects for India's soy DOC exports look better now with China's announcement of intention to reduce import duty on soy DOC by about 3 percent in the near future. Solvent Extractors Association statistics indicate that export of de-oiled R&M cakes (DOC) have dropped to a considerable extent by about 2.35 lakh tonnes with an average annual decrease of about 5%, during the last six years. Exports that stood at 7.8 lakh tonnes in 2012-13 (Mar-Feb) peaked to 10.98 lakh tonnes in 2014-15. Exports of DOC that slid to a low of 2.14 lakh tonnes in 2016-17, have improved in 2017-18 and stands at 5.47 lakh tonnes. Total world production of R&M seeds remained at 63.44 MT and 66.54 MT during 2016-17 and 2017-18 respectively. India's share in the world production stands at roughly about 10% of world production during both the years at 6.80 MT and 6.4 MT respectively. Total domestic usage and crushing are estimated and forecast to be 6.80 MT and 6.30 MT respectively. Export of R&M DOC is a function of domestic production of R&M seed, its international prices and its domestic consumption. Currently, India's exports of R&M DOC could be observed to be in consonance with vicissitudes in domestic production of R&M seeds and increasing domestic demand for feeding a growing cattle population.

Trade Policy

4.24 Exports of oilseeds are free while imports of oilseeds are under OGL with an import duty of 30 percent since January, 2003 subject to quarantine conditions. Edible oils were under negative list of imports till April, 1994 when imports of Palmolein were placed under OGL with 65 percent import duty. Subsequently, import of other edible oils was also placed under OGL. Import duty was as high as 80 percent on

crude oil and 90 percent on refined edible oils during early 2000s but was reduced to zero percent on crude and 7.5 percent on refined edible oils in April, 2008. Import duty on crude edible oils was increased to 2.5 percent in January, 2013 which was further increased to 7.5 percent in December, 2014 to 12.5 percent in September, 2015. Import duty on refined edible oils was also increased to 10 percent in January, 2014 which was further increased to 15 percent in December, 2014 and later to 20 percent in September, 2015. However, import duty was reduced on crude palm oil to 7.5 percent and on refined palm oil to 15 percent from September, 2016. In order to curtail the alarming level of imports of edible oil and to support domestic farmers and oil industry, government increased the tariffs for edible oils in 2017-18. The import duty on crude palm oil was increased to 30 percent in November, 2017 and further revised to 44 percent (March, 2018). Import duty on RBD (Palmolein & Palm Oil) was raised from 40 percent (Nov, 2017) to 54 percent (March, 2018). Similarly import duty on R&M oil crude raised to 35 percent (June, 2018) and on R&M refined oil raised to 45 percent (June, 2018). In order to improve self-sufficiency in edible oils, import duty needs to be linked to domestic demand-supply situation and international prices. Duty differential between crude and refined oil should be sufficient to discourage imports of refined oil and encourage domestic refining industry through import of crude oil.

- 4.25 Exports of edible oils were initially prohibited for a period of one year in March, 2008 which was extended from time to time. At present also, export of edible oils is prohibited. However, there are certain exemptions, namely (a) Castor oil, (b) Coconut oil from all Electronic Data Interchange (EDI) Ports and through all Land Custom Stations (LCS), (c) Deemed export of edible oils (as input raw material) from Domestic Tariff Area (DTA) to 100 percent Export Oriented Units (EOUs) for production of non-edible goods to be exported, (d) Edible oils from DTA to Special Economic Zones (SEZs) to be consumed by SEZ Units for manufacture of processed food products, subject to applicable value addition norms, (e) edible oils produced out of minor forest produce, (f) organic edible oils subject to export contracts being registered and certified as 'Organic' by APEDA, (g) Rice Bran oil in bulk (irrespective of any pack size) (h) Groundnut oil, Sesame oil, Soybean oil and Maize (corn) oil in bulk. In addition, export of edible oils in branded consumer packs of up to 5 kg is permitted with a Minimum Export Price (MEP) of US \$ 900 per MT. India's Trade policy for major Rabi Crops is summarized in Table 4.2.

Table 4.2: India's Trade Policy - Rabi Crops

Crop/ Commodity	Trade Policy				
	Import Policy			Export Policy	
	OGL/import ban	Import duty (percent)	Bound duty (percent)	OGL/Export ban	Export duty (percent)
Cereals					
Wheat	OGL	30	100	OGL	Zero
Barley	OGL	Zero	100	OGL	Zero

Crop/ Commodity	Trade Policy				
	Import Policy			Export Policy	
	OGL/import ban	Import duty (percent)	Bound duty (percent)	OGL/Export ban	Export duty (percent)
Pulses					
Gram (Chickpea)	OGL	60	100	OGL	Zero
Masoor (Lentil)	OGL	30	100	OGL	Zero
Oilseeds & Oils					
R&M	OGL	30	100	OGL	Zero
R&M Oil (Crude)	OGL	35	75	Export ban*	
R&M Oil (Refined)	OGL	45	75	Export ban*	
Palm Oil (Crude)	OGL (Tariff value -US \$644 per metric tonne)**	44	300	Export ban*	
RBD Palmolein	OGL (Tariff value -US \$673 per metric tonne)**	54	300	Export ban*	
RBD Palm Oil	OGL (Tariff value -US \$664 per metric tonne)**	54			

Note : * Export of Edible oils in branded, consumer packs up to 5 kg is permitted with a MEP of US \$ 900 per tonne.

**as on June 14, 2018

Source: CBEC

- 4.26 Based on the discussions of the Commission with various stakeholders during price policy meetings, academic literature and discussions in a WTO symposium on India's Agriculture Trade Policy, certain desirable features that can be built into India's Agricultural Trade Policy which the commission suggests are: (1) Agricultural Trade Policy need to be more predictable and stable so that exports as well as imports could be made more reliable. For example sudden decisions to restrict import of pulses may result into drying up of supply sources in future during low production period, (2) A predictable and stable export policy would help in encouraging agri-exports and achieve the objective of doubling farmers' income, (3) India needs export centric clusters with world class infrastructure for enhancing

exports, (4) Synchronization of domestic policies on trade, incentives / subsidies and (5) Establishment of world class infrastructure etc., are crucial for improving exports from India.


Trade Outlook

- 4.27 As per USDA, and FAO, global wheat production is anticipated to fall in 2018-19 mainly due to weather-stressed yields especially in CIS producers despite a moderate gains in North America and South America. However, world wheat markets are expected to be adequately supplied but reduction in production and increased demand for food, feed and industrial uses, wheat inventories are likely to be lower (34.9%) in 2018-19 than in 2017-18 (36.9%). Production forecast in 2018-19 is likely to be 744.7 MT that is 13.5 MT lower than 2017-18 production estimate of 758.2 MT. Downfall is mainly contributed by Russia 16.5 MT, European Union 2.2 MT and India 1.5 MT. Increased production levels are expected from Canada, Australia and USA. World wheat supply and use scenario for 2018-19 indicates to a beginning stock of 272.4 MT. Combined with production forecast of 744.7 MT total supply is expected to be 1017.1 MT which is 1.5 MT more than the total supply estimated for 2017-18. As per FAO, OECD-FAO world wheat trade is expected to exceed 2017-18 trade volume and USDA forecast for 2018-19 is higher than 2017-18. Despite large global supplies and strong export competition, world prices have remained generally above last year's levels. In June, wheat Futures in CBDT for September 2018 delivery was about 9 per cent higher than the beginning of the year and the corresponding period last year. Trade forecast for 2018-19 is 187.3 MT which is 4.5 MT more than the trade estimate of 182.80 MT for 2017-18. However, trade volume growth in wheat that stood at about 3.9% during 2008-17 is projected to slide down to about 1.5% during 2018-27, as per OECD-FAO Agricultural Outlook 2018-2027. India's target for rabi season production of wheat, based on hopes of favourable weather conditions, is at 100 MT which is 2.9 MT more than output of 97.11 MT estimated for 2017-18, as per Ministry of Agriculture and Farmers Welfare and FCI also has excess stocks of wheat. As indicated above, USDA forecast of global wheat production is lower in 2018-19 by 13.5 MT, however, forecast for global wheat consumption stands increased due to higher use mainly due to rise in consumption in Australia, Venezuela and Iraq. India could target these areas for export of her surplus wheat.
- 4.28 Information about global pulses production in OECD-FAO Agricultural Outlook 2016-25 shows that in the year 2014, India's share in world production was about 26%. Going by India's import statistics no drastic change seems to have occurred in this share even in subsequent years. Major sources of pulses imports for India have been Canada (with 8 % of global production), Myanmar (with 6 % of global production) and Australia (with 4 % of global production).
- 4.29 Despite a sizeable share in production, India is also the largest importer of pulses with a share of about 43.6 percent of global imports in 2017. Moreover, India's pulses imports have nearly tripled during last decade. However, pulses production in the country has reached new record of 23.13 MT in 2016-17 and 24.51 MT in 2017-18. Due to high imports and record production, domestic prices



were adversely impacted during the last two years. However, with restrictions on imports of pulses and opening up of exports, pulses imports are expected to fall in 2018-19 and have positive impact in producer prices. Untapped potential for pulses production could be utilized to achieve self sufficiency on sustainable basis and minimise imports, given farmers are assured remunerative prices.

- 4.30 World oilseeds production forecast in 2018-19 (June) as per USDA, is likely to be 593.94 MT, 21 MT more than 2017-18 production estimate of 572.93 MT. World oilseeds supply and use scenario for 2018-19 indicates a beginning stock of 108 MT. Combined with production forecast of 593.94 MT, total supply is expected to be 702 MT which is 17.44 MT more than the total supply estimated of 684.59 MT for 2017-18. Forecast for total use for 2018-19 is at 509.56 MT that leaves an ending stock of 100.7 MT which is lower by 7.41 MT in comparison to ending stock of 108.09 of 2017-18. Trade forecast for 2018-19 is 187.10 MT, is higher by 11.16 MT than the trade estimate of 175.94 MT for 2017-18.
- 4.31 Similarly World oilmeals production forecast in 2018-19 (June) as per USDA is likely to be higher than 2017-18. World oilmeals supply and use scenario for 2018-19 indicates a beginning stock of 15.04 MT. Combined with production forecast of 348.71 MT, total supply is expected to be 363.75 MT, which is more than the total supply estimated for 2017-18. Global stocks-to-use ratio is expected to be marginally lower in 2018-19 than last season's high level.
- 4.32 As per USDA, world vegetable oils production is likely to be 206.28 MT in 2018-19, about 7.6 MT more than 2017-18 production estimates of 198.68 MT. World vegetable oils supply is forecast to be higher in 2018-19 and global stock-to-use ration is also likely to improve. Global oils/fats trade is anticipated to increase marginally due to higher trade of palm oil, while soy and rapeseed oils would remain at around last season's level. Trade forecast of vegetable oils for 2018-19 is 83.97 MT which is 2.72 MT more than the trade estimate of 81.25 MT for 2017-18. However, trade volume growth in vegetable oils that stood at about 3.8% during the decade 2008-17 is projected to slide down to about 1.9% during 2018-27, as per OECD-FAO Agricultural Outlook 2018-2027.



Chapter 5

Costs and Returns

- 5.1 The Commission considers the cost of production and other important factors such as demand and supply situation, trends in domestic and international prices, inter-crop price parity, terms of trade between agricultural and non-agricultural sectors, the likely impact of MSP on consumers and overall economy along with rational utilization of scarce natural resources like land and water, and a minimum of 50 percent as the margin over cost of production, while recommending MSPs of mandated agricultural crops.
- 5.2 The Commission uses crop-wise, state-wise cost estimates provided by the Directorate of Economics & Statistics (DES), Ministry of Agriculture and Farmers Welfare, Government of India compiled under 'Comprehensive Scheme (CS) for studying the Cost of Cultivation of Principal Crops in India'. Since CS data is generally available with a time lag of two years in case of rabi crops, it needs to be projected for rabi crop season 2018-19. Based on CS data, crop-wise and state-wise projections of cost of cultivation (CoC) are made for the ensuing season.
- 5.3 The projected CoC estimates of wheat, barley, gram, lentil and rapeseed & mustard are based on actual estimates available for latest three years viz. 2014-15 to 2016-17 for each State, whereas, projected CoC estimates of safflower are based on actual estimates for 2014-15 and 2015-16, for rabi marketing season 2019-20. However, CoC estimates are not projected for the State where respective share in all-India production and the State production for a particular crop is negligible or number of sample holdings under CS for the crop is very thin. The CoC estimates' projections capture movement in overall input cost separately over each of the past three years viz. 2014-15, 2015-16 and 2016-17 for wheat, barley, gram, lentil and rapeseed & mustard; and two years viz. 2014-15 and 2015-16 for safflower, for the crop season 2018-19.
- 5.4 An assessment of likely changes in input costs for the crop year 2018-19 with reference to each of the above mentioned three consecutive years ending with 2016-17 in respect of wheat, barley, gram, lentil and rapeseed & mustard and two consecutive year ending with 2015-16 in respect of safflower is made by constructing

the Composite Input Price Indices (CIPIs) (base 2011-12=100) based on latest prices of major inputs like human labour, bullock labour, machine labour, fertilisers, manures, seeds, pesticides and irrigation as per data available from Labour Bureau, Ministry of Labour and Employment, State Governments and Office of Economic Adviser, Ministry of Commerce & Industry. Based on CIPIs thus constructed, the Commission projects crop-wise, state-wise CoC A_2 , A_2 +FL and subsequently C_2 .

- 5.5 Crop-wise, state-wise cost of production (CoP) A_2 , A_2 +FL & C_2 are then derived from these projected CoC using projected yields. Subsequently, all-India estimates of CoP A_2 , A_2 +FL and C_2 are derived based on crop-wise, state-wise CoP and production shares. These projected all-India estimates of CoP are considered by the Commission while formulating price policy recommendations.
- 5.6 The Commission has undertaken cost projection exercise on the basis of latest three year cost estimates in respect of wheat, barley, gram, lentil and rapeseed & mustard and two year cost estimates in respect of safflower for each State under certain implicit assumptions. One, since projections for each crop in a State are made two years in respect of wheat, barley, gram, lentil and rapeseed & mustard and three year in respect of safflower, it is assumed that fixed cost components would not, in all likelihood, undergo any significant change in the intervening period. Two, since yield varies from year to year due to multiplicity of factors, projections of costs for the last three years in respect of wheat, barley, gram, lentil and rapeseed & mustard; and two years in respect of safflower have been undertaken for each state to smoothen out fluctuations in yield and hence in CoP. However, in cases where there is wide fluctuation in yields, olympic average yield has been used.

Costs and Returns of Rabi Crops during TE2016-17

- 5.7 The Commission examines actual costs and returns of crops for which latest CS data is available from DES. It is pertinent to mention that gross value of output (GVO) is estimated at prevailing market prices during harvest season in village/cluster of villages where the crop is grown and harvested. With this stipulation, an analysis of rate of return over CoC A_2 and A_2 +FL for mandated crops during TE2016-17 in respect of wheat, barley, gram, lentil and rapeseed & mustard and TE2015-16 in respect of safflower, is presented in Table 5.1.
- 5.8 To estimate returns of rabi crops, gross returns over CoC A_2 (GVO less CoC A_2) and gross returns over CoC A_2 +FL (GVO less CoC A_2 +FL) are calculated. The average CoC and average gross returns derived for wheat, barley, gram, lentil and rapeseed & mustard during TE2016-17; and safflower during TE2015-16, are presented in Table 5.1 and Chart 5.1. It is evident from Table 5.1 that the average gross returns over average CoC A_2 and A_2 +FL are positive for all rabi crops. The average gross returns over CoC A_2 vary from 41 percent in safflower to 211 percent in rapeseed & mustard while average gross returns over CoC A_2 +FL range from 11 percent in safflower to 122 percent in lentil. The state-wise details of average returns are given in Annex Table 5.1.

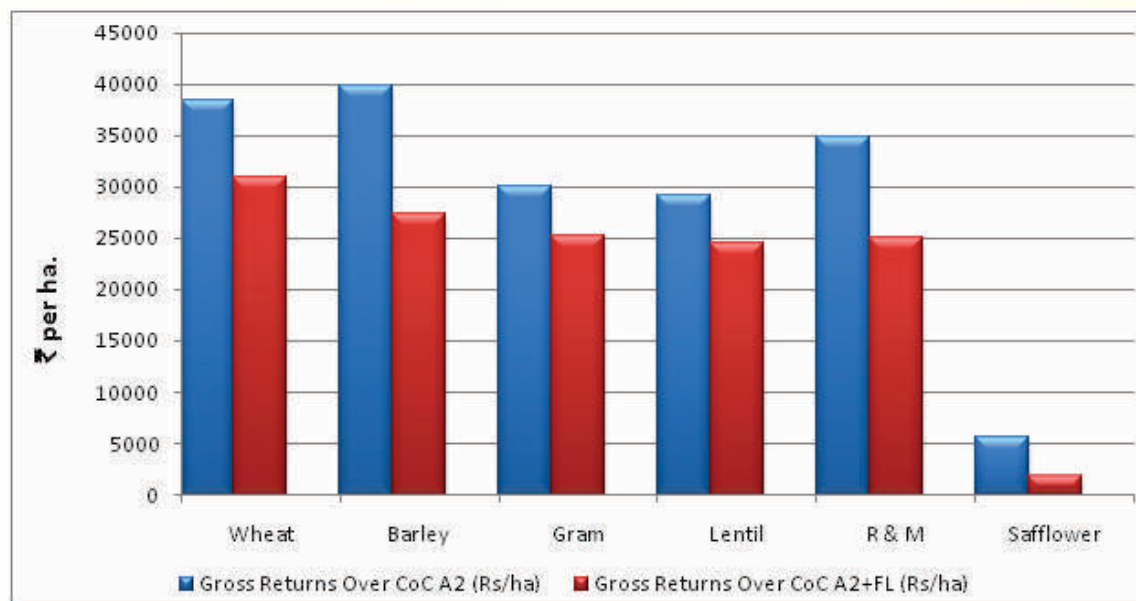
Table 5.1: Average Gross Returns of Rabi Crops, TE2016-17

Crop	CoC A ₂	CoC A ₂ +FL	GVO	Gross Returns over CoC A ₂		Gross Returns over CoC A ₂ +FL	
	₹/ha			₹/ha (Col.4- Col.2)	Percent (Col.5/ Col.2*100)	₹/ha (Col.4- Col.3)	Percent (Col.7/ Col.3*100)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A. Cereals							
Wheat	25258	32644	63642	38384	152	30998	95
Barley	19427	31897	59191	39763	205	27294	86
B. Pulses							
Gram	20364	25203	50409	30045	148	25205	100
Lentil	15468	20078	44659	29191	189	24581	122
C. Oilseeds							
R&M	16491	26327	51298	34807	211	24971	95
Safflower	13385	17054	18916	5532	41	1862	11

Source: CACP using CS data.

Note: Average Gross Returns of safflower are for TE2015-16.

Chart 5.1: Average Gross Returns of Rabi Crops, TE2016-17



Note: Average Gross Returns of safflower are for TE2015-16.

Source: CACP using CS data.

Movement in Agricultural Labour Wages and Farm Inputs

5.9 Growth in average daily wage rates of agricultural labour during rabi season in major states and at all-India level at current prices and constant prices (2017-18=100) during TE2017-18 are given in Table 5.2. At all-India level, agricultural wage rate has increased by 3.4 percent in 2015-16, 5.8 percent in 2016-17 and 4.6 percent

in 2017-18 at current prices; while at constant prices, it has declined by 2.1 percent in 2015-16, and increased by 2.5 percent in 2016-17 and 2.9 percent in 2017-18. Further, Chart 5.2 reflects state-wise average daily wages of agricultural labour in rabi season during 2017-18 and growth in average daily wages in rabi season during 2017-18 over 2016-17. The average wage rate is the highest (₹691 per day) in Kerala and the lowest in Madhya Pradesh (₹213 per day). Rajasthan registered lowest growth of 0.4 percent in average daily wage rate while Punjab recorded the highest growth of 9.1 percent. The state-wise and all-India details of monthly average of daily wage rates for agricultural labour at current prices are given in Annex Table 5.2.

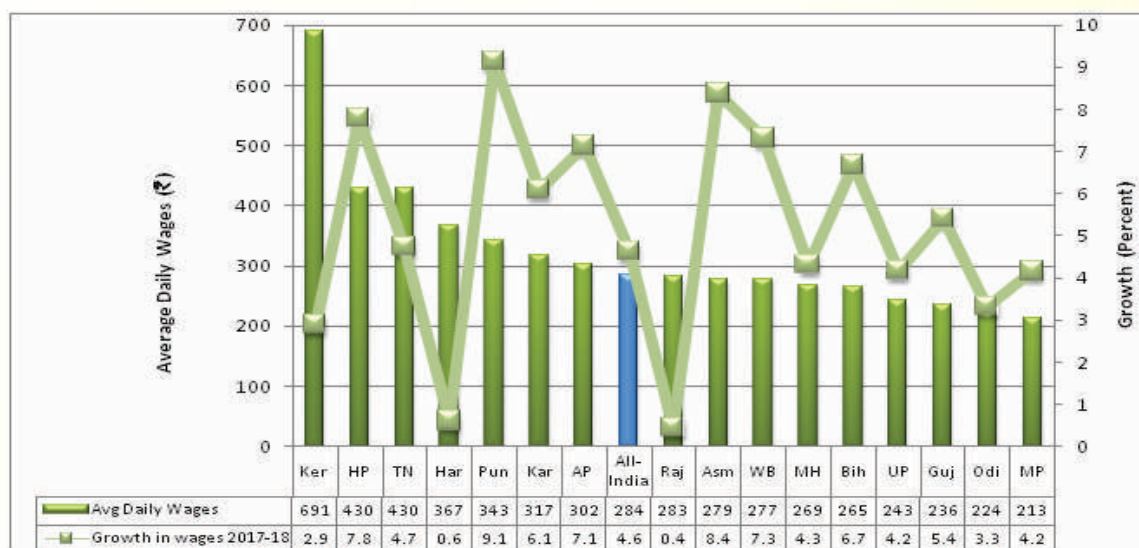
Table 5.2: Growth in Average Daily Wage Rates of Agricultural Labour during Rabi Season-States and All-India

State	Growth (percent) at Current Prices			Growth (percent) at Constant Prices (2017-18=100)		
	2015-16	2016-17	2017-18	2015-16	2016-17	2017-18
Andhra Pradesh	8.0	6.7	7.1	1.2	4.2	3.5
Assam	2.7	8.3	8.4	0.8	7.5	3.8
Bihar	10.0	1.3	6.7	7.9	1.3	6.9
Gujarat	6.1	8.0	5.4	-0.6	6.2	4.7
Haryana	3.7	2.1	0.6	0.6	-3.1	-1.0
Himachal Pradesh	6.3	6.2	7.8	1.6	1.5	6.1
Karnataka	12.9	5.8	6.1	4.1	-1.1	2.1
Kerala	6.3	1.3	2.9	1.7	-5.2	-1.9
Madhya Pradesh	4.5	10.7	4.2	-0.6	7.6	3.4
Maharashtra	2.4	11.9	4.3	-3.3	7.4	3.6
Odisha	0.1	8.4	3.3	3.7	8.9	-0.9
Punjab	1.3	5.3	9.1	-2.0	-0.6	6.7
Rajasthan	-4.0	-0.6	0.4	-8.7	-5.5	1.9
Tamil Nadu	-7.4	5.1	4.7	-15.5	0.3	-2.2
Uttar Pradesh	7.9	6.9	4.2	0.4	8.7	5.5
West Bengal	3.4	4.2	7.3	2.0	1.8	0.9
All-India	3.4	5.8	4.6	-2.1	2.5	2.9

Note: Average is from October to April

Source: Labour Bureau, Ministry of Labour & Employment, Government of India.

Chart 5.2: Average Daily Wage Rates and Growth in Rabi Season during 2017-18

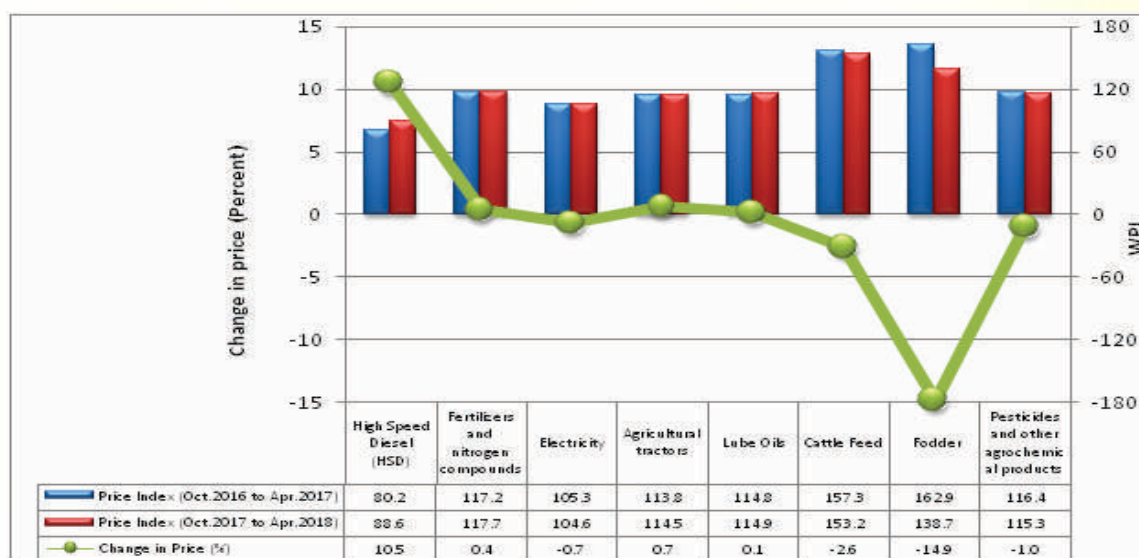


Note: Average is from October to April.

Source: Labour Bureau, Ministry of Labour & Employment, Government of India.

5.10 The movement of the Wholesale Price Index (WPI) for the various farm inputs (Base: 2011-12=100) in rabi season during 2017-2018 over 2016-2017 is presented in chart 5.3. The index for HSD rose from 80.2 to 88.6, registering a growth of 10.5 percent during the corresponding period of the previous year. The indices of fertilizers & nitrogen components, agricultural tractors and lube oils also moved up by registering growth of 0.4 percent, 0.7 percent and 0.1 percent, respectively. However, indices of electricity, cattle feed, fodder and pesticides & other agro chemical products declined by 0.7 percent, 2.6 percent, 14.9 percent and 1.0 percent, respectively. The month-wise indices from 2012 to 2018 are given in Annex Table 5.3.

Chart 5.3: Movements in Prices of Farm Inputs during Rabi Season



Source: DIPP, Ministry of Commerce and Industry.

Cost Projections for Rabi Marketing Season, 2019-20

5.11 Based on CIPI, state-wise CoC is projected for each crop. However, in case of wide fluctuations in yield of a crop in a State during three years, olympic average yield was used to project CoC estimates. Based on this, state-wise CoP estimates are obtained by using respective three year average yield for wheat, barley, gram, lentil and rapeseed & mustard; and two year average yield for safflower. Subsequently, all-India weighted average projected CoP with weights being shares of States in all-India production during TE2017-18 has been worked out for rabi crops for the marketing season 2019-20 (Table 5.3). State-wise and all-India projected costs for mandated rabi crops for marketing season 2019-20 are given in Annex Table 5.4. The actual CoC estimates for different States for 2015-16 and 2016-17 in respect of wheat, barley, gram, lentil and rapeseed & mustard are given in Annex Tables 5.5a to 5.5e, respectively, whereas, the actual CoC estimates of safflower for different States for 2014-15 and 2015-16 are given in Annex Table 5.5f.

Table 5.3: Projected CoP of Mandated Rabi Crops, RMS 2019-20

Crops	Cost of Production (₹/qtl)		
	A ₂	A ₂ +FL	C ₂
Wheat	673	866	1,339
Barley	540	860	1,247
Gram	2,144	2,637	3,838
Lentil	1,945	2,532	4,215
Rapeseed & Mustard	1,385	2,212	3,277
Safflower	2,503	3,294	4,072

Source: CACP Calculations.

5.12 The all-India weighted average composite input price index is computed for years 2015-16 to 2018-19 with base 2011-12=100. For this, on the basis of state-wise CIPIs, an all-India crop-wise weighted average input price index for all inputs; with weights being relative shares of states in all-India area under the crop during TE2017-18, has been calculated. These indices are used to compute all-India weighted average composite input price index for rabi crops, with weights being relative shares of crops in total production at all-India level during TE2017-18. It may be observed from Table 5.4 that all-India CIPI for rabi crops shows an increase of 6.3 percent in 2018-19 over 2017-18.

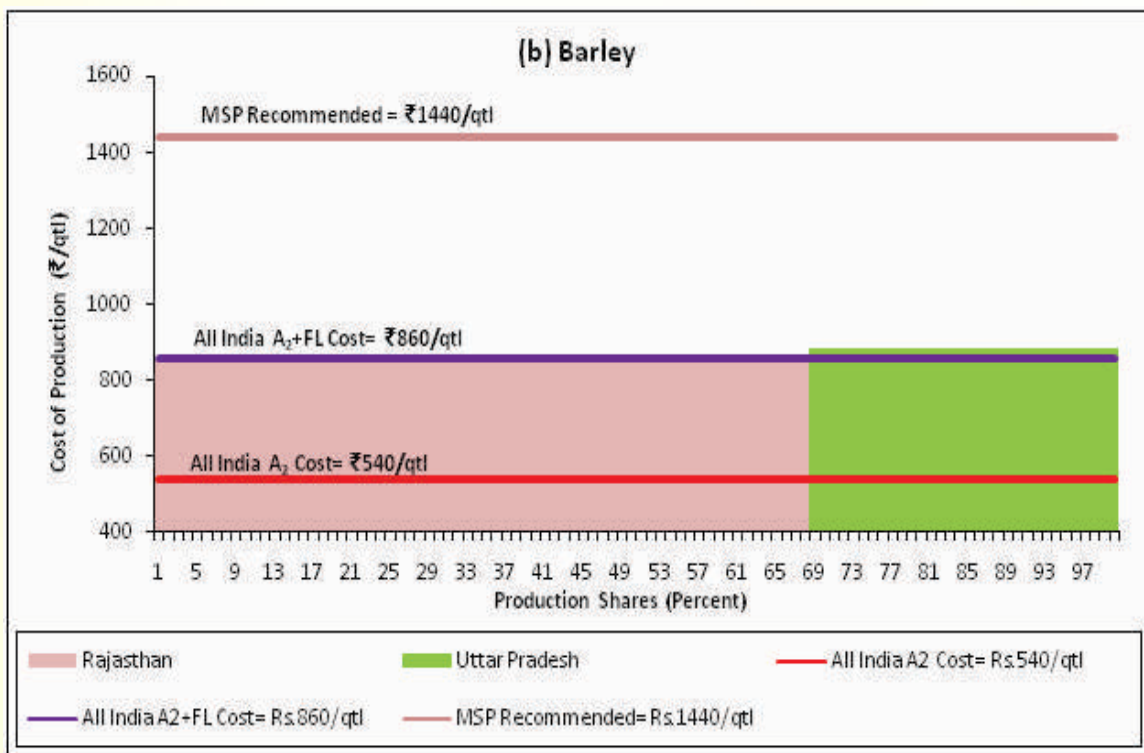
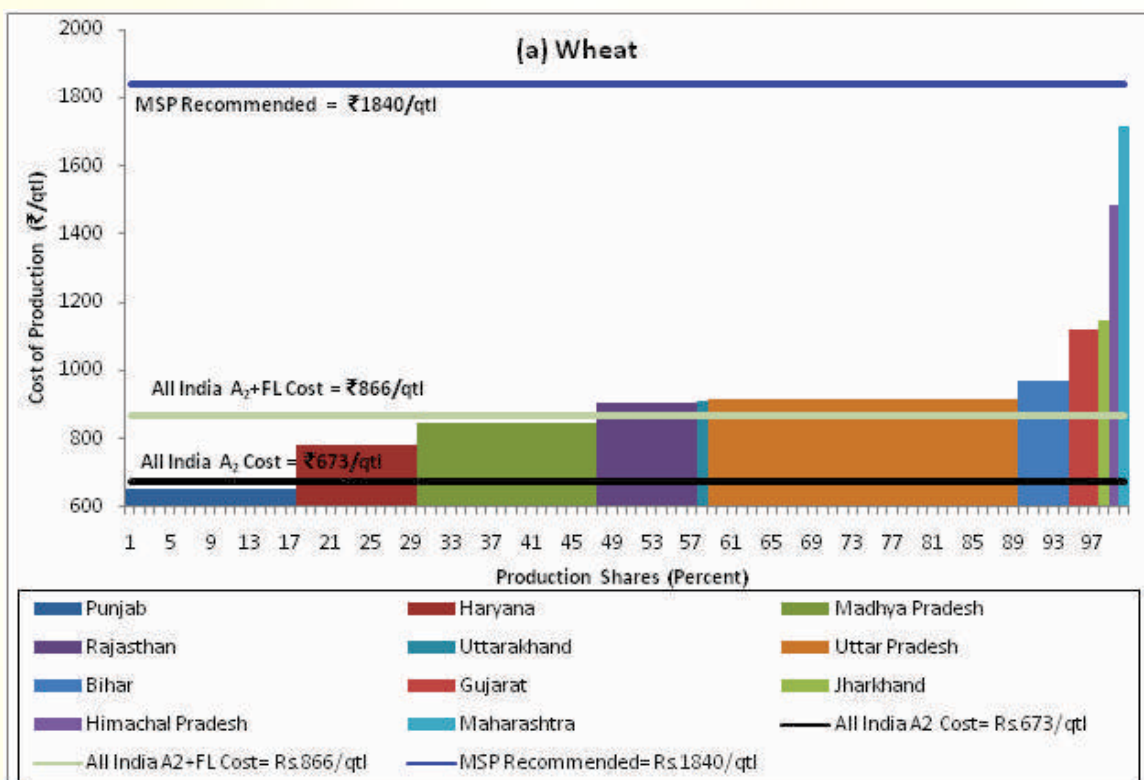
Table 5.4: All-India Rabi Crops Input Price Index (Base 2011-12=100)

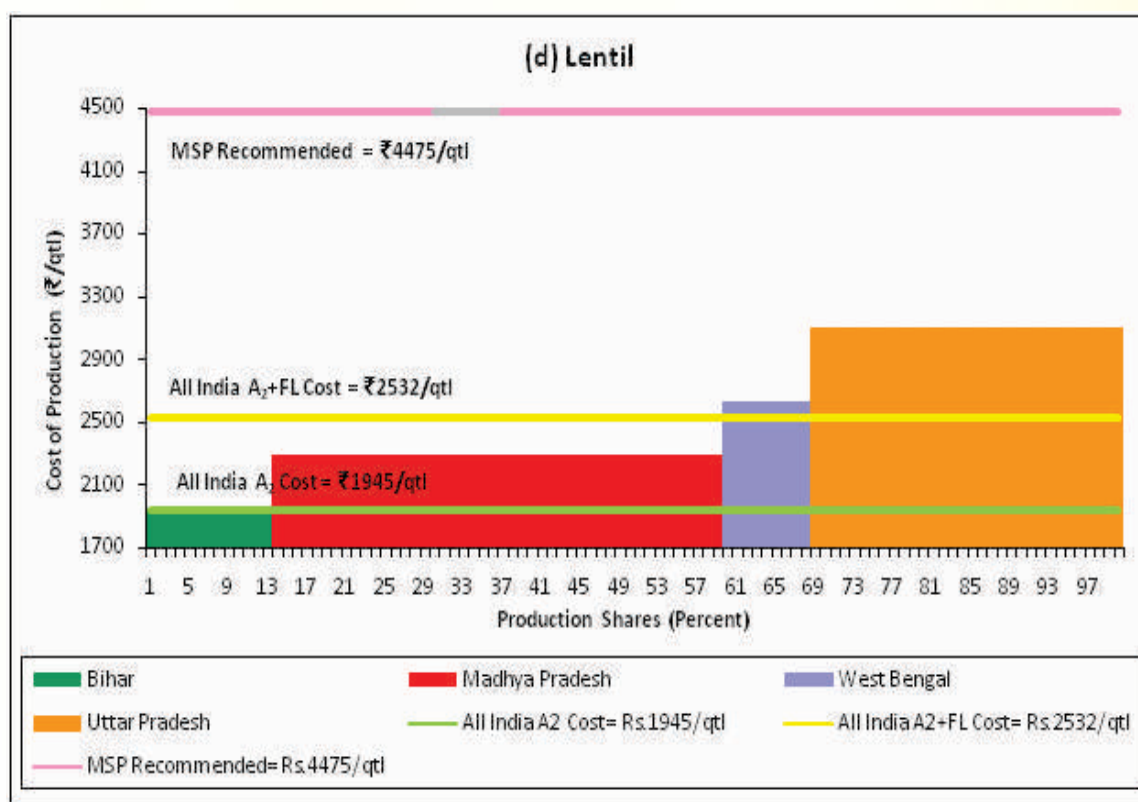
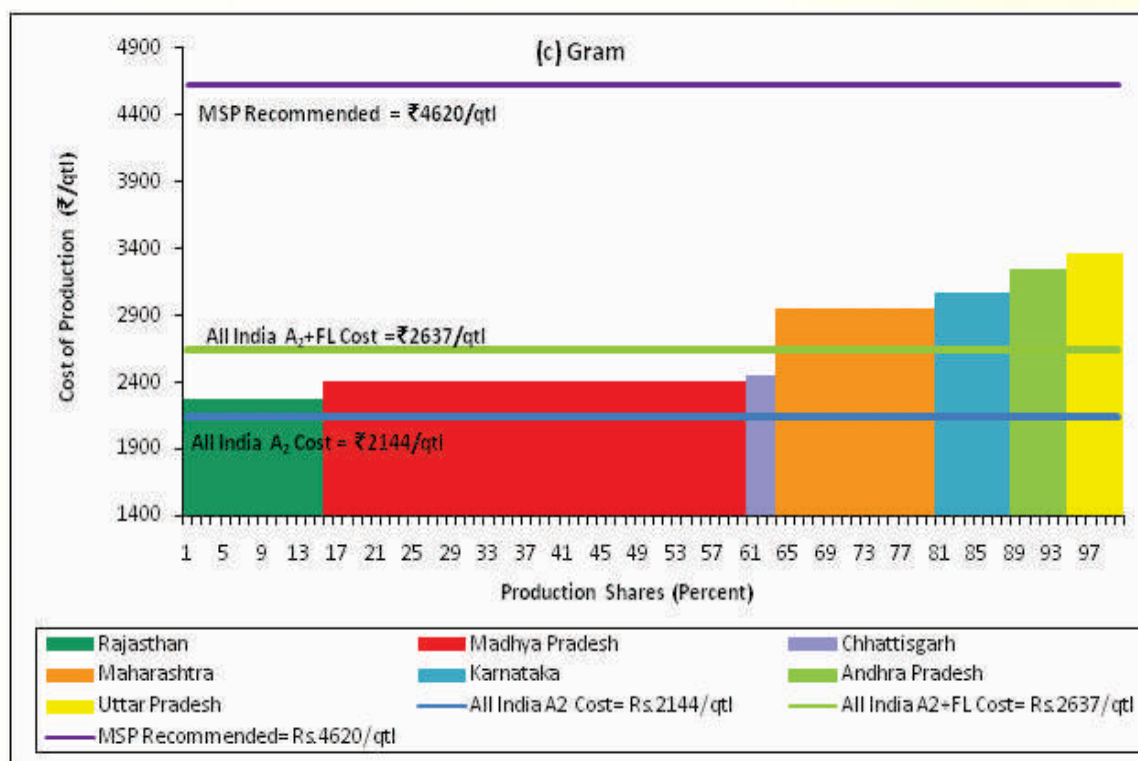
Inputs	Weights (2016-17)	Crops Input Price Index (CIPI)				Percentage Change in Input Price Index 2018-19 over 2017-18
		2015-16	2016-17	2017-18	2018-19	
Human Labour (HL)	0.37	154.64	164.99	176.15	188.40	7.0
Bullock Labour (BL)	0.02	187.72	213.09	226.75	241.88	6.7
Machine Labour (ML)	0.23	107.77	112.53	119.04	126.04	5.9
Seeds	0.11	141.91	152.49	162.83	174.38	7.1
Fertilizers	0.12	124.86	117.41	122.56	128.04	4.5
Manures	0.00	122.13	131.42	139.43	148.11	6.2
Insecticides	0.01	119.33	124.11	129.06	134.22	4.0
Irrigation Charges	0.13	121.57	125.69	131.93	138.62	5.1
Composite Input Price Index (CIPI)		134.28	140.55	149.10	158.44	6.3
Percentage Change (year-on-year)		-	4.67	6.09	6.26	-

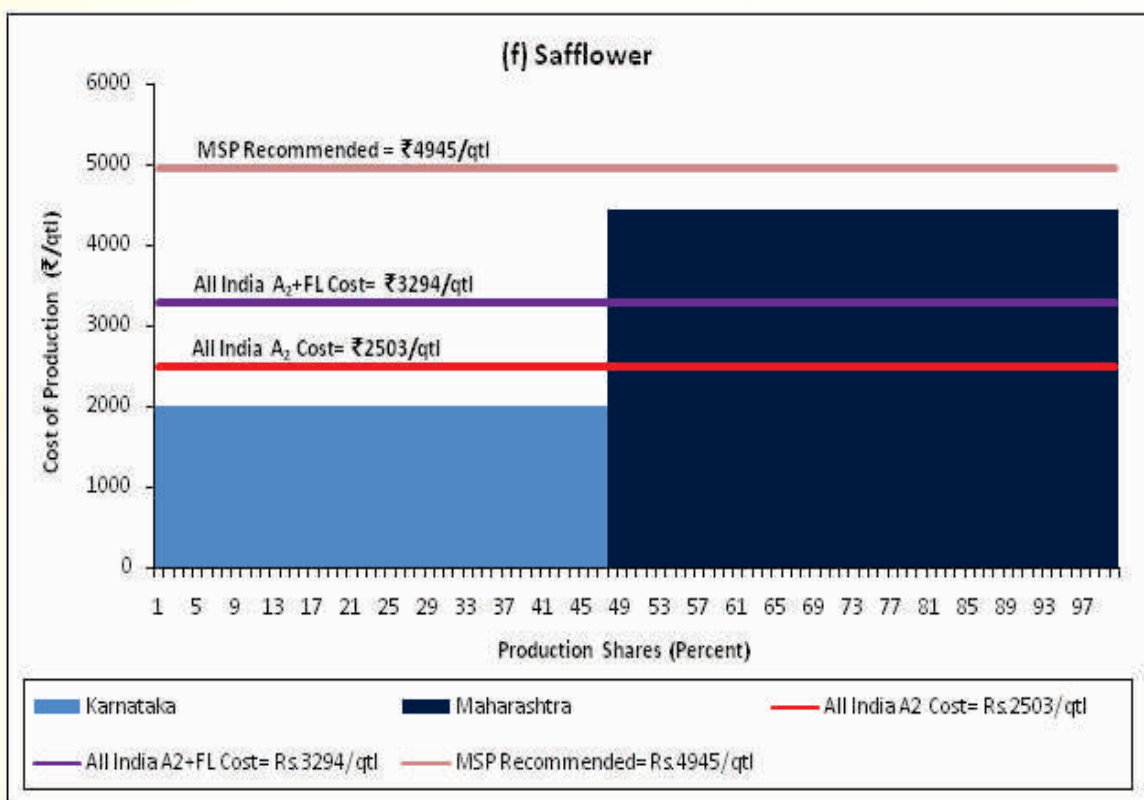
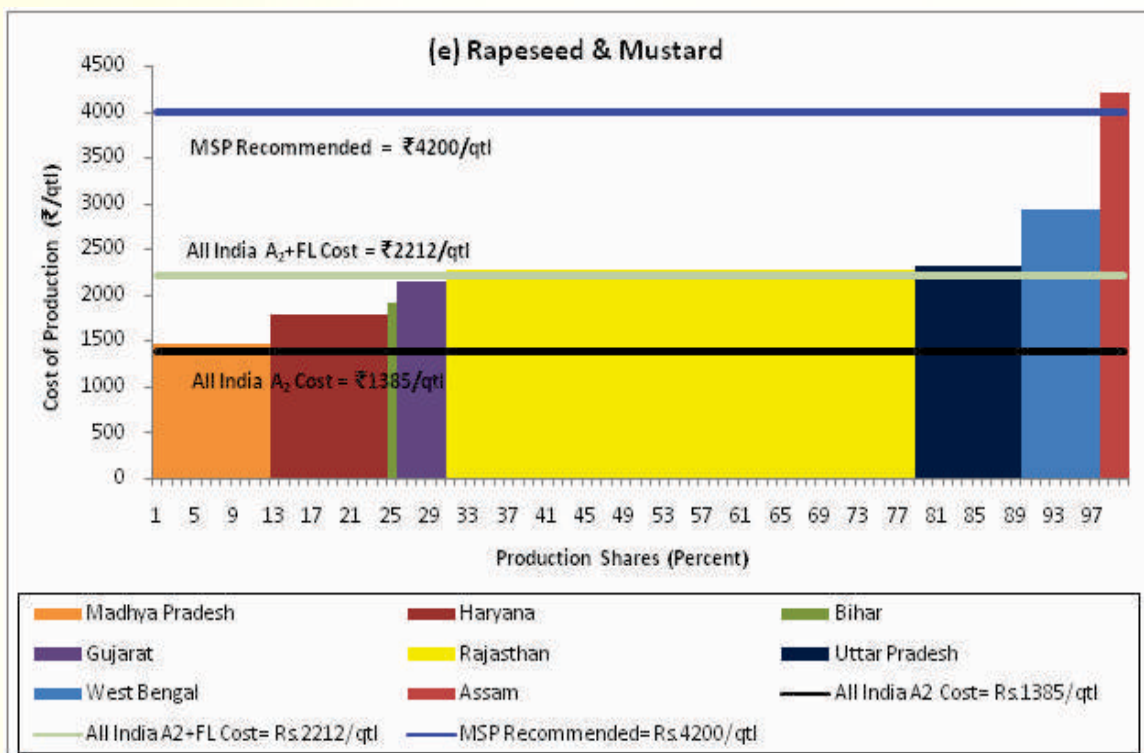
Source: CACP Calculations.

- 5.13 Charts 5.4 (a) to (f) show crop-wise supply curves for A_2 +FL CoP by states in ascending order with their corresponding relative shares in all-India production. Supply curves for different crops are graphical representation of CoP, which represent the quantum of production of rabi crops produced at different CoP in various States. The average A_2 +FL is the lowest (₹860 per quintal) in barley and the highest (₹3294 per quintal) in case of safflower.
- 5.14 As per the supply curves presented in charts 5.4 (a) to (f), A_2 +FL CoP for wheat, is lowest at ₹654 per quintal in Punjab while highest (₹1717 per quintal) in Maharashtra. In the case of barley, A_2 +FL at ₹850 per quintal is the lowest in Rajasthan while highest at ₹881 per quintal in Uttar Pradesh. In gram, A_2 +FL CoP is the lowest (₹2277 per quintal) in Rajasthan and highest (₹3362 per quintal) in Uttar Pradesh. Supply curve for Lentil shows that A_2 +FL is lowest (₹1954 per quintal) in Bihar while highest (₹3103 per quintal) in Uttar Pradesh. As regards rapeseed & mustard, A_2 +FL is lowest (₹1475 per quintal) in Madhya Pradesh and highest (₹4195 per quintal) in Assam, whereas, in case of Safflower, A_2 +FL is lowest (₹1992 per quintal) in Karnataka and is highest (₹4438 per quintal) in Maharashtra.
- 5.15 All India weighted A_2 +FL CoP covers 48 percent of production in case of wheat, 68 percent in barley, 63 percent in gram, 59 percent in lentil, 30 percent in rapeseed & mustard and 47 percent in safflower. After recommending MSPs on the basis of atleast 1.5 times of CoP A_2 +FL, share of production covered at MSP is 100 percent in case of wheat, barley, gram, lentil, rapeseed & mustard and safflower.

Chart 5.4: Supply Curve and Projected CoP for RMS, 2019-20







Relative Returns with Respect to Wheat

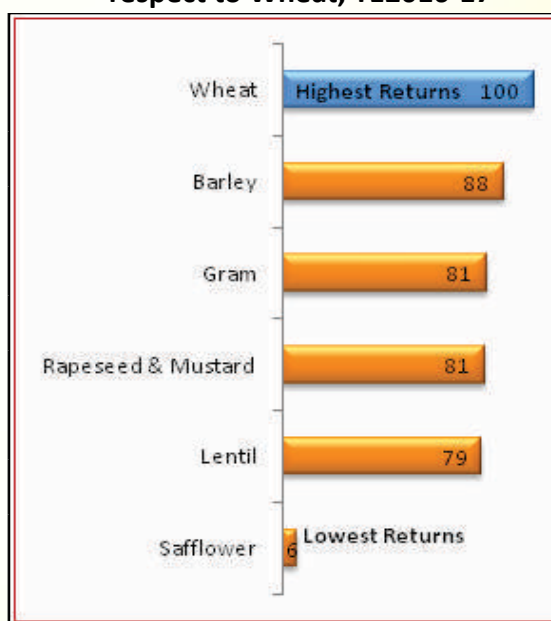
5.16 Inter-crop price parity being one of the important factors for determination of MSP, per hectare returns of different competing rabi crops, are computed. This comparison of returns may be useful to understand why farmers are attracted to a particular crop over other competitive crops. Table 5.5 outlines relative returns measured in percentage terms over A_2+FL for various rabi crops with reference to wheat. It is found that there is some degree of disparity in returns earned from mandated rabi crops. It is observed that farmers are getting lower returns from other rabi crops than wheat. It may be one of the reasons that 65 percent of area under mandated rabi crops during TE2016-17 was under wheat, and 18 percent was under gram. In contrast, area under safflower was only 0.3 percent and has recorded a significant decline over the years. In case of rabi crops, pulses and oilseeds have lower returns as compared to cereals, as can be seen from Chart 5.5. The lower returns in addition to lack of assured market and prices in pulses and oilseeds could be one of the reasons that farmers prefer wheat over pulses and oilseeds. By increasing relative returns through higher MSP, assured markets and prices, and reducing cost of production, farmers may be encouraged to grow pulses and oilseeds.

Table 5.5: Relative Gross Returns (%) with respect to Wheat, TE2016-17

Crops	Relative Gross Returns over A_2+FL with respect to wheat
A. Cereals	
Wheat	100
Barley	88
B. Pulses	
Gram	81
Lentil	79
C. Oilseeds	
Rapeseed & Mustard	81
Safflower	6

Note: Gross return of safflower is for TE2015-16.
Source: CACP Calculations.

Chart 5.5: Relative Gross Returns (%) with respect to Wheat, TE2016-17



Note: Gross return of safflower is for TE2015-16.
Source: CACP Calculations.

Comparison of Projected Cost Estimates with State Estimates

5.17 The projected cost estimates of States for mandated rabi crops for marketing season 2019-20 are given in Annex Table 5.6. The estimates of CoC for recommending MSPs for RMS, 2019-20 are provided by Bihar, Chhattisgarh, Haryana, Jharkhand, Punjab,


Rajasthan and West Bengal for wheat; Haryana and Rajasthan for barley; Andhra Pradesh, Bihar, Chhattisgarh, Haryana, Jharkhand and Rajasthan for gram; Bihar for lentil; and Andhra Pradesh, Bihar, Chhattisgarh, Haryana, Jharkhand, Rajasthan and West Bengal for rapeseed & mustard. There are differences in cost estimates provided by the States and CACP estimates. The main reasons for variations in two sets of estimates, i.e., State Government projections and CACP projections is due to methodology used by the States and CACP. For instance, projected CoP by Andhra Pradesh for gram is higher than CACP projections, as State Government has included 10 percent managerial cost & cost on land formation, harvesting and threshing and 38.7 percent more on labour (human/bullock/machine). Similarly, in case of wheat and rapeseed & mustard by Bihar, projected CoPs for respective crops are higher than CACP projections; as State Government, besides including 5 percent interest on fixed capital and 10 percent risk cost, has also included higher cost estimates of 34.7 percent in case of machine labour, 125.3 percent in fertiliser & manure, 159.8 percent in interest on working capital, 105.6 percent in interest on fixed capital for wheat; and 31.1 percent in human labour, 48.9 percent in machine labour, 119.04 percent in fertiliser & manure, 36.7 percent in irrigation charges, 279.6 percent in interest on working capital, 141.1 percent in interest on fixed capital. In case of wheat and rapeseed & mustard by Haryana, projected CoPs for respective crops of that State are higher than respective CACP projections; as State Government, besides including transportation charges & other incidental charges, and 15 percent cost on management charges & weather risk incentive; has higher cost estimates of 7.9 percent in human labour, 21.9 percent in seed, 114.8 percent in fertilizer & manure, 101.8 percent in insecticides, 71.9 percent in irrigation charges, 70.9 percent in interest on working capital and 44.1 percent in rental value of own land for wheat; and 39.1 percent in fertilizer & manure and 31.2 percent in interest on working capital for rapeseed & mustard. Projected CoP for wheat in case of Punjab is higher than CACP projection; because State Government has included marketing/transportation charges, 25 percent on farmers' margin, and 10 percent on account of weather risk and management charges. Projected CoP of rapeseed & mustard of West Bengal is higher than CACP projection due to higher cost estimates of human labour (6.6 percent), machine labour (49.1 percent), fertiliser & manure (35.2 percent), irrigation charges (32.6 percent), and ₹67 per quintal as profit to farmers. However, in some States, projected CoPs are lower than CACP projections. For example, in case of wheat in Jharkhand and Rajasthan, barley in Rajasthan, gram in Chhattisgarh and Rajasthan, and rapeseed & mustard in Rajasthan, lentil in Bihar, State estimates are lower than CACP projections. Other States have not provided cost estimates for RMS, 2019-20.

- 5.18 The Commission has made detailed analysis of the cost data available for making projections for the current marketing season and observed that there are certain crops in States whose share in the all-India crop production as well as State production is very low. Similarly, there are instances where the sample size for a certain crop in a State is very low and may not be a representative sample of the population. The Commission is of the considered view that Karnataka and West Bengal in wheat, and Bihar and Haryana in gram may be dropped from the Comprehensive Scheme (details in Annex Table 5.7).

- 5.19 Similarly, in some crops like Safflower, sample size is very thin and may not be representative sample to estimate cost of cultivation/production of the crop at all-India level. Therefore, the Commission recommends that appropriate sampling technique should be used in such cases, so that, there representation in the sample is appropriate for getting quality estimates.

Recapitulation

- 5.20 Given the time lag of two years in availability of data in respect of wheat, barley, gram, lentil and rapeseed & mustard; and three years in respect of safflower; the Commission, by constructing CIPIs, projects the cost estimates A_2 , A_2+FL and C_2 per quintal for mandated rabi crops for the ensuing season 2018-19. The growth in all-India CIPI for rabi crops during 2018-19 over 2017-18 is 6.3 percent. The all-India CoP A_2+FL for wheat, barley, gram, lentil, rapeseed & mustard and safflower for 2018-19 (RMS 2019-20) are projected at ₹866, ₹860, ₹2637, ₹2532, ₹2212 and ₹3294 per quintal, respectively. The increase in projected CoP A_2+FL varies from 1.8 percent for barley to 7.2 percent for gram in 2018-19 over 2017-18 (details in Annex Table 5.8). These projected cost estimates have been considered into formulation of price policy recommendations, as the Union Budget for 2018-19 has announced the pre-determined principle of offering to farmers a threshold MSP of at least one and half times the cost of production for the mandated crops.



Chapter 6

Considerations and Recommendations for Price Policy

Non-Price Policy Recommendations

Overall Demand and Supply

6.1 Agriculture plays a vital role in the Indian economy as more than 50 percent of the population is engaged in agriculture and allied activities though the share of Gross Value Added (GVA) in agriculture sector to total GVA is around 17-18 percent. Rabi foodgrains production witnessed an increase of around 2.9 percent in 2017-18, though area under rabi foodgrains declined by about 1.8 percent in 2017-18 compared with 2016-17. Improvement in productivity (4.8 percent) has driven the rabi production, which augurs well for Indian agriculture. Production of wheat, barley, gram and lentil increased by 0.1 percent, 2.3 percent, 19.0 percent and 23.8 percent respectively in 2017-18 over the previous year. According to the FAO, USDA and IGC, world wheat production is anticipated to fall (2.8 percent) and stocks-to-use ratio is also expected to decline (2.0-4.8 percent) in 2018-19 compared with 2017-18. On the other hand, wheat consumption and trade is forecast to improve marginally in 2018-19.

Improvement in Yields: Bridging Yield Gap

6.2 Low level of crop productivity, large inter-state differences and yield gap between potential and actual farm yield are main issues for all major rabi crops. An integrated approach to bridging yield gaps and inter-state differences by ensuring timely availability of various farm inputs, modern technology, and policy interventions is required.

Low Market Prices and Implementation of MSP

6.3 During RMS 2018-19, market prices of all rabi crops ruled below MSP in major producing states. Wheat prices ruled below MSP in Uttar Pradesh, Rajasthan and

Madhya Pradesh, while gram prices were also below MSP in all major producing states. This trend essentially shows that a high MSP is not the only policy instrument to sustain higher production and income but it should be backed up by an effective procurement mechanism to arrest the prices falling below MSP. This emphasizes the importance of public procurement machinery and adequate preparatory measures for establishment of proper procurement system alongwith adequate modern storage & warehousing facilities with active participation of state/state agencies. Private sector participation needs to be encouraged and incentivized to create competitive markets for better price discovery. This calls for formulation of robust and structured mechanism for implementation of MSP.

- 6.4 To ensure that farmers get remunerative price for their produce, the Market Assurance Scheme (MAS) or Price Deficiency Payment or procurement by private agencies should be implemented. Market Assurance Scheme (MAS), which proposes procurement by States and compensation of losses up to certain extent of MSP after the procurement and price realization out of sale of the procured produce, can be a better solution for nutri-cereals and pulses. The Commission is of the considered view that states producing nutri-cereals should take responsibility of procurement, storage and distribution of nutri-cereals under PDS and other welfare schemes. In case of pulses, since the quantities procured will not be large, pulses can be supplied to consumers in selected aspirational districts, which would address the problem of malnutrition in these areas and have limited financial implication that can be shared between the state governments and central government.
- 6.5 In case of commercial and oilseed crops like soybean, groundnut, rapeseed & mustard, cotton, etc., Price Deficiency Payment (PDP) Scheme, under which in the event of market prices falling below the MSP, farmers need to be compensated to the difference between MSP and actual price (subject to a capping on the lowest market price), could be a better model. However, FAQ standards should be strictly adhered and transparent and efficient price discovery is essential for the success of PDP scheme. The Commission recommends that PDP Scheme should be implemented on pilot basis in case of R&M in all major producing states in the next rabi marketing season.
- 6.6 Role of private sector in agricultural marketing is extremely important and cannot be ignored. Therefore, efforts should be made to attract organized private sector agribusiness companies in agricultural trade through appropriate incentives and reducing legal hurdles by amending APMC Act and Essential Commodities Act (ECA).
- 6.7 The Commission suggests that States should be free to choose a particular scheme or a set of schemes from the bouquet of available choices like Market Assurance Scheme, Price Deficiency Payment, Private Sector participation, etc.

Management of Food Stocks

- 6.8 Along with robust procurement, there is a need to develop a mechanism for disposal of stocks procured by government agencies. Wheat stocks as on July 1, 2018 were



much higher (41.8 million tonnes) than buffer norms (27.58 million tonnes) as well as the last year's stocks (32.27 million tonnes). Therefore, there is a need to liquidate excess stocks in the domestic markets through Open Market Sales/PDS as well as world markets. The Commission recommends that a long-term sustainable procurement as well as disposal mechanism for nutri-cereals and pulses needs to be put in place through effective participation of state governments, Farmer Producers' Organizations (FPOs) and other players. One of the options for disposal of stocks on a continuous basis is to introduce pulses under Public Distribution System (PDS) and other welfare schemes in identified aspirational districts with active involvement of State governments to bring stability in the pulses market and encourage farmers to grow more pulses. It would not only help in disposal of stocks but help in improving nutrition and human capital in these districts. Similarly, nutri-cereals can be distributed under PDS in traditionally nutri-cereal consuming States. Major initiatives for creation of scientific warehouses need to be taken by the State Governments to facilitate storage of procured stocks from farmers. The availability of warehouses will also facilitate the farmers to avail credit under pledge finance.

- 6.9 The rural educated youth may be encouraged to be trained as quality surveyors under skilled development programmes of government of India. Such an action will create rural employment as well as facilitate faster and dependable quality certification of the stocks being procured.

Impact of MSP and Procurement

- 6.10 It is encouraging to note that total number of wheat farmers benefited from procurement operations has increased from 20.47 lakh in RMS 2016-17 to 39.75 lakh in RMS 2018-19 at all-India level, more than 94 percent increase. At state level, number of beneficiary farmers has increased significantly in Uttar Pradesh, Haryana and Madhya Pradesh during the last three years, which is a positive sign to instill confidence among farmers for assured price. However, in terms of proportion of wheat farmers benefited under procurement operations in some states like Uttar Pradesh, Rajasthan and Bihar is still very small. So, there is a lot of scope for expanding wheat procurement operations in these states.

Timely Payment to Farmers and Announcement of MSP

- 6.11 Problem of delay in payment to farmers by procurement agencies, particularly in case of pulses and oilseeds, was highlighted by farmers and it was reported that farmers received payment after many days and in some cases after months. Since small and marginal farmers need cash for the next crop season and to meet other obligations, they are forced to either sell under distress conditions at low prices or borrow from informal sources at exorbitant interest rates. The Commission recommends that payment to farmers should be made within 2-3 days and directly transferred to their bank accounts.

- 6.12 The Commission has time and again re-iterated that MSPs should be announced well before the sowing season so that farmers can make informed decisions about crop acreage allocation.

Market Intelligence and Crop Outlook

- 6.13 The Commission in its earlier reports has been recommending setting up of marketing information and intelligence mechanism with the primary objective of forecasting market prices and demand-supply situation for forthcoming marketing season. This will help farmers in knowing the expected prices of various crops in next season and making decision about crop choices to avoid glut or shortages of a commodity in the market. The Commission recommends that Directorate of Marketing and Inspection (DMI), Ministry of Agriculture and Farmers Welfare should be restructured and strengthened to act as a nodal agency for providing market information and intelligence and crop outlook to farmers in making informed decisions about production and marketing of their produce. Agro-Economic Research Centres/Units under the Directorate of Economics and Statistics, Ministry of Agriculture & Farmers Welfare can generate data on prices, demand-supply and commodity markets and market outlook analysis based on farm-level empirical evidences.

Awareness Creation about MSP and FAQ

- 6.14 Awareness among the farmers on MSP needs to be improved and the information about MSP of important crops and procurement agencies should be disseminated timely by the Central and State Governments in regional/vernacular languages in electronic and print media and public announcement in the villages. Besides, there is a need to create transparent and scientific system of measuring quality standards of the produce brought to the market rather than rejecting on subjective judgement.

Trade Policy

- 6.15 The Commission suggests that agricultural trade policy needs to be stable and predictable so that trade becomes more reliable. However, for creating favourable and stable conditions for promoting domestic production and remunerative prices to farmers, appropriate border protection measures are needed to maintain a price differential between domestic prices and international prices. To safeguard interest of oilseed farmers and domestic refining industry, duty differential between crude and refined oil should be about 15 percent. A predictable and stable export policy would help in encouraging agri-exports and achieve the objective of doubling farmers' income. Synchronization of domestic policies on trade, incentives/subsidies and infrastructure are crucial for improving exports.



Gramin Agricultural Markets (GrAMs)

- 6.16 Upgradation of rural haats can address the problem of much needed market linkages. Government's has recently announced for upgradation of existing 22,000 rural haats into GrAMs. This will address the issue of small and marginal farmers accessibility to markets. The GrAMs can then be linked to e-NAM and exempted from regulations of APMCs. However, concern remains of smooth functioning of GrAMs in remote areas where requirement of electricity and other infrastructure is a pre-requisite as they will be connected to e-NAM.

Agricultural Credit

- 6.17 Total credit disbursement to agricultural sector for 2017-18 has exceeded the target of ₹10 lakh crore by ₹1.69 lakh crore. The lower share of term loan in total credit disbursement is an area of concern which needs to be addressed. The Commission in its earlier reports has time and again emphasized that the share of term loans needs to be improved to promote investment in agriculture as there is high degree of complementarity between public and private investment in agriculture. Efforts are also needed to step up loan facilities to tenant farmers as they are often deprived of institutional finance due to absence of collateral. Moreover, lower share of cooperatives and RRBs in total credit disbursement is also an area of concern as these are primary sources of short and medium term credit to small and marginal farmers due to deep penetration of these institutions in rural areas.

Water Productivity

- 6.18 Given that 80 percent of water resources of the country are used by agriculture and since the country is already reeling under the acute water shortage in many parts, it is of utmost necessity to increase crop productivity per drop of water. The existing almost free electricity policy in agriculture in Punjab and Haryana has led to indiscriminate groundwater exploitation and non-judicious water use in agriculture. Thus there exists a serious misalignment in rice cropping patterns with respect to the water availability in India, which needs to be rectified with effective demand side as well as supply side policies.

Oilseeds and Oilcakes/Meals

- 6.19 In order to ensure the better price realization to oilseed farmers, there is a need to address issues related to oilseed complex rather than focusing only on edible oils because both edible oils and oilseeds cake/de-oiled cake play a critical role in overall value-addition from oilseeds. The major share of oilseed cakes is exported and therefore, the industry should be incentivized for exporting oilseed cakes as this will translate into better demand for oilseeds. In addition, technological interventions are required to process the oilseed cakes to increase its domestic demand in livestock and poultry industries.

Wildlife Management

6.20 The problem of human-wildlife conflict has been standing for a long time which needs to be addressed on priority as farmers cultivating crops are facing serious problem of crop losses due to wild/stray animals. To address the issue, State governments may explore the feasibility of installing electric/solar fencing or digging trenches near farmlands on community based approach. Possibility of using funds of MGNREGA, RKVY, etc. already available with the state governments may be explored for the same.

Price Policy Recommendations

6.21 Union Budget 2018-19 recommended a pre-determined principle of offering to farmers a threshold MSP of at least one and half times the cost of production for the mandated crops. Taking forward this recommendation, Department of Agriculture, Cooperation and Farmers Welfare (DAC&FW) mandated CACP to consider, in addition to cost of production, trends in market prices, demand and supply situation, effect on general price level and cost of living a minimum of 50 percent as the margin over the cost of production, in calibrating the price policy for mandated crops. Accordingly, the Commission recommends the MSPs for 6 Rabi crops for RMS 2019-20 as given in the Table 6.1. It may be noted share of production covered at MSP is 100 percent in case of wheat, barley, gram, lentil, rapeseed & mustard and safflower i.e. MSP fully covers projected A_2 +FL cost of production in all States.

Table 6.1: MSPs Recommended for RMS 2019-20

(₹/qtl)

Crops	Projected Costs for RMS 2019-20		MSP, RMS 2018-19	Recommended MSP for RMS 2019-20	MSP as percent of A_2 +FL
	A_2	A_2 +FL			
Wheat	673	866	1735	1840 (6.05)	212
Barley	540	860	1410	1440 (2.13)	167
Gram	2144	2637	4400*	4620 (5.00)	175
Lentil	1945	2532	4250**	4475 (5.29)	177
R&M	1385	2212	4000**	4200# (5.00)	190
Safflower	2503	3294	4100**	4945 (20.61)	150

Note: Figures in parenthesis represent increase in MSP over the previous year.

corresponding to oil content of 35 percent

*including bonus of ₹150 per quintal



***including bonus of ₹100 per quintal*

Incentivising Efficiency: Linking MSP of R&M with Oil Content

- 6.22 There are variations in oil content of different varieties of R&M and therefore a uniform MSP may not be desirable. The Commission is of the opinion that farmers be incentivized for higher 'oil content'. The Commission recommends that MSP of R&M be linked to the basic 'oil content' of 35 percent in R&M seeds. As per CACP's calculations, farmers should be compensated an additional ₹19.34 per quintal for every 0.25 percent point increase in the oil content beyond this level. The Commission also recommends that such a dispensation of linking MSP with oil content in other oilseeds, where variation in oil content is high, may be introduced in a phased manner to incentivize farmers to adopt high oil content varieties and thereby increase production of edible oils in the country.
- 6.23 The Commission is of the considered opinion that these non-price and price policy recommendations would help farmers in reducing cost of cultivation and improving crop productivity, thereby enhancing their income. It would also contribute to suitable diversification of crops in line with emerging demand patterns and would boost growth of agriculture sector.

(Vijay Paul Sharma)

Chairman

(Shailja Sharma)

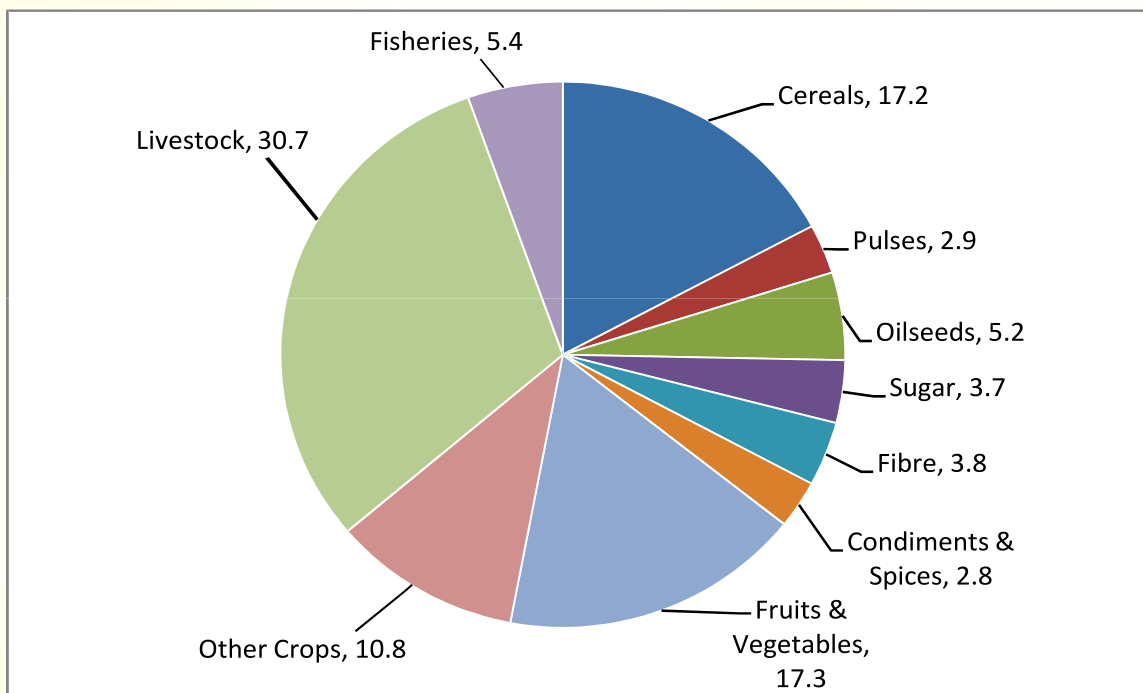
Member Secretary

31st July 2018



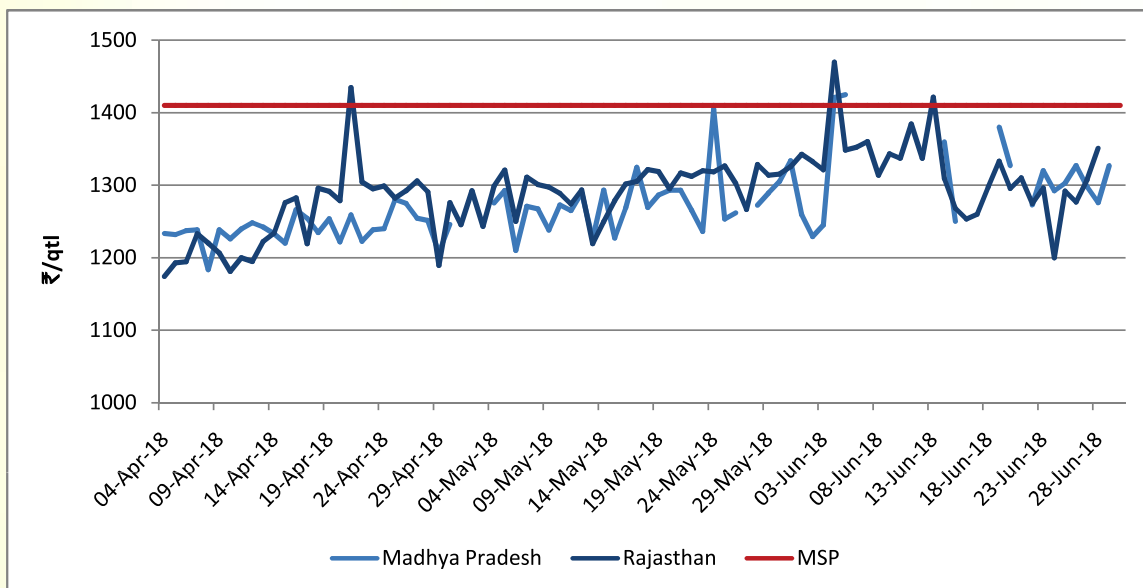
Annex Charts and Tables

Annex Chart 1.1: Share of Value of Output from Agriculture and Allied Sector (TE2016-17)



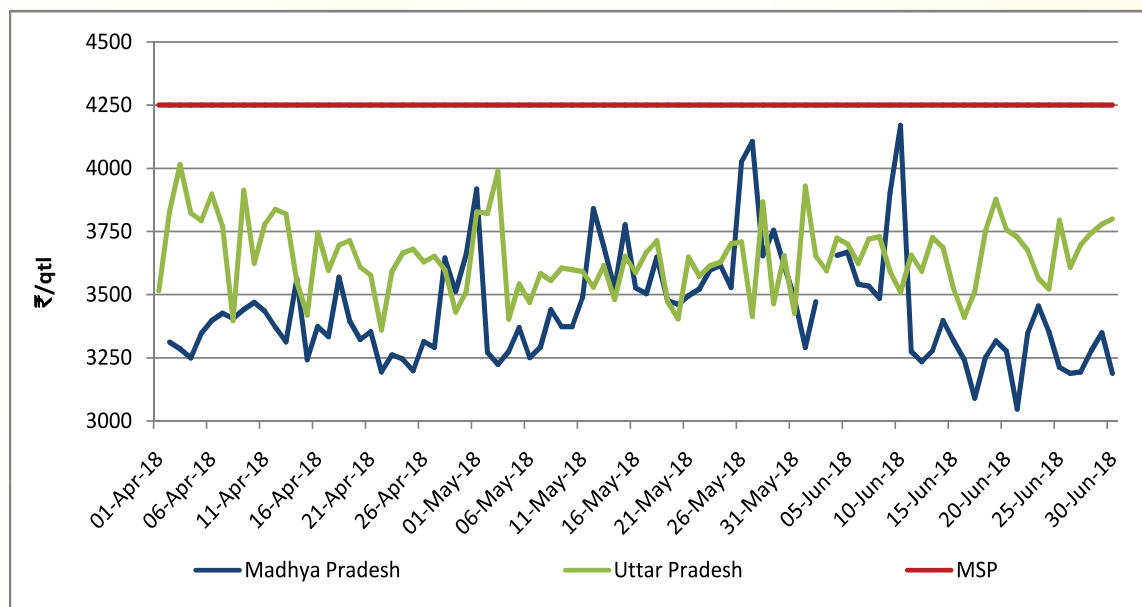
Source: CSO (2018)

Annex Chart 2.1: Comparison of Market Prices vs MSP of Barley in Madhya Pradesh and Rajasthan during RMS 2018-19



Source: AGMARKNET, Directorate of Marketing & Inspection (DMI)

Annex Chart 2.2: Comparison of Market Prices vs MSP of Lentil in Madhya Pradesh and Uttar Pradesh during RMS 2018-19



Source: AGMARKNET, Directorate of Marketing & Inspection (DMI)

Annex Table 1.1: All India Estimates of Area of Agricultural Commodities

(Million hectares)

S.No.	Crops		2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18*
1	Rice	Kharif	38.05	40.14	38.91	39.45	39.83	39.66	39.85	39.52
		Rabi	4.81	3.87	3.84	4.69	4.28	3.84	4.15	4.39
		Total	42.86	44.01	42.75	44.14	44.11	43.50	43.99	43.92
2	Wheat	Rabi	29.07	29.86	30.00	30.47	31.47	30.42	30.79	29.72
3	Barley	Rabi	0.71	0.64	0.70	0.67	0.71	0.59	0.66	0.68
4	Jowar	Kharif	3.07	2.62	2.43	2.28	2.27	2.14	2.06	1.89
		Rabi	4.31	3.63	3.79	3.52	3.89	3.94	3.57	3.07
		Total	7.38	6.25	6.21	5.79	6.16	6.08	5.62	4.95
5	Bajra	Kharif	9.61	8.78	7.30	7.81	7.32	7.13	7.46	7.40
6	Maize	Kharif	7.28	7.38	7.21	7.31	7.56	7.18	7.84	7.66
		Rabi	1.27	1.40	1.46	1.76	1.62	1.63	1.79	1.55
		Total	8.55	8.78	8.67	9.07	9.19	8.81	9.63	9.22
7	Ragi	Kharif	1.29	1.18	1.13	1.19	1.21	1.14	1.02	1.20
	Coarse Cereals	Kharif	22.05	20.75	18.82	19.27	18.95	18.23	18.99	18.68
		Rabi	6.29	5.67	5.94	5.95	6.22	6.15	6.01	5.30
		Total	28.34	26.42	24.76	25.22	25.17	24.39	25.01	23.98
	Cereals	Kharif	60.10	60.89	57.73	58.72	58.78	57.89	58.84	58.20
		Rabi	40.17	39.40	39.78	41.11	41.97	40.42	40.95	39.42
		Total	100.27	100.29	97.52	99.83	100.75	98.31	99.79	97.62
8	Tur (Arhar)	Kharif	4.37	4.01	3.89	3.90	3.85	3.96	5.34	4.46
9	Moong	Kharif	2.85	2.61	1.97	2.34	2.03	2.76	3.37	3.25
		Rabi	0.76	0.78	0.74	1.04	0.99	1.07	0.96	0.82
		Total	3.51	3.39	2.72	3.38	3.02	3.83	4.33	4.07
10	Urad	Kharif	2.51	2.36	2.44	2.35	2.49	2.72	3.48	4.18
		Rabi	0.74	0.86	0.69	0.72	0.76	0.90	1.00	0.85
		Total	3.25	3.22	3.13	3.06	3.25	3.62	4.48	5.03
11	Gram	Rabi	9.19	8.30	8.52	9.93	8.25	8.40	9.63	10.57
12	Lentil (Masur)	Rabi	1.60	1.56	1.42	1.34	1.47	1.28	1.46	1.49
	Pulses	Kharif	12.32	11.19	9.95	10.33	9.99	11.31	14.36	13.77
		Rabi	14.08	13.27	13.30	14.88	13.56	13.60	15.08	15.60
		Total	26.40	24.46	23.26	25.21	23.55	24.91	29.45	29.36
	Foodgrains	Kharif	72.42	72.08	67.69	69.05	68.77	69.21	73.20	71.97
		Rabi	54.25	52.67	53.09	55.99	55.53	54.01	56.03	55.01
		Total	126.67	124.75	120.78	125.04	124.30	123.22	129.23	126.98
13	Groundnut	Kharif	4.98	4.32	3.93	4.65	4.01	3.84	4.58	4.08
		Rabi	0.88	0.95	0.79	0.86	0.76	0.76	0.76	0.82
		Total	5.86	5.26	4.72	5.51	4.77	4.60	5.34	4.90
14	Soybean	Kharif	9.60	10.11	10.84	11.72	10.91	11.60	11.18	10.44
15	Sunflower	Kharif	0.32	0.26	0.30	0.25	0.22	0.16	0.17	0.14
		Rabi	0.61	0.47	0.53	0.42	0.37	0.33	0.21	0.19
		Total	0.93	0.73	0.83	0.67	0.59	0.49	0.38	0.33
16	Sesamum	Kharif	2.08	1.90	1.71	1.68	1.75	1.95	1.67	1.57
17	Nigerseed	Kharif	0.37	0.36	0.31	0.30	0.23	0.25	0.26	0.22
18	Rapeseed/Mustard	Rabi	6.90	5.89	6.36	6.65	5.80	5.75	6.07	6.01
19	Safflower	Rabi	0.24	0.25	0.18	0.18	0.17	0.13	0.14	0.08
	Nine Oilseeds@	Kharif	18.23	18.42	18.32	19.65	18.21	18.86	18.67	17.26
		Rabi	9.00	7.89	8.16	8.40	7.39	7.22	7.51	7.43
		Total	27.22	26.31	26.48	28.05	25.60	26.09	26.18	24.70
20	Cotton		11.24	12.18	11.98	11.96	12.82	12.29	10.83	12.45
	Jute		0.77	0.81	0.78	0.76	0.75	0.73	0.71	0.07
	Mesta		0.10	0.10	0.09	0.08	0.06	0.05	0.06	0.05
21	Jute & Mesta		0.87	0.90	0.86	0.84	0.81	0.78	0.76	0.76
22	Sugarcane		4.88	5.04	5.00	4.99	5.07	4.93	4.44	4.77

Note : * Third Advance Estimates (2017-18)

@ : Nine Oilseeds include Castorseed and Linseed also

Source : Directorate of Economics & Statistics, Ministry of Agriculture & Farmers Welfare

Annex Table 1.2: All India Estimates of Production of Agricultural Commodities

(Million tonnes)

S.No.	Crops		2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18*
1	Rice	Kharif	80.65	92.78	92.37	91.50	91.39	91.41	96.30	96.39
		Rabi	15.33	12.52	12.87	15.15	14.09	13.00	13.40	15.12
		Total	95.98	105.30	105.24	106.65	105.48	104.41	109.70	111.52
2	Wheat	Rabi	86.87	94.88	93.51	95.85	86.53	92.29	98.51	98.61
3	Barley	Rabi	1.66	1.62	1.75	1.83	1.61	1.44	1.75	1.79
4	Jowar	Kharif	3.44	3.29	2.84	2.39	2.30	1.82	1.96	2.04
		Rabi	3.56	2.69	2.44	3.15	3.15	2.42	2.60	2.69
		Total	7.00	5.98	5.28	5.54	5.45	4.24	4.57	4.73
5	Bajra	Kharif	10.37	10.28	8.74	9.25	9.18	8.07	9.73	9.08
6	Maize	Kharif	16.64	16.49	16.20	17.14	17.01	16.05	18.92	19.81
		Rabi	5.09	5.27	6.05	7.11	7.16	6.51	6.98	7.07
		Total	21.73	21.76	22.26	24.26	24.17	22.57	25.90	26.88
7	Ragi	Kharif	2.19	1.93	1.57	1.98	2.06	1.82	1.39	1.96
	Coarse Cereals	Kharif	33.08	32.44	29.80	31.20	30.94	28.15	32.44	33.33
		Rabi	10.32	9.58	10.25	12.09	11.92	10.37	11.33	11.54
		Total	43.40	42.01	40.04	43.29	42.86	38.52	43.77	44.87
	Cereals	Kharif	113.77	125.22	122.16	122.70	122.34	119.56	128.93	128.72
		Rabi	112.48	116.98	116.63	123.09	112.53	115.66	122.05	125.28
		Total	226.24	242.20	238.78	245.79	234.87	235.22	250.98	255.00
8	Tur (Arhar)	Kharif	2.86	2.65	3.02	3.17	2.81	2.56	4.87	4.18
9	Moong	Kharif	1.53	1.24	0.79	0.96	0.87	1.00	1.64	1.39
		Rabi	0.27	0.40	0.40	0.65	0.64	0.59	0.52	0.51
		Total	1.80	1.63	1.19	1.61	1.50	1.59	2.17	1.90
10	Urad	Kharif	1.40	1.23	1.43	1.15	1.28	1.25	2.18	2.64
		Rabi	0.36	0.53	0.47	0.55	0.68	0.70	0.66	0.65
		Total	1.76	1.77	1.90	1.70	1.96	1.95	2.83	3.28
11	Gram	Rabi	8.22	7.70	8.83	9.53	7.33	7.06	9.38	11.16
12	Lentil (Masur)	Rabi	0.94	1.06	1.13	1.02	1.04	0.98	1.22	1.51
	Pulses	Kharif	7.12	6.06	5.92	5.99	5.73	5.53	9.58	9.01
		Rabi	11.12	11.03	12.43	13.25	11.42	10.82	13.55	15.50
		Total	18.24	17.09	18.34	19.25	17.15	16.35	23.13	24.51
	Foodgrains	Kharif	120.85	131.27	128.07	128.69	128.06	125.09	138.33	137.73
		Rabi	123.64	128.01	129.06	136.35	123.96	126.47	136.78	140.78
		Total	244.49	259.29	257.13	265.04	252.02	251.57	275.11	279.51
13	Groundnut	Kharif	6.64	5.13	3.19	8.06	5.93	5.37	6.05	7.37
		Rabi	1.62	1.84	1.51	1.66	1.47	1.37	1.41	1.58
		Total	8.26	6.96	4.69	9.71	7.40	6.73	7.46	8.94
14	Soybean	Kharif	12.74	12.21	14.67	11.86	10.37	8.57	13.16	10.93
15	Sunflower	Kharif	0.19	0.15	0.19	0.15	0.14	0.07	0.10	0.07
		Rabi	0.46	0.37	0.36	0.35	0.29	0.23	0.15	0.12
		Total	0.65	0.52	0.54	0.50	0.43	0.30	0.25	0.19
16	Sesamum	Kharif	0.89	0.81	0.69	0.71	0.83	0.85	0.75	0.74
17	Nigerseed	Kharif	0.11	0.10	0.10	0.10	0.08	0.07	0.09	0.08
18	Rapeseed/ Mustard	Rabi	8.18	6.60	8.03	7.88	6.28	6.80	7.92	8.04
19	Safflower	Rabi	0.15	0.15	0.11	0.11	0.09	0.05	0.09	0.05
	Nine Oilseeds@	Kharif	21.92	20.69	20.79	22.61	19.22	16.68	21.51	20.68
		Rabi	10.56	9.11	10.15	10.14	8.29	8.57	9.76	9.96
		Total	32.48	29.80	30.94	32.75	27.51	25.25	31.28	30.64
20	Cotton\$		33.90	36.70	37.00	39.80	38.60	33.80	34.50	37.00
	Cotton\$\$		33.00	35.20	34.22	35.90	34.81	30.01	32.58	34.86
	Jute#		10.01	10.74	10.34	11.08	10.62	9.94	10.43	10.14
	Mesta#		0.61	0.66	0.59	0.61	0.51	0.58	0.53	0.48
21	Jute & Mesta#		10.62	11.40	10.93	11.69	11.13	10.52	10.96	10.62
22	Sugarcane		342.38	361.04	341.20	352.14	362.33	348.45	306.07	355.10

Note : * Third Advance Estimates (2017-18)

@ : Nine Oilseeds include Castorseed and Linseed also

\$: CAB estimates of million bales of 170 kgs each

\$\$: E&S estimates of Million bales of 170 kgs each

: Million bales of 180 kgs each

Source : Directorate of Economics & Statistics, Ministry of Agriculture & Farmers Welfare, Cotton Advisory Board.

Annex Table 1.3: All India Estimates of Yield of Agricultural Commodities

(Kgs per hectare)

S.No.	Crops		2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18*
1	Rice	Kharif	2120	2311	2374	2319	2295	2305	2417	2439
		Rabi	3185	3238	3353	3232	3291	3382	3231	3442
		Total	2239	2393	2462	2416	2391	2400	2494	2539
2	Wheat	Rabi	2989	3177	3117	3145	2750	3034	3200	3318
3	Barley	Rabi	2357	2516	2521	2718	2280	2439	2666	2645
4	Jowar	Kharif	1119	1257	1171	1050	1014	849	952	1082
		Rabi	827	741	644	896	808	615	729	877
		Total	949	957	850	957	884	697	813	955
5	Bajra	Kharif	1079	1171	1198	1184	1255	1132	1305	1227
6	Maize	Kharif	2285	2234	2246	2346	2249	2236	2413	2585
		Rabi	4003	3765	4152	4050	4414	4006	3896	4548
		Total	2540	2478	2566	2676	2632	2563	2689	2916
7	Ragi	Kharif	1705	1641	1396	1661	1706	1601	1368	1633
	Coarse Cereals	Kharif	1500	1563	1583	1619	1633	1544	1708	1785
		Rabi	1641	1689	1725	2034	1915	1686	1884	2178
		Total	1531	1590	1617	1717	1703	1579	1750	1871
	Cereals	Kharif	1893	2056	2116	2089	2081	2065	2191	2212
		Rabi	2800	2969	2931	2995	2681	2862	2981	3178
		Total	2256	2415	2449	2462	2331	2393	2515	2612
8	Tur (Arhar)	Kharif	655	662	776	813	729	646	912	937
9	Moong	Kharif	538	475	398	410	428	363	487	428
		Rabi	354	508	539	620	640	554	543	621
		Total	514	483	436	475	498	416	502	467
10	Urad	Kharif	557	523	586	490	516	459	627	631
		Rabi	489	621	679	768	891	773	660	766
		Total	542	549	606	555	604	537	632	652
11	Gram	Rabi	895	928	1036	960	889	840	974	1055
12	Lentil (Masur)	Rabi	591	678	797	759	705	765	838	1011
	Pulses	Kharif	578	541	594	580	573	489	667	654
		Rabi	790	831	934	891	842	796	898	994
		Total	691	699	789	763	728	656	785	835
	Foodgrains	Kharif	1669	1821	1892	1864	1862	1808	1890	1914
		Rabi	2279	2430	2431	2435	2232	2341	2441	2559
		Total	1930	2078	2129	2120	2028	2042	2129	2201
13	Groundnut	Kharif	1335	1188	811	1735	1478	1399	1321	1807
		Rabi	1846	1938	1908	1926	1948	1801	1862	1917
		Total	1411	1323	994	1764	1552	1465	1398	1825
14	Soybean	Kharif	1327	1208	1353	1012	951	738	1177	1047
15	Sunflower	Kharif	608	566	622	621	660	420	565	548
		Rabi	748	783	674	826	781	698	737	620
		Total	701	706	655	750	736	608	659	590
16	Sesamum	Kharif	429	426	402	426	474	436	448	475
17	Nigerseed	Kharif	290	269	325	328	328	295	332	335
18	Rapeseed/ Mustard	Rabi	1185	1121	1262	1185	1083	1183	1303	1339
19	Safflower	Rabi	617	580	591	638	515	416	652	556
	Nine Oilseeds@	Kharif	1203	1123	1135	1151	1056	884	1152	1198
		Rabi	1174	1155	1244	1207	1122	1186	1300	1339
		Total	1193	1133	1168	1168	1075	968	1195	1240
20	Cotton\$		513	512	525	566	512	467	542	505
	Cotton\$\$		499	491	486	510	462	415	512	476
	Jute		2329	2389	2396	2639	2549	2457	2659	25921
	Mesta		1115	1248	1237	1338	1525	1945	1664	1678
21	Jute & Mesta		2192	2268	2281	2512	2473	2421	2585	2530
22	Sugarcane		70091	71667	68254	70520	71512	70721	69001	74375

Note: *Third Advance Estimates (2017-18)

@ : Nine Oilseeds include Castorseed and Linseed also

\$: CAB estimates

\$\$: E&S estimates

Source : Directorate of Economics & Statistics, Ministry of Agriculture & Farmers Welfare

Annex Table 1.4: Share of Rabi Crops (under MSP) in Total Production and Area TE2017-18

(Percent)

(a) Production																
S.No.	Crop/ State	Bihar	Chhatt	Guj	Har	Jhar	Kar	M.P.	Maha	Punjab	Raj	U. P.	UK	W.B.	Others	Total
1	Wheat	5.0	0.1	2.9	11.8	0.4	0.2	17.8	1.5	17.3	9.8	30.2	0.9	0.7	1.4	100.0
2	Barley	0.9	0.1	0.0	4.9	0.0	0.0	14.6	0.2	2.1	49.5	23.3	1.4	0.2	2.7	100.0
3	Gram	0.7	2.8	2.5	0.4	2.4	7.5	41.7	15.4	0.0	13.5	5.3	0.0	0.4	7.3	100.0
4	Lentil*	11.6	0.5	0.5	0.2	3.2	0.0	41.0	0.0	0.1	4.9	28.5	0.6	7.4	1.6	100.0
5	R&M	1.3	0.3	4.4	11.5	2.4	0.0	11.3	0.0	0.6	45.8	10.6	0.2	7.1	4.5	100.0
6	Saf- flower	0.1	1.0	0.0	0.0	0.8	37.7	10.9	42.9	0.0	0.0	0.0	0.0	1.3	5.3	100.0

Note : **TE2016-17

Source : Directorate of Economics & Statistics, Ministry of Agriculture & Farmers Welfare

(Percent)

(b) Area																
S.No.	Crop/ State	Bihar	Chhatt	Guj	Har	Jhar	Kar	M.P.	Maha	Punjab	Raj	U. P.	U.K.	W.B.	Others	Total
1	Wheat	6.9	0.4	3.2	8.5	0.6	0.6	19.0	3.4	11.6	9.7	32.0	1.1	0.9	2.2	100.0
2	Barley	1.7	0.4	0.9	3.6	0.0	0.0	17.8	0.8	1.5	42.3	23.4	3.2	0.4	4.1	100.0
3	Gram	0.6	3.2	2.0	0.4	2.1	13.3	34.4	18.8	0.0	13.5	5.0	0.0	0.3	6.4	100.0
4	Lentil*	10.6	1.2	0.0	0.2	3.5	0.0	39.5	0.0	0.1	4.3	30.8	0.7	6.6	2.6	100.0
5	R&M	1.4	0.8	3.4	8.7	4.3	0.0	11.6	0.1	0.6	41.2	11.1	0.3	8.5	7.9	100.0
6	Saf- flower	0.1	2.6	0.0	0.0	0.7	33.4	11.6	47.3	0.0	0.0	0.0	0.0	0.7	3.6	100.0

Note : **TE2016-17

Source : Directorate of Economics & Statistics, Ministry of Agriculture & Farmers Welfare

Annex Table 1.5: Statewise Number of Farmers Benefited

States/ UTs	KMS 2015-16	KMS 2016-17	KMS 2017-18	RMS 2016-17	RMS 2017-18	RMS 2018-19
A.P.	276699	544570	488751	0	0	0
Telangana	535007	1088312	1073219	0	0	0
Assam	7288	6960	3068	0	0	0
Bihar	275484	287830	163425	0	0	2669
Chattisgarh	1110163	1327944	1014195	0	0	0
Gujarat	335	1316	462	14	1700	20768
Haryana	212351	556654	681984	472313	690448	883783
Jharkhand	53945	39480	42346	0	0	0
J&K	2812	2693	3856	0	0	0
Kerala	162737	125530	140777	0	0	0
M.P.	199984	287759	278898	532907	738895	958417
Maharashtra	111503	149279	116523	0	0	0
Odisha	1078596	1101193	795304	0	0	0
Punjab	1206216	940560	1142621	834655	843446	897905
Tamilnadu	850640	73367	322299	0	0	0
U.P.	433556	435320	492913	166073	800646	1070044
Uttarakhand	51772	79470	7618	710	654	15987
WB	1244256	373311	1718	0	0	0
Rajasthan	0	0	0	38942	110338	123939
HP	0	0	0	127	167	318
Karnataka	14587	0	0	0	0	0
Chandigarh	3468	2235	3148	1025	935	1557
Total	7831399	7423783	6773125	2046766	3187229	3975387

Source: FCI

Annex Table 1.6: Additional Burden on the Exchequer for Increase in Allocation of Rice and Wheat under AAY

AAY	Rice	Wheat
Additional Allocation (Kgs per month)	3	2
No. of beneficiary households (lakh)	237.8	237.8
Total Additional Allocation (000 tonnes)	856.08	570.72
Selling Price (Rs per kg)	3	2
Total Revenue (Rs crore)	256.82	114.14
Economic Cost (Rs per qtl) (as per 2018-19 BE)	3310.28	2445.60
Total Economic Cost (Rs crore)	2833.86	1395.75
Cost towards subsidy (Rs crore)	2577.04	1281.61

Source: DFPD

Annex Table 1.7: Additional Burden on the Exchequer for Increase in Allocation of Rice and Wheat under AAY & PHH Combined

AAY	Rice	Wheat
Additional Allocation (Kgs per month)	3	2
No. of beneficiary households (lakh)	237.8	237.8
Total Additional Allocation (000 tonnes)	856.1	570.7
PHH		
Additional Allocation (Kgs per month)	0.5	0.5
No. of beneficiaries (lakh)	7129.3	7129.3
Total Additional Allocation (000 tonnes)	4277.6	4277.6
AAY + PHH		
Total Additional Allocation (000 tonnes)	5133.7	4848.3
Selling Price (Rs per kg)	3.0	2.0
Total Revenue (AAY + PHH) (Rs crore)	1540.1	969.7
Economic Cost (Rs per qtl) (as per 2018-19 BE)	3310.3	2445.6
Total Economic Cost (Rs crore)	16993.8	11857.0
Cost towards subsidy (Rs crore)	15453.7	10887.3

Source: DFPD

Annex Table 2.1: State-wise Procurement of Pulses by NAFED

Crop	Year	State	Quantity (MT)	No. of Farmers Benefited
Gram	2017-18	Karnataka	63901	52640
		Telangana	31344	22235
		Andhra Pradesh	18505	10618
		Rajasthan	8762	4023
		Maharashtra	5785	3925
		Total	128297	93441
	2018-19	Madhya Pradesh	1564007	609626
		Rajasthan	419702	163421
		Maharashtra	156562	113769
		Gujarat	75614	44491
		Andhra Pradesh	73161	44508
		Karnataka	63400	50851
		Telangana	18656	14714
		Uttar Pradesh	3830	3024
		Total	2374931	1044404
Masur	2018-19	Madhya Pradesh	224138	159346
		Uttar Pradesh	3405	2462
		Total	227543	161808

Note: Procurement for 2018-19 as on 11.06.2018

Source: NAFED

Annex Table 2.2: State-wise Procurement of Mustard Seeds by NAFED

Year	State	Quantity	No. of Farmers Benefited
2017-18	Haryana	46710	24488
	Rajasthan	2271	1098
	Total	48981	25586
2018-19	Rajasthan	402177	146422
	Haryana	217748	109498
	Madhya Pradesh	118542	52970
	Gujarat	36069	17576
	Uttar Pradesh	413	228
	Total	774949	326694

Note: Procurement for 2018-19 as on 11.06.2018

Source: NAFED

Annex Table 2.3: Statutory Cesses/Fees (Percent) Imposed on Pulses & Oilseeds by Major States

State	Mandi Tax (%)
Karnataka	1.2
Madhya Pradesh	2.2 (and 0.2 Nirashit Tax)
Gujarat	0.6
Andhra Pradesh	1
Maharashtra	1.05
Rajasthan	1.0 for Mustard Seed, 1.6 for Gram
Uttar Pradesh	2.5

Note: Purchase tax/VAT is 5 percent in above states

Source: NAFED

Annex Table 3.1: Simulation-Impact of Oil Content on MSP of R&M

S. N.	Oil Content (%)	Oil Cake(%) {100-col(2)}	Realisation from oil cake on processing of 1 quintal of oilseeds, assuming price of cake/q= Rs.1728 col(3)*Price of Oil cake}/100	Cost of Oil Content i.e. oilseeds without cake (Rs/ qtl.), assuming MSP/qtl.= 4200 MSP-Col(4)	Cost of Oil Content i.e. oilseeds without cake for each 0.25 percent point of oil content (Rs/qtl.) {col(5)/col(2)}*0.25	MSP at Oil Content given in col. (2)[MSP+{Average of col.(6)* percent points of oil content that is over & above 35%}]/(0.25)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	35.00	65.00	1123	3077	21.98	4200
2	35.25	64.75	1119	3081	21.85	4222
3	35.50	64.50	1115	3085	21.73	4244
4	35.75	64.25	1110	3090	21.61	4266
5	36.00	64.00	1106	3094	21.49	4287
6	36.25	63.75	1102	3098	21.37	4309
7	36.50	63.50	1097	3103	21.25	4330
8	36.75	63.25	1093	3107	21.14	4351
9	37.00	63.00	1089	3111	21.02	4372
10	37.25	62.75	1084	3116	20.91	4393
11	37.50	62.50	1080	3120	20.80	4414
12	37.75	62.25	1076	3124	20.69	4435
13	38.00	62.00	1071	3129	20.58	4456
14	38.25	61.75	1067	3133	20.48	4476
15	38.50	61.50	1063	3137	20.37	4497
16	38.75	61.25	1058	3142	20.27	4517
17	39.00	61.00	1054	3146	20.17	4538
18	39.25	60.75	1050	3150	20.07	4558
19	39.50	60.50	1045	3155	19.97	4578
20	39.75	60.25	1041	3159	19.87	4598
21	40.00	60.00	1037	3163	19.77	4618
22	40.25	59.75	1032	3168	19.67	4637
23	40.50	59.50	1028	3172	19.58	4657
24	40.75	59.25	1024	3176	19.49	4677
25	41.00	59.00	1020	3180	19.39	4696
26	41.25	58.75	1015	3185	19.30	4715

Cont..

Annex Table 3.1: Simulation-Impact of Oil Content on MSP of R&M

S. N.	Oil Content (%)	Oil Cake(%) {100-col(2)}	Realisation from oil cake on processing of 1 quintal of oilseeds, assuming price of cake/q= Rs.1728 col(3)*Price of Oil cake}/100	Cost of Oil Content i.e. oilseeds without cake (Rs/ qtl.), assuming MSP/qtl.= 4200 MSP-Col(4)	Cost of Oil Content i.e. oilseeds without cake for each 0.25 percent point of oil content (Rs/qtl.) {col(5)/col(2)}*0.25	MSP at Oil Content given in col. (2)[MSP+{Average of col.(6)* percent points of oil content that is over & above 35%}]/(0.25)
27	41.50	58.50	1011	3189	19.21	4735
28	41.75	58.25	1007	3193	19.12	4754
29	42.00	58.00	1002	3198	19.03	4773
30	42.25	57.75	998	3202	18.95	4792
31	42.50	57.50	994	3206	18.86	4811
32	42.75	57.25	989	3211	18.78	4830
33	43.00	57.00	985	3215	18.69	4849
34	43.25	56.75	981	3219	18.61	4867
35	43.50	56.50	976	3224	18.53	4886
36	43.75	56.25	972	3228	18.45	4905
37	44.00	56.00	968	3232	18.37	4923
38	44.25	55.75	963	3237	18.29	4941
39	44.50	55.50	959	3241	18.21	4960
40	44.75	55.25	955	3245	18.13	4978
41	45.00	55.00	950	3250	18.05	4996
42	45.25	54.75	946	3254	17.98	5014
43	45.50	54.50	942	3258	17.90	5032
44	45.75	54.25	937	3263	17.83	5050
45	46.00	54.00	933	3267	17.75	5068
46	46.25	53.75	929	3271	17.68	5086
47	46.50	53.50	924	3276	17.61	5103
48	46.75	53.25	920	3280	17.54	5121
49	47.00	53.00	916	3284	17.47	5138
50	47.25	52.75	912	3288	17.40	5156
51	47.50	52.50	907	3293	17.33	5173
52	47.75	52.25	903	3297	17.26	5191
53	48.00	52.00	899	3301	17.20	5208
Average increase in MSP with 0.25 percent increase in oil content					19.34	

Annex Table 4.1: India's Agricultural Exports of Major Commodities

(Value in ₹ Crore)

Commodity	2016-17	2017-18	% increase/decrease over previous year	% Share in Total Export
Rice	38443	49838	29.6	19.3
Marine Products	39594	47637	20.3	18.5
Meat & Processed Meat	27036	26896	-0.5	10.4
Spices	19111	20024	4.8	7.8
Cotton (Raw)	10907	12156	11.4	4.7
Oilseeds	8987	7504	-16.5	2.9
Oil Meal	5410	7022	29.8	2.7
Coffee	5646	6245	10.6	2.4
Cashew	5279	5945	12.6	2.3
Sugar	8660	5229	-39.6	2.0
Fresh Vegetables	5791	5046	-12.9	2.0
Fresh Fruits	4974	4758	-4.3	1.8
Guargum Meal	3107	4170	34.2	1.6
Processed Fruits & Juices	3921	4165	6.2	1.6
Others	46734	51076	9.3	19.8
Total	233599	257711	10.3	100.0

Source: Directorate General of Commercial Intelligence and Statistics

Annex Table 4.2: India's Agricultural Imports of Major Commodities

(Value in ₹ Crore)

Commodity	2016-17	2017-18	% increase/decrease over previous year	% Share in Total Export
Vegetable Oils	73039	74996	2.7	42.7
Pulses	28523	18749	-34.3	10.7
Wood & Wood Products	15361	17565	14.3	10.0
Fresh Fruits	11291	12525	10.9	7.1
Cashew	9027	9134	1.2	5.2
Spices	5760	6384	10.8	3.6
Cotton Raw including Waste	6339	6307	-0.5	3.6
Sugar	6869	6036	-12.1	3.4
Natural Rubber	4375	5344	22.2	3.0
Wheat	8509	2358	-72.3	1.3
Others	16244	16364	0.7	9.3
Total	185337	175760	-5.2	100.0

Source: Directorate General of Commercial Intelligence and Statistics

Annex Table 4.3: Quarterly Domestic and International Prices of Rabi Crops

(₹/qtl)

Quarter	Wheat		Barley		Gram		Lentil		R&M Oilseed		R&M Oil	
	D	I	D	I	D	I	D	I	D	I	D	I
2013 Q1	1500	1612	1222	1282	3396	3665	3732	3137	3444	3408	7369	6502
2013 Q2	1496	1538	1199	1289	3308	3654	4005	4167	3131	3202	6654	6208
2013 Q3	1501	1604	1190	1186	2897	3154	4068	4098	3157	3050	6756	6231
2013 Q4	1533	1715	1247	935	2864	3127	4057	3790	3348	3173	7152	6305
2014 Q1	1628	1630	1265	800	2722	3202	4283	4211	3207	3332	6833	6069
2014 Q2	1537	1577	1209	824	2679	3239	4536	4464	3121	3242	6546	5776
2014 Q3	1577	1296	1325	789	2546	3303	4394	4618	3367	2575	6872	5276
2014 Q4	1569	1483	1401	947	2659	3162	4498	4717	3572	2597	7089	5023
2015 Q1	1579	1390	1336	1175	3157	3666	5159	5364	3493	2529	7090	4716
2015 Q2	1510	1302	1209	1276	3986	4412	5816	6330	3854	2713	7873	4897
2015 Q3	1545	1276	1279	1300	4416	4782	6459	6583	4137	2692	8493	4996
2015 Q4	1603	1322	1396	1234	4576	5108	6558	5813	4492	2735	9577	5296
2016 Q1	1627	1282	1425	1236	4251	4480	6364	4860	3875	2669	7946	5234
2016 Q2	1630	1270	1524	1157	5751	6115	6243	5840	4032	2776	8366	5376
2016 Q3	1687	1080	1606	957	7705	8220	6090	5761	4208	2761	8879	5432
2016 Q4	1817	1108	1636	918	8553	9727	5529	5088	4072	2924	8364	6098
2017 Q1	1804	1186	1615	919	5645	5705	5037	4359	3667	2980	7557	5911
2017 Q2	1691	1140	1491	887	5192	5704	4651	3852	3406	2722	7116	5330
2017 Q3	1683	1183	1507	922	5099	5581	4296	3586	3556	2738	7456	5591
2017 Q4	1703	1133	1501	700	4342	4818	4104	3548	3592	2790	7716	5821
2018 Q1	1723	1218	1430	818	3691	3823	3791	3622	3647	2741	7639	5307
2018 Q2	1785	1362	1455	872	3427	3565	3710	3824	3684	2760	7875	5348

Notes: 1. Wheat (US) no. 2, soft red winter, export price delivered at US Gulf port for prompt or 30 days shipment

2. Barley Canadian, No. 1 Western Barley, spot price.

3. R&M Oil, Rotterdam Dutch, Ex Mill, Oil World.

4. R&M Oilseed, Hamburg CIF.

5. Domestic Price from Directorate of Economics and Statistics

6. D: Domestic and I: International

Sources: Directorate of Economics and Statistics, Agriwatch, Solvent Extractors Association of India, United States Department of Agriculture and World Bank.

Annex Table 5.1: State-wise Average Gross Returns of Rabi Crops, TE2016-17

Crop/State	Cost A ₂	Cost A ₂ +FL	GVO	Gross Returns over A ₂		Gross Returns over A ₂ +FL	
	₹/ha			₹/ha (Col.4- Col.2)	Percent (Col.5/ Col.2*100)	₹/ha (Col.4- Col.3)	Percent (Col.7/ Col.3*100)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Wheat							
Bihar	22833	28510	50804	27971	123	22294	78
Gujarat	26498	32237	59035	32537	123	26798	83
Haryana	26892	34943	82869	55977	208	47926	137
Himachal Pradesh	13399	24079	29017	15618	117	4938	21
Jharkhand	17078	20837	27567	10489	61	6730	32
Karnataka	15684	19328	18234	2550	16	-1094	-6
Maharashtra	31335	39175	47376	16041	51	8201	21
Madhya Pradesh	21274	27541	60264	38990	183	32723	119
Punjab	26581	29664	80171	53590	202	50507	170
Rajasthan	24176	38935	74799	50623	209	35864	92
Uttarakhand	19691	27214	57596	37905	192	30382	112
Uttar Pradesh	27474	35108	60078	32603	119	24969	71
West Bengal	32710	39492	36702	3992	12	-2790	-7
ALL-INDIA	25258	32644	63642	38384	152	30998	95
Barley							
Rajasthan	19478	35866	63933	44455	228	28067	78
Uttar Pradesh	19313	24177	49907	30594	158	25731	106
ALL-INDIA	19427	31897	59191	39763	205	27294	86
Gram							
Andhra Pradesh	30997	33927	54535	23538	76	20608	61
Bihar	17343	21022	77896	60553	349	56874	271
Chhattisgarh	15486	19364	34266	18781	121	14903	77
Haryana	13852	21771	57567	43715	316	35796	164
Jharkhand	11844	14610	55455	43612	368	40845	280
Karnataka	18825	21047	34080	15255	81	13033	62
Maharashtra	26023	30376	46811	20788	80	16435	54
Madhya Pradesh	21084	25622	60399	39315	186	34777	136
Rajasthan	12874	21446	47196	34322	267	25751	120
Uttar Pradesh	19079	25651	47639	28560	150	21988	86
ALL-INDIA	20364	25203	50409	30045	148	25205	100

(contd..)

Annex Table 5.1: State-wise Average Gross Returns of Rabi Crops, TE2016-17

Crop/State	Cost A ₂	Cost A ₂ +FL	GVO	Gross Returns over A ₂		Gross Returns over A ₂ +FL	
	₹/ha			₹/ha (Col.4-Col.2)	Percent (Col.5/Col.2*100)	₹/ha (Col.4-Col.3)	Percent (Col.7/Col.3*100)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lentil							
Bihar	13366	17083	54705	41339	309	37623	220
Madhya Pradesh	15543	19156	46768	31225	201	27612	144
Uttar Pradesh	15373	21388	35337	19964	130	13949	65
West Bengal	19980	26200	60764	40784	204	34564	132
ALL-INDIA	15468	20078	44659	29191	189	24581	122
Rapeseed/Mustard							
Assam	14707	28228	25964	11257	77	-2264	-8
Bihar	13218	18144	41900	28682	217	23756	131
Gujarat	22178	28744	55726	33549	151	26983	94
Haryana	18776	25628	60298	41522	221	34670	135
Madhya Pradesh	14052	20462	55590	41537	296	35128	172
Rajasthan	14972	26262	53054	38082	254	26792	102
Uttar Pradesh	17235	27359	45384	28149	163	18025	66
West Bengal	24697	34448	48150	23453	95	13702	40
ALL-INDIA	16491	26327	51298	34807	211	24971	95
Safflower							
Karnataka	9631	10941	20904	11273	117	9964	91
Maharashtra	13962	18374	17252	3290	24	-1122	-6
ALL-INDIA	13385	17054	18916	5532	41	1862	11

Note: Average Gross Returns of safflower are for TE2015-16.

Source: CACP calculations based on CS data

Annex Table 5.2: Month-wise and State-wise Average Daily Wage Rates for Agricultural Labour (Man)

(₹/Day)

Year/Month	AP	Asm	Bih	Guj	Har	HP	Kar	Ker	MP	MH	Odi	Pun	Raj	TN	UP	WB	All-India
2014																	
January	229	182	194	172	320	336	237	580	155	215	178	276	262	355	191	229	225
February	226	188	200	172	329	336	240	629	158	214	180	275	251	362	191	230	226
March	222	189	202	175	333	341	243	594	161	219	164	279	270	356	195	223	229
April	222	199	204	179	335	352	240	594	163	223	160	306	291	361	201	226	235
May	225	203	206	179	346	335	242	594	165	223	173	307	283	364	202	225	235
June	217	204	207	179	347	341	241	594	164	230	191	304	280	362	199	227	235
July	230	208	218	185	345	345	241	599	173	225	201	302	320	372	200	226	244
August	226	220	220	190	348	343	241	599	173	226	208	304	305	371	202	230	243
September	239	225	220	190	350	343	242	586	180	222	204	310	296	417	198	234	246
October	241	226	222	198	354	339	242	586	171	222	202	310	297	412	201	237	246
November	247	238	220	198	357	330	244	597	170	223	200	312	305	421	199	236	248
December	236	234	220	192	344	349	252	604	176	222	194	307	307	417	199	237	247
2015																	
January	246	235	219	194	338	363	254	643	178	225	201	286	298	430	200	241	249
February	250	234	221	194	335	363	252	643	179	225	202	290	287	440	202	241	249
March	245	226	228	194	341	363	253	642	179	226	202	281	284	429	205	242	248
April	245	225	230	195	340	363	253	652	182	231	201	277	291	403	209	242	249
May	235	231	231	196	345	362	260	652	183	232	200	292	279	405	208	242	249
June	239	239	237	196	346	351	260	664	188	228	203	311	282	399	207	240	250
July	229	236	242	203	350	361	269	664	186	234	206	311	295	393	211	240	253
August	241	238	246	203	355	366	277	653	188	233	202	304	300	404	214	239	257
September	241	239	246	203	354	372	278	656	190	228	196	303	304	394	214	241	256
October	240	236	244	203	354	367	279	656	189	233	200	298	298	392	215	237	256
November	276	243	243	203	351	374	285	657	182	228	204	301	303	382	216	237	259
December	278	241	245	203	361	379	286	657	180	229	200	301	302	383	219	248	260

(contd..)

Annex Table 5.2: Month-wise and State-wise Average Daily Wage Rates for Agricultural Labour (Man)

(₹/Day)

Year/Month	AP	Asm	Bih	Guj	Har	HP	Kar	Ker	MP	MH	Odi	Pun	Raj	TN	UP	WB	All-India
2016																	
January	276	235	248	206	354	371	285	664	183	231	199	288	276	381	218	251	256
February	254	233	248	206	359	371	281	666	182	229	195	300	270	383	217	252	253
March	250	234	246	213	359	371	280	670	186	231	206	292	277	406	217	254	256
April	272	240	246	214	362	395	278	670	188	232	198	310	260	406	223	254	257
May	256	241	248	214	368	369	283	665	186	247	199	312	266	400	223	256	258
June	254	255	249	214	368	370	288	665	190	249	210	321	265	396	222	259	260
July	257	255	251	219	368	373	295	665	189	238	207	313	289	408	225	259	264
August	262	253	252	219	368	379	293	665	188	246	213	296	283	411	225	258	264
September	263	254	247	219	368	379	293	665	192	248	209	288	284	412	221	254	263
October	263	254	247	219	368	391	290	665	199	249	203	306	284	409	221	257	265
November	271	254	247	219	368	387	297	665	199	255	207	307	281	406	227	260	267
December	284	259	247	219	368	387	298	665	201	255	217	305	279	406	225	263	269
2017																	
January	286	259	249	225	362	417	303	675	204	255	222	321	272	412	226	265	271
February	286	261	251	227	363	387	302	675	207	259	220	318	281	413	229	264	273
March	290	256	250	227	363	417	300	675	208	262	223	318	293	413	231	264	276
April	291	257	251	229	361	408	300	682	210	269	227	326	283	413	270	232	280
May	288	256	251	229	363	406	301	687	214	275	229	335	266	413	232	265	275
June	269	256	251	229	363	404	300	687	215	280	227	335	281	410	233	264	276
July	281	252	255	230	373	425	301	687	217	277	235	327	288	415	241	268	280
August	276	258	258	230	365	423	305	687	216	271	231	327	290	412	247	268	280
September	280	272	260	234	365	429	306	687	215	265	227	345	287	416	248	270	281
October	277	282	259	234	367	399	306	687	211	265	226	348	279	416	246	275	279
November	282	281	261	234	367	423	310	687	208	269	222	342	289	417	244	277	281
December	291	275	262	234	367	419	315	687	209	268	225	349	291	417	243	279	282
2018																	
January	312	277	264	236	367	439	321	691	212	268	226	349	267	424	243	275	283
February	308	278	269	236	367	439	322	691	214	267	225	341	283	444	243	277	286
March	320	278	270	238	368	445	320	698	216	273	223	332	279	445	240	278	287
April	321	280	271	238	367	445	322	698	217	272	223	341	294	445	239	277	290

Note: Daily Wage rate - Average of five operations i.e. Ploughing, Sowing, Weeding, Transplanting and Harvesting
Source: Labour Bureau, Ministry of Labour & Employment, Government of India

Annex Table 5.3: Farm Inputs - Wholesale Price Index (Base 2011-12=100)

Year/Month	High Speed Diesel (HSD)	Fertilizers and nitrogen compounds	Electricity	Agricultural tractors	Lube Oils	Cattle Feed	Fodder	Pesticides and other agrochemical products
Average-October to April								
2012-13	112.4	115.1	101.2	104.9	110.6	132.3	125.3	108.1
2013-14	131.3	116.9	105.2	104.7	115.5	142.2	145.4	114.0
2014-15	97.0	119.6	107.4	108.1	120.1	138.6	151.0	121.3
2015-16	63.1	121.5	103.7	112.1	120.8	152.3	171.4	121.3
2016-17	80.2	117.2	105.3	113.8	114.8	157.3	162.9	116.4
2017-18	88.6	117.7	104.6	114.5	114.9	153.2	138.7	115.3
2012								
April	111.9	108.1	97.4	103.9	106.0	106.7	107.9	105.9
May	111.5	109.7	100.8	103.9	106.0	109.8	105.3	106.4
June	109.6	111.8	102.5	104.1	110.3	112.6	101.7	106.1
July	108.5	113.5	101.8	103.8	110.3	118.3	107.0	106.5
August	111.0	113.6	98.5	104.2	110.3	123.3	111.3	107.9
September	114.3	114.5	97.4	104.0	110.3	128.7	118.6	109.1
October	108.4	114.6	101.4	104.7	110.3	131.1	122.8	108.3
November	108.0	115.4	101.6	104.6	110.3	131.9	125.0	108.9
December	108.1	114.9	101.3	104.7	110.3	130.9	124.9	108.1
2013								
January	112.0	114.6	104.5	104.7	110.3	129.7	121.9	107.5
February	117.6	114.9	100.6	104.9	110.3	130.5	127.4	107.3
March	118.4	116.1	98.2	105.1	110.3	133.8	128.9	107.5
April	114.6	115.3	101.1	105.9	112.1	138.2	126.3	109.1
May	112.1	115.4	101.0	103.6	112.1	139.5	124.7	105.4

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Annex Table 5.3: Farm Inputs - Wholesale Price Index (Base 2011-12=100)

Year/Month	High Speed Diesel (HSD)	Fertilizers and nitrogen compounds	Electricity	Agricultural tractors	Lube Oils	Cattle Feed	Fodder	Pesticides and other agrochemical products
June	117.1	116.2	101.5	104.1	112.1	140.0	131.9	107.0
July	123.4	116.7	102.3	104.1	112.1	140.2	136.2	109.7
August	126.3	116.5	103.1	103.9	115.3	140.4	137.1	111.1
September	132.8	116.7	104.6	104.3	115.3	142.0	138.2	112.3
October	130.1	116.4	103.3	104.7	115.3	142.8	138.6	113.0
November	130.3	116.8	103.1	104.6	115.3	143.4	140.2	113.1
December	132.5	116.6	105.6	104.1	115.3	142.3	141.6	113.8
2014								
January	131.8	116.7	105.8	104.3	115.3	140.6	144.3	113.2
February	131.6	117.0	105.9	104.4	115.3	140.8	149.5	110.9
March	133.1	117.7	106.4	104.8	115.3	141.8	156.0	115.1
April	130.0	116.9	106.0	106.3	117.0	144.0	147.5	118.6
May	131.2	117.8	102.7	106.7	117.0	147.5	139.3	118.6
June	129.0	118.6	101.9	106.4	117.0	146.6	142.3	120.7
July	131.6	118.6	102.7	107.0	117.0	146.0	142.0	120.3
August	130.9	118.6	106.1	106.8	117.0	144.2	145.5	118.3
September	129.6	118.8	104.9	106.9	120.0	141.5	154.1	124.0
October	125.8	119.1	104.3	107.1	120.0	138.9	155.0	121.9
November	112.7	119.4	106.5	107.1	120.0	137.1	156.1	121.9
December	103.5	119.6	108.4	107.6	120.0	137.2	156.9	118.6
2015								
January	87.9	119.0	109.1	108.0	120.0	138.4	155.8	122.9

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Annex Table 5.3: Farm Inputs - Wholesale Price Index (Base 2011-12=100)

Year/Month	High Speed Diesel (HSD)	Fertilizers and nitrogen compounds	Electricity	Agricultural tractors	Lube Oils	Cattle Feed	Fodder	Pesticides and other agrochemical products
February	79.1	119.5	107.8	108.1	120.0	139.0	150.8	122.5
March	86.6	120.3	107.5	108.1	120.1	138.7	143.1	119.6
April	83.3	120.5	108.0	111.0	120.8	140.8	139.5	121.6
May	91.7	120.9	106.1	110.9	120.8	143.5	138.4	122.9
June	92.7	120.7	105.9	111.0	120.8	144.8	142.8	122.7
July	86.5	120.9	106.5	111.3	120.8	145.0	150.5	124.9
August	73.1	121.7	105.4	110.9	120.8	147.2	165.9	122.7
September	71.3	122.3	106.3	110.7	120.8	148.8	166.6	123.6
October	73.8	122.1	103.1	111.8	120.8	150.6	168.7	124.1
November	74.2	121.4	104.5	111.9	120.8	150.4	172.9	123.1
December	72.3	121.4	104.9	111.9	120.8	150.3	176.2	121.6
2016								
January	57.1	121.6	105.9	111.7	120.8	151.3	173.3	122.6
February	50.3	121.6	103.5	111.7	120.8	153.8	170.3	121.8
March	54.9	121.3	102.9	111.9	120.8	154.4	171.6	119.5
April	59.1	121.3	101.1	113.7	120.8	155.4	167.1	116.7
May	66.5	121.1	102.2	113.0	120.8	155.9	161.4	118.8
June	75.0	121.0	102.8	113.0	120.8	158.9	170.2	117.7
July	74.7	120.3	102.7	113.1	120.8	161.3	170.1	117.1
August	67.0	119.1	103.2	113.6	114.8	161.8	162.7	116.0
September	70.7	118.3	103.8	113.9	114.8	160.9	162.9	116.5
October	72.6	118.3	103.9	113.8	114.8	159.0	165.4	115.3
November	76.5	117.8	105.9	113.8	114.8	158.6	163.5	115.3
December	77.3	116.7	106.2	113.5	114.8	157.9	163.5	115.5

Cont...

Annex Table 5.3: Farm Inputs - Wholesale Price Index (Base 2011-12=100)

Year/Month	High Speed Diesel (HSD)	Fertilizers and nitrogen compounds	Electricity	Agricultural tractors	Lube Oils	Cattle Feed	Fodder	Pesticides and other agrochemical products
2017								
January	83.4	117.0	107.9	113.8	114.8	157.3	163.0	117.9
February	85.0	116.7	107.4	114.2	114.8	157.6	165.9	117.0
March	84.9	116.8	102.7	113.3	114.8	155.2	159.8	117.2
April	81.5	117.1	103.3	114.0	114.8	155.7	159.5	116.8
May	81.3	117.2	102.8	114.0	114.0	156.4	157.4	117.2
June	80.0	116.4	102.0	114.3	113.3	155.4	157.2	116.9
July	78.8	116.0	102.0	113.5	112.9	154.5	162.4	115.3
August	80.9	116.5	100.6	114.1	112.9	154.6	163.1	114.9
September	82.5	116.5	106.1	114.5	112.9	154.9	160.2	113.7
October	84.5	116.8	106.1	114.3	112.9	154.0	154.7	112.9
November	85.8	116.7	102.7	114.0	112.9	152.9	143.9	114.0
December	87.1	116.8	102.4	113.8	112.9	151.2	132.7	114.8
2018								
January	89.5	117.4	105.0	114.4	114.0	150.6	132.3	115.3
February	91.3	118.6	105.4	114.3	117.3	154.3	134.3	114.8
March	90.1	118.9	105.4	115.3	117.3	154.4	136.3	117.0
April	92.1	118.4	105.4	115.5	117.3	155.1	137.0	118.0
May	95.4	119.0	105.4	114.7	117.3	154.9	135.2	117.9
% change of Oct.2017 to Apr.2018 over Oct.2016 to Apr.2017	10.5	0.4	-0.7	0.7	0.1	-2.6	-14.9	-1.0

Source : Office of the Economic Adviser, Ministry of Commerce and Industry

Annex Table 5.4: Projected Cost of Production (A_2 , A_2+FL & C_2) for Rabi 2018-19 and Production Shares

States	Cost of Production (₹/qtl)			Shares in Production(%)
	A ₂	A ₂ +FL	C ₂	
Wheat				
Bihar	778	972	1,380	5.1
Gujarat	922	1,122	1,423	2.9
Haryana	602	783	1,369	12.0
Himachal Pradesh	828	1,485	2,077	0.7
Jharkhand	941	1,149	1,552	0.4
Madhya Pradesh	653	845	1,281	18.1
Maharashtra	1,375	1,717	2,222	1.5
Punjab	585	654	1,174	17.6
Rajasthan	562	903	1,264	10.0
Uttar Pradesh	717	917	1,402	30.8
Uttarakhand	665	913	1,385	0.9
All India Wtd. Avg.	673	866	1,339	
Barley				
Rajasthan	462	850	1,146	68.0
Uttar Pradesh	705	881	1,462	32.0
All India Wtd. Avg.	540	860	1,247	
Gram				
Andhra Pradesh	2,969	3,245	4,295	6.1
Chhattisgarh	1,952	2,443	3,576	3.1
Karnataka	2,741	3,064	4,214	8.2
Madhya Pradesh	1,989	2,402	3,600	45.3
Maharashtra	2,547	2,942	4,082	16.8
Rajasthan	1,375	2,277	3,413	14.7
Uttar Pradesh	2,512	3,362	5,195	5.8
All India Wtd. Avg.	2,144	2,637	3,838	
Lentil				
Bihar	1,526	1,951	3,188	13.1
Madhya Pradesh	1,850	2,281	3,664	46.3
Uttar Pradesh	2,234	3,103	5,518	32.2
West Bengal	2,008	2,626	3,852	8.4
All India Wtd. Avg.	1,945	2,532	4,215	
Rapeseed & Mustard				
Assam	2,190	4,195	5,185	2.7
Bihar	1,389	1,904	3,005	1.3
Gujarat	1,653	2,140	2,876	4.7
Haryana	1,309	1,788	3,217	12.1
Madhya Pradesh	1,015	1,475	2,446	11.9
Rajasthan	1,295	2,269	3,263	48.4
Uttar Pradesh	1,457	2,315	3,621	11.2
West Bengal	2,100	2,922	3,872	7.6
All India Wtd. Avg.	1,385	2,212	3,277	
Safflower				
Karnataka	1,756	1,992	2,806	46.8
Maharashtra	3,160	4,438	5,184	53.2
All India Wtd. Avg.	2,503	3,294	4,072	

Note: Production share are related to production of projected States only.
Source: CACP Calculations.

Annex Table 5.5(a): Wheat : Break-up of Cost of Cultivation (₹/ha)

Cost Items	Bihar		Gujarat		Haryana		Himachal Pradesh	
	2016-17	2015-16	2016-17	2015-16	2016-17	2015-16	2016-17	2015-16
Operational Cost	28427.72	28471.30	31598.81	29706.20	35609.79	34040.24	24702.15	23098.07
Human Labour								
Casual	4731.13	4544.25	3303.38	3358.49	4421.95	4369.71	641.94	470.65
Attached	37.67	26.49	16.63	17.40	236.91	244.07	66.06	73.82
Family	5884.75	5839.18	5872.79	5414.21	7879.83	7492.23	11046.89	10788.66
Total	10653.55	10409.92	9192.80	8790.10	12538.69	12106.01	11754.89	11333.13
Bullock Labour								
Hired	0.00	0.00	61.32	61.38	0.00	1.29	349.98	475.11
Owned	38.81	27.66	176.64	178.08	35.49	95.09	872.17	615.26
Total	38.81	27.66	237.96	239.46	35.49	96.38	1222.15	1090.37
Machine Labour								
Hired	5758.29	5913.04	7024.56	5255.99	8378.17	7833.46	4904.43	3997.21
Owned	45.36	23.36	782.99	812.87	1281.98	1211.92	226.25	231.88
Total	5803.65	5936.40	7807.55	6068.86	9660.15	9045.38	5130.68	4229.09
Seed	3161.68	3234.08	4385.96	4337.26	2460.60	2408.99	1915.45	1855.67
Fertilisers and Manure								
Fertilisers	3965.06	4124.60	4271.72	4600.28	4190.42	4490.42	1197.19	1039.67
Manure	84.86	70.52	62.48	8.69	0.00	0.00	2873.54	2506.46
Total	4049.92	4195.12	4334.20	4608.97	4190.42	4490.42	4070.73	3546.13
Other Inputs								
Insecticides	36.07	36.36	422.15	413.86	991.03	1019.02	90.74	238.03
Irrigation charges	4000.92	3945.94	4438.61	4511.57	4852.48	4069.55	103.71	432.64
Interest on working capital	683.12	685.82	779.58	736.12	840.30	804.49	413.80	373.01
Miscellaneous	0.00	0.00	0.00	0.00	40.63	0.00	0.00	0.00
Fixed Cost	15534.99	14453.85	12669.09	11640.79	34432.53	32339.70	12915.95	11756.29
Rental value of owned land	12529.10	11649.57	9909.41	7952.44	27763.87	24763.67	7722.93	6617.50
Rent paid for leased-in land	0.00	0.00	530.81	1569.99	105.22	0.00	28.46	29.59
Land revenue, cesses & taxes	68.34	69.64	6.82	6.29	0.00	0.00	9.07	8.96
Depreciation on implements & Farm buildings	505.60	515.33	136.43	154.75	626.42	797.40	761.06	731.95
Interest on fixed capital	2431.95	2219.31	2085.62	1957.32	5937.02	6778.63	4394.43	4368.29
Total Cost	43962.71	42925.15	44267.90	41346.99	70042.32	66379.94	37618.10	34854.36

Source: Directorate of Economics and Statistics.

(Contd..)

Annex Table 5.5(a): Wheat : Break-up of Cost of Cultivation (₹/ha)

Cost Items	Jharkhand		Karnataka		Madhya Pradesh		Maharashtra		Punjab	
	2016-17	2015-16	2016-17	2015-16	2016-17	2015-16	2016-17	2015-16	2016-17	2015-16
Operational Cost	21261.69	19375.69	14049.76	22497.87	28918.91	26334.34	43111.24	39183.92	25658.63	24832.93
Human Labour										
Casual	3689.66	3138.24	2238.50	6197.44	3054.46	2661.80	4669.90	4397.51	2104.51	2116.63
Attached	0.00	0.00	0.00	0.00	186.00	159.26	1259.18	952.42	692.06	648.93
Family	3243.09	4002.24	2025.51	4843.38	7113.59	5832.51	8051.10	9231.20	3491.08	3021.38
Total	6932.75	7140.48	4264.01	11040.82	10354.05	8653.57	13980.18	14581.13	6287.65	5786.94
Bullock Labour										
Hired	0.00	361.82	308.22	1164.79	39.61	36.46	935.30	361.76	0.00	0.44
Owned	138.32	0.00	3150.41	1402.66	479.45	510.76	1885.40	2075.74	48.91	46.78
Total	138.32	361.82	3458.63	2567.45	519.06	547.22	2820.70	2437.50	48.91	47.22
Machine Labour										
Hired	4738.09	3569.78	2476.13	2329.30	6761.91	6379.25	7355.04	7467.77	6708.26	6121.50
Owned	0.00	1.24	140.03	728.97	510.66	317.37	1252.86	634.65	2711.62	2243.69
Total	4738.09	3571.02	2616.16	3058.27	7272.57	6696.62	8607.90	8102.42	9419.88	8365.19
Seed	2867.19	2848.87	2097.88	2162.31	2869.91	2839.95	3844.23	3437.03	2162.12	2169.31
Fertilisers and Manure										
Fertilisers	3493.07	2928.10	755.08	2271.72	3084.99	3023.04	4864.13	3734.55	4829.21	5383.96
Manure	2.48	9.82	0.00	0.00	0.00	0.42	16.16	13.57	7.73	7.65
Total	3495.55	2937.92	755.08	2271.72	3084.99	3023.46	4880.29	3748.12	4836.94	5391.61
Other Inputs										
Insecticides	0.00	0.00	0.00	0.00	35.84	34.86	224.36	201.25	1572.89	1829.16
Irrigation charges	2543.77	2049.72	493.63	862.32	3916.80	3732.18	7691.15	5768.81	584.84	545.04
Interest on working capital	546.02	465.86	364.37	534.98	660.77	621.27	1062.43	907.66	671.74	660.96
Miscellaneous	0.00	0.00	0.00	0.00	204.92	185.21	0.00	0.00	73.66	37.50
Fixed Cost	7681.49	8331.82	6081.57	7280.48	17531.05	17983.25	14618.14	13160.55	35314.86	32152.31
Rental value of owned land	6883.90	6613.74	4032.88	4715.26	13084.96	13749.21	8584.73	8088.00	25394.23	23001.33
Rent paid for leased-in land	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5340.29	4499.04
Land revenue, cesses & taxes	18.95	26.78	7.28	8.80	4.21	4.47	18.84	18.43	0.00	0.00
Depreciation on implements & Farm buildings	386.09	581.57	75.66	155.54	561.16	578.97	490.60	425.27	476.14	413.29
Interest on fixed capital	392.55	1109.73	1965.75	2400.88	3880.72	3650.60	5523.97	4628.85	4104.20	4238.65
Total Cost	28943.18	27707.51	20131.33	29778.35	46449.96	44317.59	57729.38	52344.47	60973.49	56985.24

Source: Directorate of Economics and Statistics.

(Contd..)

Annex Table 5.5(a): Wheat : Break-up of Cost of Cultivation (₹/ha)

Cost Items	Rajasthan		Uttar Pradesh		Uttarakhand		West Bengal	
	2016-17	2015-16	2016-17	2015-16	2016-17	2015-16	2016-17	2015-16
Operational Cost	41069.41	37814.56	34600.38	33763.37	28662.65	29076.84	40106.03	36658.15
Human Labour								
Casual	3801.64	2941.75	3951.93	3924.96	1928.58	1516.45	11706.55	10571.87
Attached	343.41	366.84	15.58	7.89	28.09	16.55	3.74	0.00
Family	16124.89	14663.93	7855.89	7731.55	8724.29	7528.85	7585.03	6083.94
Total	20269.94	17972.52	11823.40	11664.40	10680.96	9061.85	19295.32	16655.81
Bullock Labour								
Hired	43.08	52.61	0.00	0.07	194.90	219.31	1839.53	755.88
Owned	362.16	268.03	145.67	651.94	6361.18	5972.89	1420.47	1671.45
Total	405.24	320.64	145.67	652.01	6556.08	6192.20	3260.00	2427.33
Machine Labour								
Hired	5442.22	4984.71	6759.20	6468.89	3338.84	5040.60	3506.16	3440.85
Owned	656.10	931.52	559.54	307.14	570.47	528.33	6.16	0.84
Total	6098.32	5916.23	7318.74	6776.03	3909.31	5568.93	3512.32	3441.69
Seed	3862.91	3542.34	3667.66	3330.46	2608.51	2378.07	3886.42	4086.84
Fertilisers and Manure								
Fertilisers	3537.54	3591.47	4396.13	4753.87	1990.69	2299.88	4853.87	5443.90
Manure	598.69	286.61	11.98	4.15	817.57	1270.50	361.51	45.16
Total	4136.23	3878.08	4408.11	4758.02	2808.26	3570.38	5215.38	5489.06
Other Inputs								
Insecticides	181.92	163.36	43.83	44.66	171.25	368.18	1.89	39.81
Irrigation charges	5358.96	5318.90	6382.53	5748.94	1324.09	1284.26	3949.22	3591.12
Interest on working capital	755.89	701.53	810.44	788.84	604.19	652.97	985.48	926.49
Miscellaneous	0.00	0.96	0.00	0.01	0.00	0.00	0.00	0.00
Fixed Cost	20684.85	18945.49	24394.83	22442.56	19716.18	18272.41	11718.90	10456.47
Rental value of owned land	13923.18	12578.23	17737.42	15268.61	17321.78	15463.81	8641.22	8127.72
Rent paid for leased-in land	497.86	326.54	1037.46	1408.24	0.00	0.00	41.63	94.78
Land revenue, cesses & taxes	13.12	28.81	4.36	3.67	3.65	3.23	38.66	38.84
Depreciation on implements & Farm buildings	568.43	613.81	881.32	881.30	308.61	948.77	617.88	462.43
Interest on fixed capital	5682.26	5398.10	4734.27	4880.74	2082.14	1856.60	2379.51	1732.70
Total Cost	61754.26	56760.05	58995.21	56205.93	48378.83	47349.25	51824.93	47114.62

Source: Directorate of Economics and Statistics.

Annex Table 5.5(b): Barley : Break-up of Cost of Cultivation (₹/ha)

Cost Items	Rajasthan		Uttar Pradesh	
	2016-17	2015-16	2016-17	2015-16
Operational Cost	38752.78	33325.97	24933.45	21019.80
Human Labour				
Casual	1632.74	1676.37	4143.06	4207.38
Attached	0.00	0.00	0.00	0.00
Family	18673.44	15844.29	5285.19	5275.73
Total	20306.18	17520.66	9428.25	9483.11
Bullock Labour				
Hired	45.07	103.51	0.00	0.00
Owned	460.47	71.63	709.61	50.49
Total	505.54	175.14	709.61	50.49
Machine Labour				
Hired	4248.69	3644.89	5074.18	4215.91
Owned	1392.72	1739.27	1238.26	1389.46
Total	5641.41	5384.16	6312.44	5605.37
Seed	3142.57	2559.94	2975.14	1887.89
Fertilisers and Manure				
Fertilisers	2331.25	2164.59	1924.56	869.65
Manure	0.00	713.14	0.00	0.00
Total	2331.25	2877.73	1924.56	869.65
Other Inputs				
Insecticides	330.61	136.99	10.10	0.00
Irrigation charges	5886.76	4141.60	2977.95	2646.20
Interest on working capital	608.46	529.75	595.40	477.09
Miscellaneous	0.00	0.00	0.00	0.00
Fixed Cost	17099.13	16039.35	19930.98	19084.45
Rental value of owned land	12081.48	11349.53	16004.51	14950.36
Rent paid for leased-in land	0.00	172.43	917.75	85.72
Land revenue, cesses & taxes	19.42	12.88	14.78	15.53
Depreciation on implements & Farm buildings	527.80	350.85	369.64	535.52
Interest on fixed capital	4470.43	4153.66	2624.30	3497.32
Total Cost	55851.91	49365.32	44864.43	40104.25

Source: Directorate of Economics and Statistics.

Annex Table 5.5(c) : Gram : Break-up of Cost of Cultivation (₹/ha)

Cost Items	Andhra Pradesh		Bihar		Chhattisgarh		Haryana		Jharkhand	
	2016-17	2015-16	2016-17	2015-16	2016-17	2015-16	2016-17	2015-16	2016-17	2015-16
Operational Cost	29582.19	29971.91	21795.45	21390.43	21961.77	19040.77	20757.70	26147.15	13089.36	16599.54
Human Labour										
Casual	5374.46	5713.63	4778.77	4978.22	2022.84	1363.50	2314.54	6501.12	3418.01	4592.93
Attached	349.31	148.29	26.47	27.46	102.10	0.00	274.08	2860.18	0.00	0.00
Family	2901.00	3325.97	3967.75	3582.30	3802.86	4788.59	9704.84	7528.53	3665.48	2381.29
Total	8624.77	9187.89	8772.99	8587.98	5927.80	6152.09	12293.46	16889.83	7083.49	6974.22
Bullock Labour										
Hired	254.09	352.21	0.00	0.00	0.00	5.09	0.00	0.00	696.17	0.00
Owned	3128.31	3682.25	83.13	12.22	499.00	848.62	10.89	0.00	0.00	16.04
Total	3382.40	4034.46	83.13	12.22	499.00	853.71	10.89	0.00	696.17	16.04
Machine Labour										
Hired	4087.39	4443.84	3523.64	3524.28	4188.29	4072.57	3850.33	2709.30	665.14	3686.18
Owned	563.05	96.04	112.85	39.24	485.58	109.28	734.84	1199.12	160.38	0.00
Total	4650.44	4539.88	3636.49	3563.52	4673.87	4181.85	4585.17	3908.42	825.52	3686.18
Seed	7653.51	4954.78	5264.83	4943.41	5898.71	3290.80	3154.76	3268.67	4198.61	4062.55
Fertilisers and Manure										
Fertilisers	2610.23	3624.70	2384.29	2516.51	1776.94	1750.47	0.00	217.37	0.00	1429.69
Manure	24.61	352.63	359.08	416.32	0.00	0.00	0.00	0.00	0.00	0.00
Total	2634.84	3977.33	2743.37	2932.83	1776.94	1750.47	0.00	217.37	0.00	1429.69
Other Inputs										
Insecticides	1673.13	2431.46	448.03	448.48	971.40	459.46	114.66	372.80	0.00	0.00
Irrigation charges	132.45	0.00	306.38	362.35	1663.78	1920.51	263.82	925.86	0.00	0.00
Interest on working capital	808.52	807.45	540.23	539.64	550.27	431.88	334.94	564.20	285.57	430.86
Miscellaneous	22.13	38.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fixed Cost	19749.73	14037.19	18678.56	17209.43	11670.84	8861.58	21488.81	16519.78	7191.35	4294.75
Rental value of owned land	12353.15	8728.68	16568.19	15563.08	9524.74	6247.54	18293.62	14113.56	3683.36	3936.57
Rent paid for leased-in land	5289.93	4237.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Land revenue, cesses & taxes	0.00	0.00	52.35	51.20	1.48	1.28	0.00	0.00	11.99	24.12
Depreciation on implements & Farm buildings	238.78	126.03	379.02	368.69	477.85	636.08	176.28	239.10	393.16	226.18
Interest on fixed capital	1867.87	945.20	1679.00	1226.46	1666.77	1976.68	3018.91	2167.12	3102.84	107.88
Total Cost	49331.92	44009.10	40474.01	38599.86	33632.61	27902.35	42246.51	42666.93	20280.71	20894.29

Source: Directorate of Economics and Statistics.

(Contd..)

Annex Table 5.5 (c): Gram : Break-up of Cost of Cultivation (₹/ha)

Cost Items	Karnataka		Madhya Pradesh		Maharashtra		Rajasthan		Uttar Pradesh	
	2016-17	2015-16	2016-17	2015-16	2016-17	2015-16	2016-17	2015-16	2016-17	2015-16
Operational Cost	21584.82	20447.35	30152.36	24072.99	35959.77	28013.89	27145.37	19564.58	28293.97	23964.69
Human Labour										
Casual	4862.81	5125.10	3543.83	2683.95	6449.06	4994.11	1528.46	780.77	5815.88	3821.18
Attached	0.00	63.03	92.41	93.31	566.05	708.41	807.35	59.56	0.00	0.00
Family	1629.66	2332.64	4733.20	4723.97	4606.94	4844.55	10590.54	8255.83	6433.04	6928.98
Total	6492.47	7520.77	8369.44	7501.23	11622.05	10547.07	12926.35	9096.16	12248.92	10750.16
Bullock Labour										
Hired	508.48	1002.45	35.74	28.12	878.00	679.32	23.91	0.33	0.00	51.32
Owned	477.27	1466.13	567.68	720.46	1159.03	2872.59	575.67	356.48	273.34	0.00
Total	985.75	2468.58	603.42	748.58	2037.03	3551.91	599.58	356.81	273.34	51.32
Machine Labour										
Hired	3005.32	3208.24	4962.55	4227.15	6699.37	3667.62	2331.69	1975.12	3474.76	5113.67
Owned	1096.49	179.19	516.19	438.67	331.85	384.99	88.75	611.50	909.25	591.87
Total	4101.81	3387.43	5478.74	4665.82	7031.22	4052.61	2420.44	2586.62	4384.01	5705.54
Seed	6658.60	3597.63	9658.69	5366.78	7335.66	4284.68	6602.33	3535.96	7630.21	5356.60
Fertilisers and Manure										
Fertilisers	1585.48	1149.45	1661.15	1853.77	2278.13	2011.05	1206.52	988.61	974.01	241.04
Manure	0.00	5.05	0.00	3.04	791.06	4.31	0.00	0.00	0.00	0.29
Total	1585.48	1154.50	1661.15	1856.81	3069.19	2015.36	1206.52	988.61	974.01	241.33
Other Inputs										
Insecticides	1139.27	1744.90	1300.25	1254.42	1042.18	738.11	1.25	93.55	607.55	35.33
Irrigation charges	16.74	24.61	2168.98	1884.88	2872.36	2122.05	2887.24	2564.18	1494.18	1308.18
Interest on working capital	604.70	548.93	770.28	586.33	950.08	702.10	501.66	342.69	662.45	516.23
Miscellaneous	0.00	0.00	141.41	208.14	0.00	0.00	0.00	0.00	19.30	0.00
Fixed Cost	9316.85	6307.91	17690.44	17409.32	14720.79	11435.46	16519.70	10776.38	26076.10	16603.70
Rental value of owned land	8880.81	5203.34	14792.54	13890.96	10159.94	6997.53	12279.42	6897.44	18901.41	12153.38
Rent paid for leased-in land	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Land revenue, cesses & taxes	5.91	9.58	4.07	4.44	18.88	21.18	9.33	7.64	12.93	13.04
Depreciation on implements & Farm buildings	79.60	127.79	608.98	645.54	510.17	455.49	416.82	321.42	1527.54	683.93
Interest on fixed capital	350.53	967.20	2284.85	2868.38	4031.80	3961.26	3814.13	3549.88	5634.22	3753.35
Total Cost	30901.67	26755.26	47842.80	41482.31	50680.56	39449.35	43665.07	30340.96	54370.07	40568.39

Source: Directorate of Economics and Statistics.

Annex Table 5.5 (d): Lentil (Masur) : Break-up of Cost of Cultivation (₹/ha)

Cost Items	Bihar		Madhya Pradesh		Uttar Pradesh		West Bengal	
	2016-17	2015-16	2016-17	2015-16	2016-17	2015-16	2016-17	2015-16
Operational Cost	17257.91	16907.29	18063.43	19283.02	26342.44	18113.90	27566.44	25300.72
Human Labour								
Casual	4745.74	4814.85	2800.36	2410.95	2088.20	2649.14	6796.22	7589.69
Attached	289.22	196.35	200.51	495.56	0.00	0.00	3.61	0.00
Family	4158.55	3688.34	3191.86	3730.99	8557.07	5253.58	7667.12	5562.51
Total	9193.51	8699.54	6192.73	6637.50	10645.27	7902.72	14466.95	13152.20
Bullock Labour								
Hired	0.00	0.00	10.82	7.23	0.00	0.00	1658.52	2391.37
Owned	0.00	0.00	681.26	1273.01	2259.15	0.00	535.27	294.47
Total	0.00	0.00	692.08	1280.24	2259.15	0.00	2193.79	2685.84
Machine Labour								
Hired	3049.79	3243.19	4122.59	3858.11	3983.38	1624.66	4610.99	3802.45
Owned	110.80	22.39	484.10	183.80	1056.65	1197.28	10.46	1.10
Total	3160.59	3265.58	4606.69	4041.91	5040.03	2821.94	4621.45	3803.55
Seed	2381.06	2172.67	2959.19	3431.66	5685.30	3678.68	4000.55	3726.25
Fertilisers and Manure								
Fertilisers	1964.79	2138.24	1067.67	1311.02	680.31	1441.53	1577.35	1254.60
Manure	6.32	60.05	0.00	0.00	0.00	0.00	0.00	4.21
Total	1971.11	2198.29	1067.67	1311.02	680.31	1441.53	1577.35	1258.81
Other Inputs								
Insecticides	109.32	119.04	640.54	568.90	205.14	114.65	45.58	9.8
Irrigation charges	45.37	51.60	1443.90	1532.44	1275.75	1746.21	52.29	66.14
Interest on working capital	396.95	400.57	450.65	471.27	538.95	389.71	603.01	598.13
Miscellaneous	0.00	0.00	9.98	8.08	12.54	18.46	5.47	0.00
Fixed Cost	13882.38	13766.71	13915.94	15405.67	17673.79	13641.53	15907.47	16642.86
Rental value of owned land	11310.20	11199.13	10100.71	12317.43	15781.03	8671.00	13799.48	14498.82
Rent paid for leased-in land	0.00	0.00	0.00	0.00	0.00	0.00	1011.84	1427.70
Land revenue, cesses & taxes	56.48	49.69	6.08	5.10	8.92	6.91	57.84	36.59
Depreciation on implements & Farm buildings	212.19	306.61	575.66	497.14	268.12	850.96	546.50	325.86
Interest on fixed capital	2303.51	2211.28	3233.49	2586.00	1615.72	4112.66	491.81	353.89
Total Cost	31140.29	30674.00	31979.37	34688.69	44016.23	31755.43	43473.91	41943.58

Source: Directorate of Economics and Statistics.

Annex Table 5.5(e): Rapeseed & Mustard : Break-up of Cost of Cultivation (₹/ha)

Cost Items	Assam		Bihar		Gujarat		Haryana	
	2016-17	2015-16	2016-17	2015-16	2016-17	2015-16	2016-17	2015-16
Operational Cost	28970.81	26739.62	19453.19	18275.26	29830.51	29537.86	24599.04	26214.08
Human Labour								
Casual	1401.66	1537.39	5240.81	3603.29	5644.28	7036.41	3857.22	5089.33
Attached	13.64	43.02	627.84	232.02	0.00	0.00	154.29	278.64
Family	14100.99	12940.75	5231.56	5690.98	6650.69	7066.18	6713.21	6664.07
Total	15516.29	14521.16	11100.21	9526.29	12294.97	14102.59	10724.72	12032.04
Bullock Labour								
Hired	5.21	28.31	0.00	0.00	660.76	284.31	0.00	5.69
Owned	8380.70	6760.37	0.00	7.68	443.85	209.61	19.39	22.89
Total	8385.91	6788.68	0.00	7.68	1104.61	493.92	19.39	28.58
Machine Labour								
Hired	1492.62	1797.21	2406.73	2863.04	3965.66	3883.02	4733.85	4556.04
Owned	274.84	366.88	137.71	41.62	829.32	611.19	1537.97	1150.11
Total	1767.46	2164.09	2544.44	2904.66	4794.98	4494.21	6271.82	5706.15
Seed	598.87	593.52	821.10	799.63	987.10	565.43	952.91	713.25
Fertilisers and Manure								
Fertilisers	1253.32	1270.72	2874.24	2203.39	3096.26	2824.04	3180.89	3528.39
Manure	966.63	939.69	219.69	948.05	67.44	287.23	0.00	0.00
Total	2219.95	2210.41	3093.93	3151.44	3163.70	3111.27	3180.89	3528.39
Other Inputs								
Insecticides	31.73	43.60	0.00	76.23	120.09	257.63	94.32	108.77
Irrigation charges	0.00	0.00	1462.55	1427.99	6662.64	5831.85	2806.24	3504.48
Interest on working capital	450.60	418.16	430.96	381.34	702.42	680.96	542.00	592.42
Miscellaneous	0.00	0.00	0.00	0.00	0.00	0.00	6.75	0.00
Fixed Cost	8827.02	8912.69	14146.69	13919.76	12733.72	11961.47	27917.27	24368.03
Rental value of owned land	6207.22	6292.03	11734.77	11820.62	9203.53	8239.78	21612.14	18273.03
Rent paid for leased-in land	0.00	0.00	0.00	0.00	62.06	266.20	0.00	0.00
Land revenue, cesses & taxes	39.53	36.65	80.20	59.78	2.71	2.42	0.00	0.00
Depreciation on implements & Farm buildings	720.87	672.87	257.86	268.14	105.31	173.18	590.88	538.54
Interest on fixed capital	1859.40	1911.14	2073.86	1771.22	3360.11	3279.89	5714.25	5556.46
Total Cost	37797.83	35652.31	33599.88	32195.02	42564.23	41499.33	52516.31	50582.11

Source: Directorate of Economics and Statistics.

Annex Table 5.5(e): Rapeseed & Mustard : Break-up of Cost of Cultivation (₹/ha)

Cost Items	Madhya Pradesh		Rajasthan		Uttar Pradesh		West Bengal	
	2016-17	2015-16	2016-17	2015-16	2016-17	2015-16	2016-17	2015-16
Operational Cost	21838.84	20174.39	26767.56	27218.70	26757.94	25552.37	36399.45	32958.54
Human Labour								
Casual	2914.81	2459.29	2402.60	2224.09	2828.12	2425.14	9527.50	9876.95
Attached	40.43	215.37	97.53	92.54	2.97	5.27	1.32	2.71
Family	7255.47	6501.71	12002.91	11840.71	10495.87	9955.15	12184.93	9667.75
Total	10210.71	9176.37	14503.04	14157.34	13326.96	12385.56	21713.75	19547.41
Bullock Labour								
Hired	0.12	5.83	7.12	8.01	3.70	1.81	1042.29	1060.47
Owned	58.05	60.36	90.74	57.94	174.34	898.90	447.42	487.64
Total	58.17	66.19	97.86	65.95	178.04	900.71	1489.71	1548.11
Machine Labour								
Hired	5240.57	4400.47	4314.73	4915.25	5332.29	4426.22	3621.72	2677.35
Owned	409.33	256.28	527.17	574.87	665.64	254.86	43.76	0.82
Total	5649.90	4656.75	4841.90	5490.12	5997.93	4681.08	3665.48	2678.17
Seed	1027.21	768.41	1448.32	1287.50	811.63	941.87	874.09	580.27
Fertilisers and Manure								
Fertilisers	2826.68	2908.90	2564.51	2463.18	2929.25	3158.96	4460.48	4295.22
Manure	0.00	522.41	0.00	8.67	33.60	11.63	517.08	497.48
Total	2826.68	3431.31	2564.51	2471.85	2962.85	3170.59	4977.56	4792.70
Other Inputs								
Insecticides	332.85	319.54	21.46	14.68	1.68	1.42	485.74	478.17
Irrigation charges	1285.38	1316.80	2842.34	3264.50	2983.33	2996.41	2352.12	2627.93
Interest on working capital	441.92	414.32	447.41	466.00	492.79	472.64	733.78	705.78
Miscellaneous	6.02	24.70	0.72	0.76	2.73	2.09	107.22	0.00
Fixed Cost	18342.21	17784.23	16834.80	13716.08	22013.69	18471.71	13695.37	13848.50
Rental value of owned land	13754.39	13551.66	10510.33	8356.54	16379.80	12487.71	11701.72	11992.74
Rent paid for leased-in land	0.00	0.00	3.31	0.00	1516.02	1168.51	285.19	271.93
Land revenue, cesses & taxes	5.84	6.36	11.96	12.90	11.99	7.84	39.61	40.28
Depreciation on implements & Farm buildings	393.18	292.45	430.77	415.08	631.93	810.07	536.22	571.60
Interest on fixed capital	4188.80	3933.76	5878.43	4931.56	3473.95	3997.58	1132.63	971.95
Total Cost	40181.05	37958.62	43602.36	40934.78	48771.63	44024.08	50094.82	46807.04

Source: Directorate of Economics and Statistics.

Annex Table 5.5(f): Safflower: Break-up of Cost of Cultivation (₹/ha)

Cost Items	Karnataka		Maharashtra	
	2015-16	2014-15	2015-16	2014-15
Operational Cost	11535.27	10138.16	16356.17	18133.96
Human Labour				
Casual	2537.53	3038.68	604.74	4069.15
Attached	0.00	0.00	939.51	0.00
Family	706.80	1912.57	3606.34	6476.14
Total	3244.33	4951.25	5150.59	10545.29
Bullock Labour				
Hired	209.57	516.76	0.00	951.55
Owned	15.88	517.83	4677.48	3528.57
Total	225.45	1034.59	4677.48	4480.12
Machine Labour				
Hired	1263.27	1487.96	2517.09	1344.01
Owned	558.20	789.33	0.00	0.00
Total	1821.47	2277.29	2517.09	1344.01
Seed	1066.22	646.12	1017.66	602.37
Fertilisers and Manure				
Fertilisers	21.41	484.53	2337.30	703.39
Manure	4400.95	0.00	0.00	0.00
Total	4422.36	484.53	2337.30	703.39
Other Inputs				
Insecticides	427.30	495.12	269.69	105.51
Irrigation charges	0.00	0.00	0.00	0.00
Interest on working capital	328.14	249.26	386.36	353.27
Miscellaneous	0.00	0.00	0.00	0.00
Fixed Cost	3072.14	8093.14	4698.47	4201.96
Rental value of owned land	2913.06	6726.96	2157.20	1894.82
Rent paid for leased-in land	0.00	0.00	0.00	0.00
Land revenue, cesses & taxes	20.29	8.29	22.68	24.96
Depreciation on implements & Farm buildings	77.56	102.02	290.43	332.91
Interest on fixed capital	61.23	1255.87	2228.16	1949.27
Total Cost	14607.41	18231.30	21054.64	22335.92

Source: Directorate of Economics and Statistics.

Annex Table 5.6: Comparison of Cost Projections of Rabi Crops, RMS 2019-20

Crop/state	State Projections		CACP Projections on the basis of CS data	
	Yield (qtl/ha)	Cost of Production (₹/qtl)	Yield (qtl/ha)	Cost of Production (₹/qtl)
Wheat				
Bihar	30.0	1,558	28.4	1,380
Chhattisgarh	15.5	1,328	NP	
Haryana	44.1	2,074	43.3	1,369
Jharkhand	-	1,055	16.3	1,552
Punjab	46.4^	2,452	46.4	1,174
Rajasthan	-	1,242	38.1	1,264
West Bengal	-	2,931	NP	
Barley				
Haryana	35.0	1926	NP	
Rajasthan	-	1,147	35.8	1,146
Gram				
Andhra Pradesh	16.0	4,538	12.2	4,295
Bihar	16.0	3,265	NP	
Haryana	8.1	6333	NP	
Chhattisgarh	11.0	1,982	8.2	3,576
Jharkhand	-	2,281	NP	
Rajasthan	-	2,861	9.3	3,413
Lentil				
Bihar	12.0	3,058	10.6	3,188
Rapeseed/Mustard				
Andhra Pradesh	10.0	3,838	NP	
Bihar	12.0	3,840	11.6	3,005
Chhattisgarh	5.6	1,347	NP	
Haryana	16.3	4369	15.9	3,217
Jharkhand	-	1,869	NP	
Rajasthan	-	3,216	12.8	3,263
West Bengal	-	5,633	13.2	3,872

Note: NP: Not Projected due to non-availability of CS estimates or share of production in All India is less than one percent

* The CACP projection of Andhra Pradesh (Andhra Pradesh & Telangana united) is considered for Telangana.

[^] Average of the last 5 years.

Annex Table 5.7: Updating States under Comprehensive Scheme for Rabi Crops

Crop	State to be dropped from CS	States to be included in CS	States for which Sample Size to be increased in CS	Reasons
Wheat	Karnataka	-	-	Share of area and production in all-India area and production during TE2017-18 are 0.6 percent and 0.2 percent respectively, and share of wheat in rabi cereals of State is 9.8 percent; which are negligible.
Wheat	West Bengal	-	-	Share of area and production in all-India area and production during TE2017-18 are 0.9 percent and 0.7 percent respectively, and share of wheat in rabi cereals of State is 12.6 percent; which are negligible.
Barley	-	Haryana	-	Share of area and production in all-India area and production during TE2017-18 are 3.6 percent and 4.9 percent respectively; which are reasonably adequate.
Barley	-	Madhya Pradesh	-	Share of area and production in all-India area and production during TE2017-18 are 17.8 percent and 14.6 percent respectively; which are reasonably adequate.
Gram	Bihar	-	-	Share of area and production in all-India area and production during TE2017-18 are 0.6 percent and 0.7 percent respectively, and share of gram in rabi pulses of State is 16.5 percent; which are negligible.
Gram	Haryana	-	-	Share of area and production in all-India area and production during TE2017-18 are 0.39 percent and 0.35 percent respectively, which are negligible; and sample size is as thin as 8.
Gram	-	Gujarat	-	Share of area and production in all-India area and production during TE2017-18 are 2.0 percent and 2.5 percent respectively; which are reasonably adequate.
Gram	-	-	Jharkhand	Share of area and production in all-India area and production during TE2017-18 are 2.1 percent and 2.4 percent respectively, which are reasonable adequate; while allocation of sampling unit is 5 (0.7 percent of all India sample for gram), which is a thin sample.
Lentil	-	Jharkhand	-	Share of area and production in all-India area and production during TE2017-18 are 3.5 percent and 3.2 percent respectively; which are reasonably adequate.
Lentil	-	Rajasthan	-	Share of area and production in all-India area and production during TE2017-18 are 4.3 percent and 4.9 percent respectively; which are reasonably adequate.
Rapeseed & Mustard	-	Jharkhand	-	Share of area and production in all-India area and production during TE2017-18 are 4.3 percent and 2.4 percent respectively; which are reasonably adequate.
Safflower	-	Madhya Pradesh	-	Share of area and production in all-India area and production during TE2017-18 are 11.6 percent and 10.9 percent respectively.

**Annex Table 5.8: All-India Projected Costs of Production of Rabi Crops
for 2018-19 over 2017-18**

Crops	Cost of Production (₹/qtl)				Percentage Change in Projected Cost (2018-19 over 2017-18)	
	2017-18		2018-19			
	A ₂ +FL	C ₂	A ₂ +FL	C ₂	A ₂ +FL	C ₂
Wheat	817	1,256	866	1,339	6.0	6.7
Barley	845	1,190	860	1,247	1.8	4.8
Gram	2,461	3,526	2,637	3,838	7.2	8.9
Lentil	2,366	3,727	2,532	4,215	7.0	13.1
Rapeseed & Mustard	2,123	3,086	2,212	3,277	4.2	6.2
Safflower	3,125	3,979	3,294	4,072	5.4	2.3

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