



सत्यमेव जयते

# Incentivising Pulses Production Through Minimum Support Price (MSP) and Related Policies



*Report Prepared By*

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September 16, 2016

## Foreword

The UN General Assembly declared 2016 the International Year of Pulses. For India, this declaration comes at a salient time. In the wake of two successive years of weak monsoons in 2014 and 2015 and the resulting mismatch between demand and supply, prices of pulses rose sharply, leading to higher inflation and straining the purchasing power of consumers all over India. This is being followed in the current kharif season by the opposite development: a sharp increase in domestic production combined with a surge in global production of pulses. The resulting decline in prices threatens to affect farmers' incomes and livelihoods.

To address the policy issues that would help address this volatility in acreage, production and prices in pulses, the Government constituted a Committee headed by Dr. Arvind Subramanian, Chief Economic Adviser, to review the Minimum Support Prices (MSPs) and related policies to incentivize the cultivation of pulses. There have been a number of comprehensive studies and reports on the pulses sector before including The Report of Expert Group on Pulses, 2012 and Towards Pulses Self-Sufficiency in India, 2016 (by the National Academy of Agricultural Sciences). The Report of this Committee does not address all the issues in the pulses markets such as seeds, extension and other support services, farmer producer organizations (FPOs), supply chain development, research and development etc. These issues were not part of the Committee's remit. Instead, the report is focused on a few key issues of current and medium term importance with the objective of providing a set of clear, actionable recommendations.

The Report of the Committee is the culmination of wide ranging consultations with experts from diverse fields over the course of eight weeks. The Committee had several rounds of meetings and deliberations with government officials, scientists, policy makers, researchers, journalists, and private sector experts.

I deeply appreciate and would like to place on record my gratitude to Dr. Ramesh Chand of Niti Aayog, Harish Damodaran of Indian Express, Ashok Gulati of ICRIER, Dr. Baldev Singh Dhillon of Punjab Agricultural University, Dr. N.P Singh of IIPR, Dr. K.V. Prabhu of IARI, Professor Devesh Kapur of the University of Pennsylvania, P.K.Joshi, Devesh Roy, Avinash Kishore, Akshay Bhatnagar and Raj Chandra of IFPRI, Dr. A.K.Singh of ICAR, Professor Bharat Ramaswamy of ISI, Professor Mekhala Krishnamurthy of Shiv Nadar University, Pradeep Ghorpade and Bimal Kotharia of IPGA, Dr. Pramod Aggarwal of PUSA, Dr. Masood Ali, Yogendra Tripathi of FCI, Prof Vijay Paul Sharma and Suresh Pal of CACP, Sangeeta Verma Senior ESA, Anurag Jain,

JS-PMO, Rajeev Lochan Adviser, ESA, Awadhesh K. Choudhary, Ministry of Consumer Affairs, S.K.Verma of NAFED, S.P.Kar of FCI, Vinit Sharma and Aleen Mukherjee of NCDEX, Manju Pandey and Bhuiyan of SFAC, and Sanjay Kaul for providing invaluable suggestions/data/inputs for preparing the report in a short span of time.

I am extremely grateful to the Union Ministers of Finance, Urban Development, Agriculture, Cooperation and Farmer's Welfare, and Consumer Affairs, and the Ministers of State of Finance and Commerce as well as the Principal Secretary to the Prime Minister, Cabinet Secretary, Secretaries in the Ministries of Finance, Agriculture, and Consumer Affairs, for sparing their precious time in providing valuable suggestions that helped refine the recommendations of the report.

Enormous thanks are due to the team members of the Agriculture and Food Management Unit and Price Unit of Economic Division of the Department of Economic Affairs—Rohit Parmar, G.S Negi, R. Sathish, Nikhila Menon, Rabi Ranjan, Gaurav Jha and Sanjay Das - for their serious and consistent efforts in the preparation of the Report. The support provided by the administrative staff of DEA is highly appreciated. And finally, I would like to acknowledge the invaluable contributions—in the form of ideas, analysis, and presentation-of Shoumitro Chatterjee, Josh Felman, M.R. Sharan, Kapil Patidar, and Syed Zubair Noqvi in preparing this report.

(Arvind Subramanian)  
Chief Economic Adviser  
&  
Chairman of the Committee

### Glossary of terms

| <i>Name of Pulses in Hindi/Indian languages</i> | <i>Name of pulses in English</i>                                        |
|-------------------------------------------------|-------------------------------------------------------------------------|
| Arhar / Rahar / Tur / Tuar                      | Pigeon pea / Red gram                                                   |
| Bajra                                           | Pearl millet                                                            |
| Besan                                           | Gram Flour                                                              |
| Chana                                           | Chickpeas (Brown)                                                       |
| Chana Daal                                      | Split Bengal gram                                                       |
| Jow                                             | Barley                                                                  |
| Jowar                                           | Sorghum                                                                 |
| Kabuli Chana / Chhole                           | Garbanzo beans / Chickpeas (White)                                      |
| Makki / Makai                                   | Maize, Corn                                                             |
| Masoor                                          | Red lentils                                                             |
| Moong / Mung bean                               | Green gram                                                              |
| Raagi / Nachani                                 | Finger millet                                                           |
| Urad Daal / Kaali Daal                          | Black gram / Black lentil (whole) / White lentil (dehusked)/Black Matpe |

### List of Abbreviations

|       |                                                                         |
|-------|-------------------------------------------------------------------------|
| FCI   | Food Corporation of India                                               |
| MSP   | Minimum Support Price                                                   |
| NAFED | National Agricultural Cooperative Marketing Federation of India Limited |
| SFAC  | Small Farmers' Agri-business Consortium                                 |
| NCML  | National Collateral Management Services Limited                         |
| NCDEX | National Commodity and Derivatives Exchange Limited                     |

## EXECUTIVE SUMMARY

It is the strong view of this report that enhancing domestic productivity and production of pulses rapidly and sustainably is the only reliable way of minimizing volatility in pulses market, and safeguarding the interests of farmers and consumers. There need be no serious conflict in the medium run between the interests of these two groups. Short-term actions that apparently benefit consumers end up hurting them because production and availability of pulses decline over time. In turn, better incentives for farmers in the form of higher MSPs (to reflect the true social value of growing pulses compared to other crops) combined with effective procurement offers the best way of increasing domestic availability and preventing price spikes. The current crisis offers a rare opportunity to show that government intervention, especially procurement, can be effective beyond rice and wheat. It is also a rare opportunity for pulses to get the policy attention it deserves. To this end, especially as prices decline, government procurement must be on war footing.

A summary of the recommendations of this report are detailed in the table below.

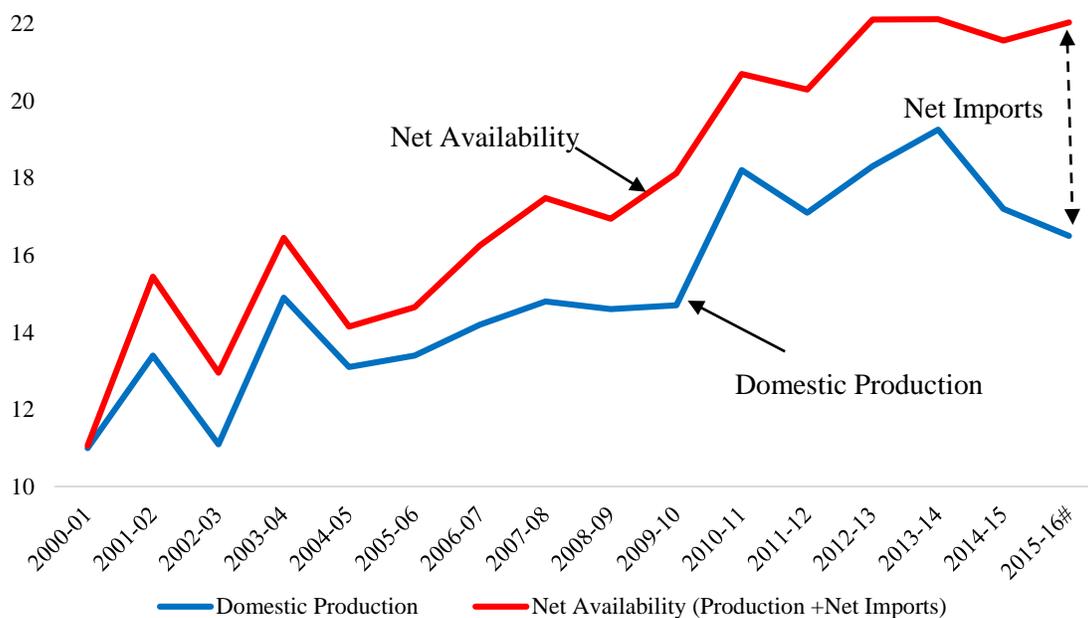
| <i><b>Incentivizing Pulses Production: Summary of Recommendations</b></i>                                                                                                                                                                                                                           |                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| <i>Policy</i>                                                                                                                                                                                                                                                                                       | <i>Timing</i>                          |
| <b><u>1. MSP and Procurement</u></b>                                                                                                                                                                                                                                                                |                                        |
| a. Government procurement machinery should be on high gear to ensure the procurement of kharif pulses at this season's announced MSP                                                                                                                                                                | Immediate                              |
| b. To ensure effective procurement, a High Level Committee comprising Ministers of Finance, Agriculture, and Consumer Affairs and Principal Secretary to PM should be constituted. There should be weekly reporting by procurement agencies on the ground with physical verification of procurement | Immediate                              |
| c. Build up 2 million tons of pulses stock with targets for individual pulses, especially tur (3.5 lakh tonnes) and urad (2 lakh tonnes). These should be built up gradually but opportunistically, buying when prices are low as in the current year                                               | Immediate                              |
| d. Announce MSP of Rs. 40/kg for gram for rabi 2016 and MSP of Rs. 60/kg for both urad and tur for kharif 2017 (adjusted for inflation between 2016-17). Minimum Support Prices for other pulses should be increased by the same percent as calculated in this report for tur, urad, and gram       | Immediate                              |
| e. MSP to be increased to Rs. 70/kg in 2018 when short duration kharif tur is ready for commercialization. Efforts to be made to give production subsidies to farmers for growing pulses in irrigated areas of about Rs. 10-15 per kg to be given via DBT                                           | Kharif 2018 but planning to begin soon |
| f. Instruct CACP to comprehensively review its MSP-setting framework to incorporate risk and social externalities along the lines done in this report                                                                                                                                               | Immediate                              |
| <b><u>2. Other Price Management Policies</u></b>                                                                                                                                                                                                                                                    |                                        |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Eliminate export ban on pulses and stock limits; at the very least limits on wholesalers should be eliminated. The greater the limits on procurement by the government, the greater the urgency to take these actions to ensure that market prices stabilize above the MSP. The worst case scenario for farmers is weak procurement and stock limits which force farmers to sell most of their output at market prices that are well below MSP.<br>More generally, the use of trade policy to control domestic prices, which induces policy volatility, should be avoided. | Immediate                                                                                                         |
| Encourage states to delist pulses from their APMCs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Immediate                                                                                                         |
| Review Essential Commodities Act,1955 and futures trading of agricultural commodities with a view to preserving objectives but finding more effective and less costly instruments for achieving them                                                                                                                                                                                                                                                                                                                                                                       | As appropriate                                                                                                    |
| <b><u>3. Institutions for procurement-stocking-disposal</u></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                   |
| Create a new institution as a Public Private Partnership (PPP) to compete with and complement existing institutions to procure, stock and dispose pulses                                                                                                                                                                                                                                                                                                                                                                                                                   | Preparation to start immediately with aim of implementation by rabi 2016. cabinet note to be ready within 4 weeks |
| Announce clear rules for disposal of stocks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                   |
| <b><u>4. Minimizing Adverse Impacts</u></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                   |
| a. Encourage development of GM technologies. Grant expeditious approval to indigenously developed new varieties of pulses                                                                                                                                                                                                                                                                                                                                                                                                                                                  | As appropriate                                                                                                    |

## Introduction

India has been in the grip of a pulses crisis, or rather crises, in the last few years. The proximate problem is two years (2014-15 and 2015-16) of poor pulses production in the wake of weak monsoons, resulting in excess demand and rising imports (Figure 1).

**Figure 1. Domestic production and net availability of pulses (in million tonnes)**



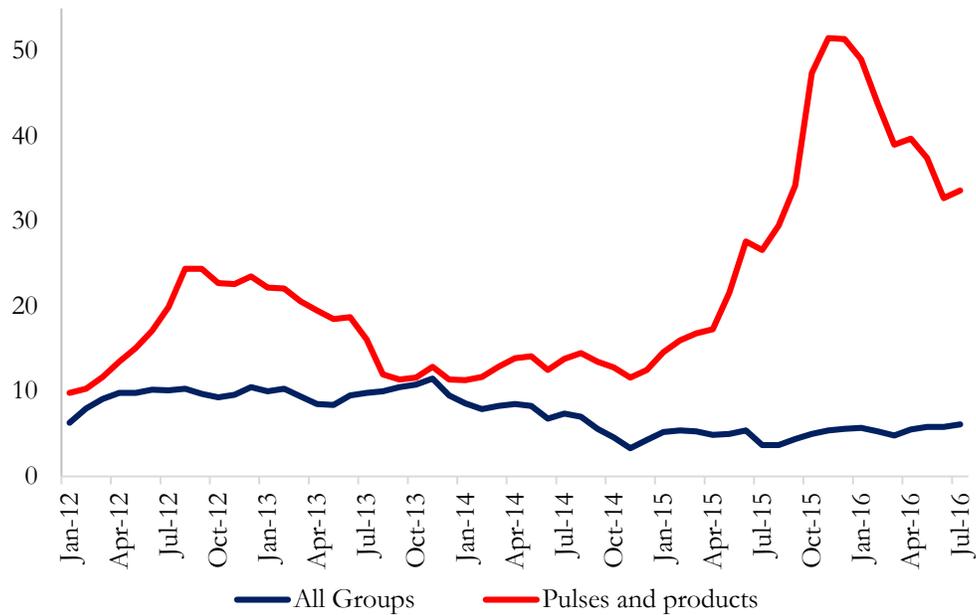
#: Data for 2015-16 is fourth Advance Estimates.

Source: DGCI&S, Ministry of Commerce and Industry and DES, Ministry of Agriculture.

As the figure shows, total supply declined relative to peak production while net imports rose from 0.06 MT in 2000-01 to 5.53MT in 2015-16. As a result, consumer price inflation of pulses averaged 25.0 percent in 2015 and 33.4 in the first 7 months of 2016, peaking at 46.1 percent in November 2015 (Figure 2).

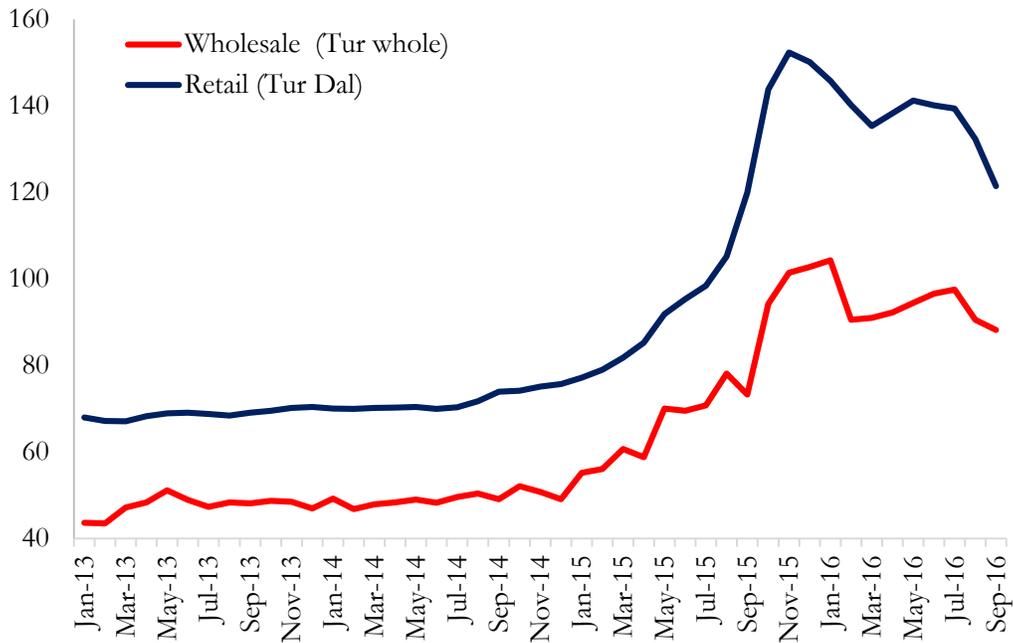
But in recent months, scarcity has ceded to surplus, near-famine to near-feast. High prices in the pre-kharif sowing period and a good monsoon have led to a sharp increase in acreage planted. In anticipation of this positive supply shock (in India and overseas where too supply has surged), prices have started plummeting. The implications for farmers and their livelihoods are dire. Figure 3 for tur illustrates the classic problem of volatility in agricultural market. It shows the retail and wholesale price movements for tur, one of the major pulses, for the last few years (trends are broadly similar for urad and other major kharif pulses).

**Figure 2. Consumer price and pulses inflation (in percent)**



Source: Central Statistics Office.

**Figure 3. Retail and wholesale (raw) price movements of Tur (Rs./kg.)**



Source: Wholesale – Agmarknet; Retail - Department of Consumer Affairs (Price Monitoring Cell); Data for September is as on 15th September 2016).

This volatility, which alternates between adversely impacting consumers and farmers, creates dilemmas for public policy. Finding ways to mitigating this volatility is thus the focus of this report.

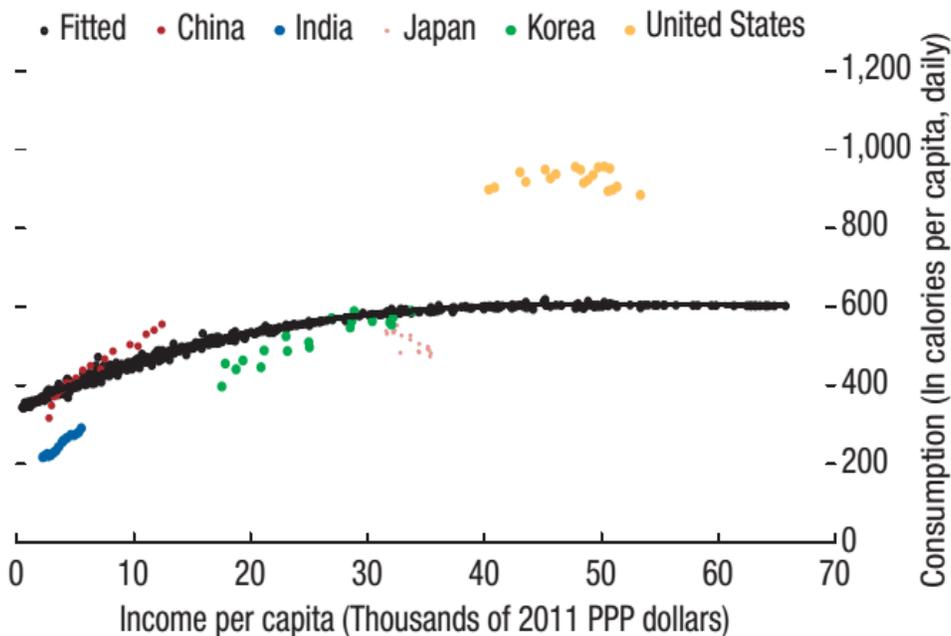
*It is the strong view of this report that enhancing domestic productivity and production rapidly and sustainably is the only reliable way of minimizing this volatility, and safeguarding the interests of farmers and also consumers. There need be no serious conflict in the medium run between the interests of these two groups. Short-term actions that apparently benefit consumers end up hurting them because production and availability of pulses decline over time. In turn, better incentives for farmers in the form of higher Minimum Support Prices (MSP) (to reflect the true social value of growing pulses compared to other crops) combined with effective procurement offers the best way of increasing domestic availability and preventing price spikes. The current crisis offers a rare opportunity to show that government intervention, especially procurement, can be effective beyond rice and wheat. It is also a rare opportunity for pulses to get the policy attention it deserves. To this end, especially as prices decline, government procurement must be on war footing.*

## I. Background

### a. Salient features

Three points need to be understood about pulses. First, from a consumption perspective, pulses are going to be increasingly important in the dietary habits of the average Indian consumer. Normatively, this is desirable because the average Indian under-consumes protein. Figure 4 from the International Monetary Fund based on FAO data plots protein consumption against the level of development for a number of countries.

**Figure 4. India's Protein Consumption in A Cross-Country Perspective**



*Source: International Monetary Fund, Asian Regional Outlook, Chapter 3, page-95.*

India stands out as an outlier. The average Indian consumes about 100 percent less protein than those in other countries at a similar level of development. Given the generally poor levels of nutrition and health (reflected in stunting rates), increasing protein consumption is a high policy priority. Further, given the low cross elasticity of substitution in demand between pulses, there is a need to ensure the availability of all pulses and not favour any one.

Of course, more protein does not necessarily mean more pulses. After all, there are other sources of protein including eggs, meat, poultry, and soya. But rough estimates suggest that for the average Indian consumer, pulses are the lowest cost source of protein. As Table 1 shows, the cost of obtaining a kilogram of protein from pulses is about 1/2 of that of a kilogram of meats and about one third that of an equivalent quantity of milk.

**Table 1. Cost per unit of protein across foods (Rupees per kg of protein)**

| Food items        | NSS 68 <sup>th</sup> round |       |
|-------------------|----------------------------|-------|
|                   | Rs. per kg of protein      |       |
|                   | Rural                      | Urban |
| Pulses            |                            |       |
| Pigeon Pea        | 260                        | 290   |
| Gram, Split       | 217                        | 232   |
| Gram, Whole       | 200                        | 237   |
| Green Gram        | 259                        | 284   |
| Lentils           | 208                        | 223   |
| Black matpe       | 235                        | 259   |
| Peas              | 154                        | 192   |
| Gram flour        | 217                        | 226   |
| Other             |                            |       |
| Milk (liter)      | 613                        | 731   |
| Egg (number)      | 447                        | 437   |
| Fish/prawn        | 611                        | 758   |
| Goat/meat/mutton  | 1094                       | 1220  |
| Beef/buffalo/meat | 490                        | 478   |
| Chicken           | 447                        | 463   |

*Source: National Sample Survey Office.*

Second, given the evolving dietary pattern in favor of pulses, and if current trends on the production side of pulses continues, there will be a large demand-supply mismatch for pulses in the medium term. The experience of 2014-15 and 2015-16, which witnessed large increases in pulses prices, will become a regular pattern (see below).

Third, this mismatch cannot be filled by imports. India is the world's largest producer of key pulses, especially tur, accounting for 67.7 per cent of the global total. More to the point, India's imports account for a significant share of the rest of the world's production, about 30 percent in the case of tur (Table 2). Consequently, if demand continues to race ahead of domestic supply, it will become increasingly difficult – and expensive – to make up the shortfall from abroad.

**Table 2. Production, consumption and imports of major crops and pulses  
(in million tons; average of 2013 and 2014)**

| Crops | Production | Consumption | Imports | Exports | Net Imports<br>as percentage<br>of RoW<br>production | Rest of<br>World<br>Production |
|-------|------------|-------------|---------|---------|------------------------------------------------------|--------------------------------|
| Rice  | 158.2      | 146.9       | 0.002   | 11.27   | -1.4                                                 | 788.0                          |
| Wheat | 94.0       | 89.9        | 0.015   | 4.13    | -0.5                                                 | 750.3                          |
| Tur   | 3.2        | 3.7         | 0.455   | 0.0004  | 30.2                                                 | 1.5                            |
| Gram  | 9.4        | 9.6         | 0.460   | 0.30    | 3.5                                                  | 4.4                            |
| Urad  | 1.9        | 2.6         | 0.654   | 0.002   | NA                                                   | NA                             |

*Source: FAO & Trade Map, ITC.*

The contrast between pulses and cereals is striking. In the case of rice and wheat, Indian production represents only about 20 and 13 percent, respectively of world production. Moreover, India has been a net exporter of these commodities (Table 2). And even if there were imports, the world could easily absorb them because of the large size of world production.

In principle, in cereals, international supply could have been a source of satisfying domestic demand and hence achieving a modicum of food security. This is much less feasible in the case of pulses. So, if India has decided to achieve food security in cereals by boosting domestic supply the underlying logic of that decision applies even more strongly to pulses, especially tur and urad.

When thinking about using the world for domestic food security purposes, it is important to look at the correlation between domestic and world supply (Table 3). It turns out that supplies are quite highly correlated, meaning that when domestic production goes down so does foreign production.<sup>1</sup> As a result, any extra demand for imports would run up against dwindling world supplies. This reinforces the point that food security in pulses must be achieved by boosting domestic productivity and supply. And there is the important point that farm incomes today are low which makes it imperative to boost these incomes to improve lives in rural India.

### **b. Excess demand projections**

We estimate the potential mismatch for the next decade based on assumptions about India's GDP and population growth, and domestic and international pulses production under current trends. We do this for two scenarios: in the first we assume a pulses demand elasticity of 0.5 (based on NSS data--low case) and in the second a demand elasticity of 0.8. The resulting estimates of mismatch for tur are shown below in Figures 5A and 5B (the estimates for urad and total pulses in Appendix). Our preferred estimate is the high demand scenario because the elasticity estimates are based on NSSO data which do not fully capture secondary processed pulses (for example, *Bikaneri Sev*).

<sup>1</sup> One reason for the correlation is that many of the pulse producing countries are as susceptible to the El Niño phenomenon as India.

**Table 3. Correlation of production between India and top pulse-producing countries**

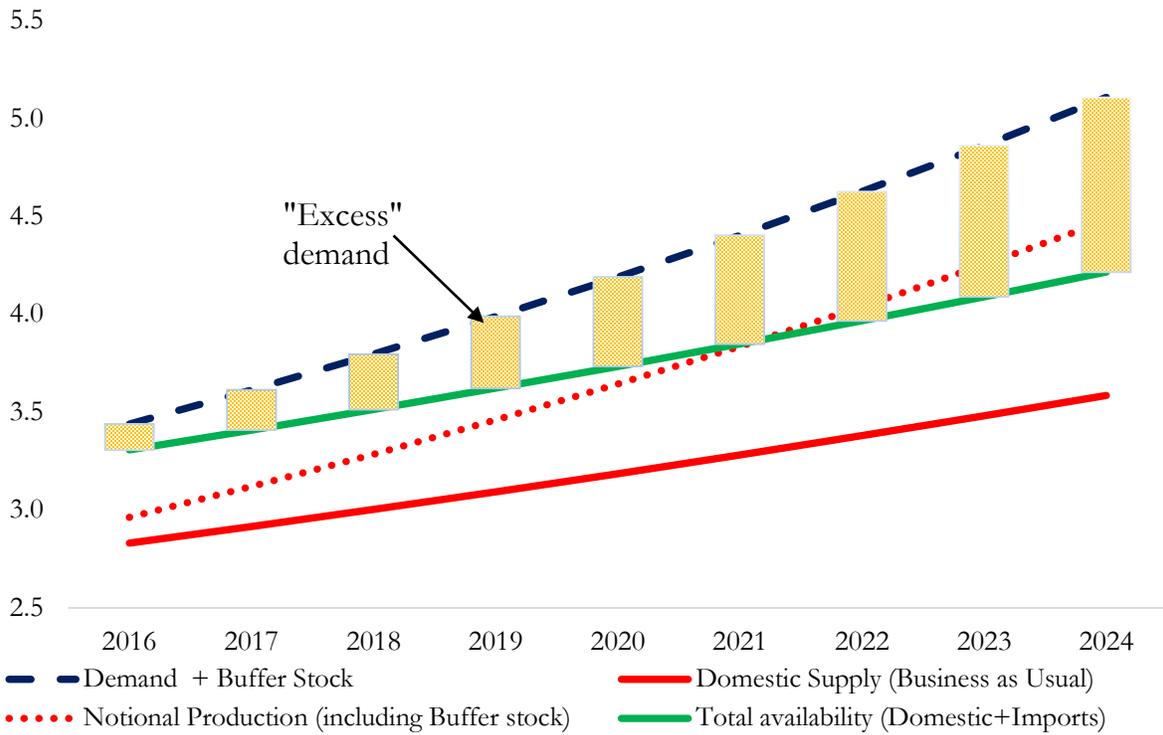
| <b>Country</b>                       | <b>Correlation coefficient</b> |
|--------------------------------------|--------------------------------|
| <b>Top gram producing countries</b>  |                                |
| Australia                            | 0.88                           |
| Pakistan                             | 0.21                           |
| Myanmar                              | 0.91                           |
| Turkey                               | -0.67                          |
| Rest of the World                    | 0.87                           |
| <b>Top tur producing Countries</b>   |                                |
| Myanmar                              | 0.25                           |
| Malawi                               | 0.68                           |
| Kenya                                | 0.63                           |
| United Republic of Tanzania          | 0.67                           |
| Rest of the World                    | 0.55                           |
| <b>Top masur producing countries</b> |                                |
| Canada                               | 0.6                            |
| Australia                            | 0.47                           |
| Turkey                               | 0.07                           |
| United States of America             | 0.4                            |
| Rest of the World                    | 0.68                           |

*Source: Food and Agriculture Organisation.*

In the more likely high demand scenario, we find that the mismatch both for tur and urad would average around 1 million tons over the next ten years. But that estimate assumes that production would steadily increase without experiencing shocks. If one factors in production shocks and the associated the need to create buffer stock the excess demand will have to be higher still. For example, for pulses as a whole, the average negative shock (defined as shortfalls from trend) for the years 2007-08 to 2015-16 was 5.5 percent of trend (about 0.8 million tons) and the maximum shock (experienced in the most recent year) was about 13 percent of trend (nearly 2 million tons).

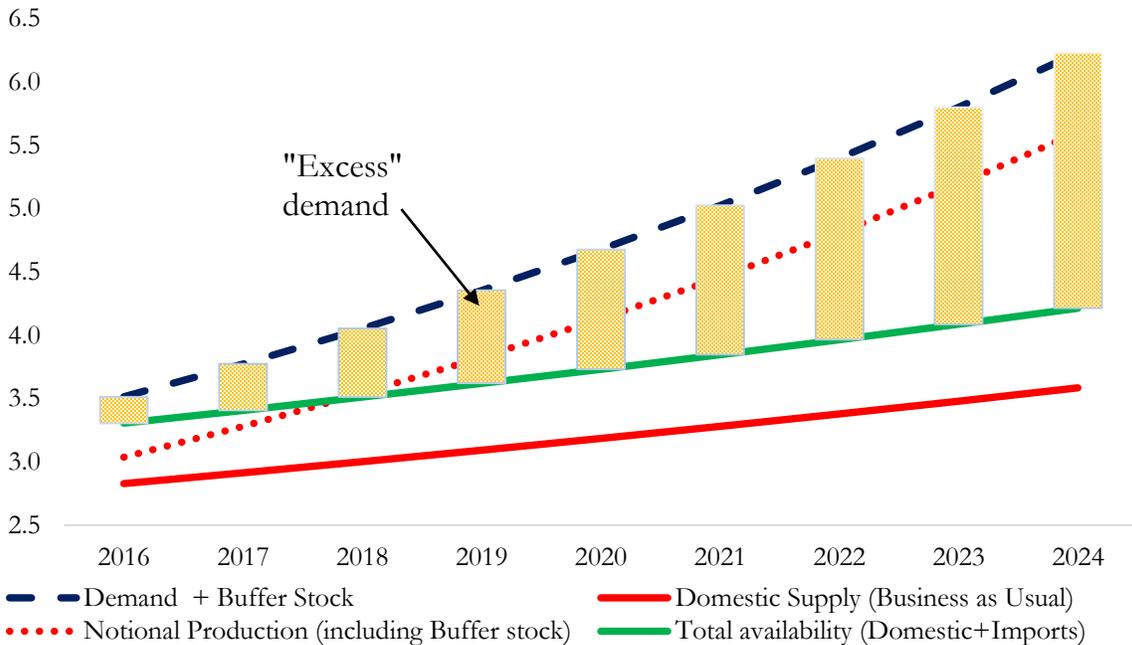
All of this means that production would have to grow at about 8 percent per year compared with the 3 percent currently in order to avoid significant shortfalls and price increases. That is the magnitude of the challenge.

**Figure 5A. Demand projection for Tur (lower consumption scenario)**  
(in million tons)



Notional Production- Production required to eliminate excess demand  
 Source: Committee's calculations.

**Figure 5B. Demand projection for Tur (higher consumption scenario)**  
(in million tons)



Notional Production- Production required to eliminate excess demand  
 Source: Committee's calculations.

## II. Spatial Distribution of Pulses Cultivation and Consumption

There are interesting spatial characteristics to pulses production and consumption in India, as shown in Maps 1-4 (based on the average for the years 2011-12 to 2013-14). Broadly, pulses production is concentrated in a few states; 80 percent of production comes from 20 percent of India's districts. As Map 1 shows, these districts are in Rajasthan, Madhya Pradesh, Maharashtra, Karnataka and Andhra Pradesh. These are targeted under the National Food Security Mission.

The major kharif pulses are tur, urad and moong. Tur production is concentrated in six states: Maharashtra, Madhya Pradesh, Gujarat, Karnataka, and Andhra Pradesh (in decreasing order of importance) (Map 2). The spatial distribution of urad production is broadly similar except for the greater importance of Andhra Pradesh and Tamil Nadu. Gram is the major rabi pulse and here Rajasthan is a major source while Karnataka is not (Map 4).<sup>2</sup>

On the consumption side, we map the top 100 pulse consuming districts based on NSSO data. The interesting pattern here is the preponderance of southern states in the consumption of tur and urad, especially the latter which is consumed in Andhra Pradesh, Tamil Nadu, Kerala, and parts of Northern Uttar Pradesh. Tur consumption, in addition to being concentrated in the South, extends to Maharashtra and Gujarat and Madhya Pradesh. In contrast, gram consumption occurs almost entirely in the northern and western states of India. Since there is some difference in the spatial concentration of production and consumption for tur and urad (compared to gram), there needs to be greater nimbleness of policy in ensuring the transport of output from production to consumption centers.

## III. Incentivizing production

What can the central government do to sustainably increase pulses production? There have been a number of reports that have discussed the pulses sector in great detail.<sup>3</sup> In this report we focus on a narrower set of policies, specifically MSP and procurement.

### *a. Why is the MSP important for pulses?*

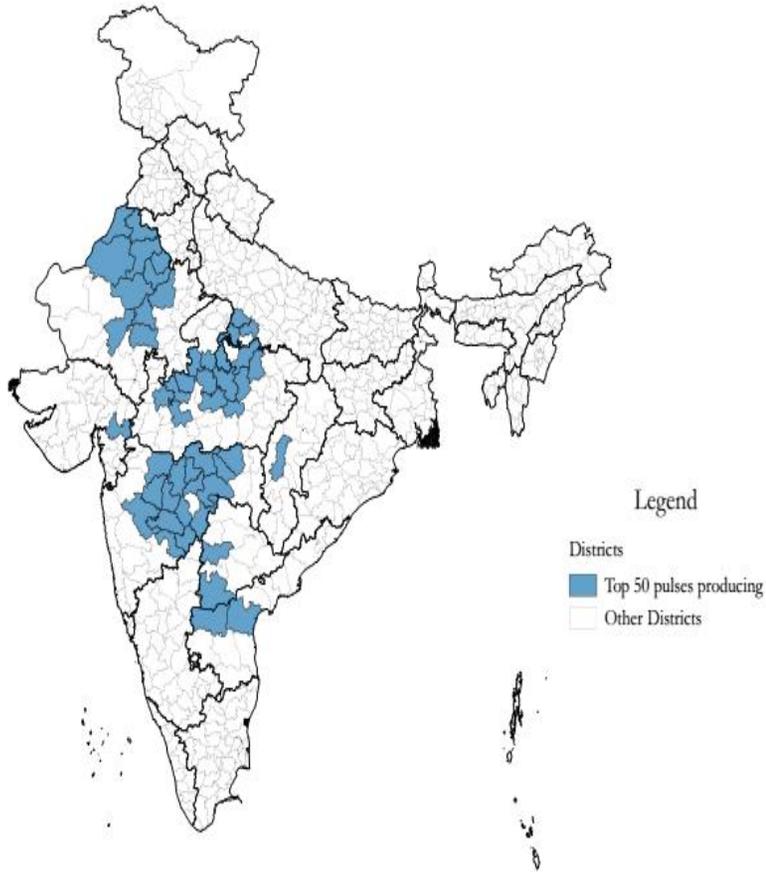
Before we describe the analytical framework for arriving at a revised set of MSPs for pulses, it is important to understand why the MSP is important for pulses even apart from the incentives for increasing production. The major crops—cereals and pulses—can be described along two dimensions: extent of production and whether or not there is effective procurement.

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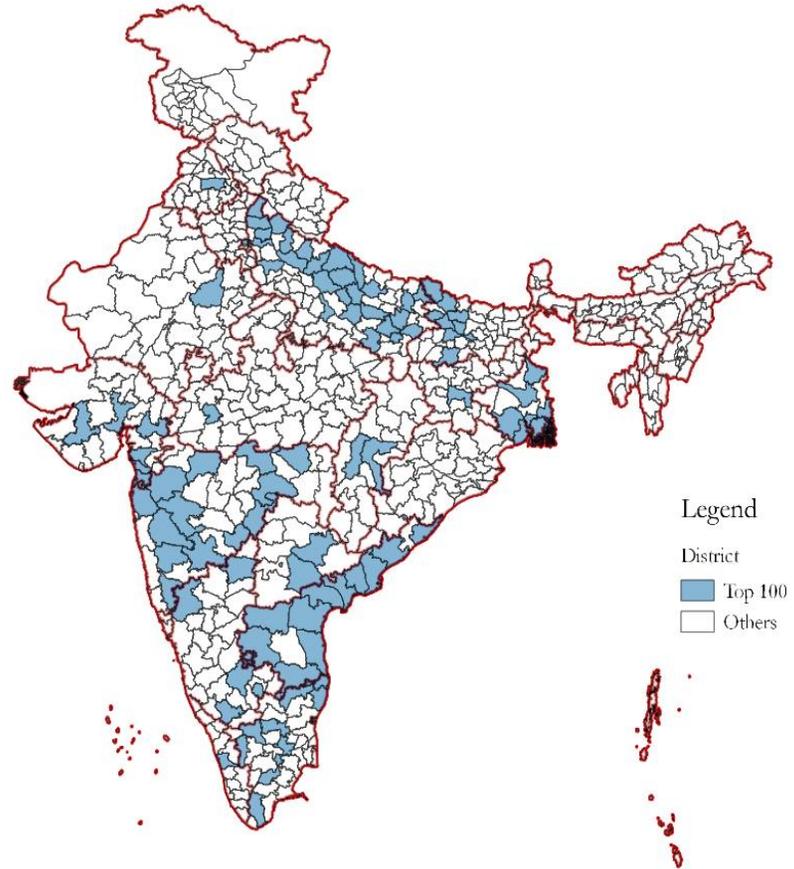
<sup>2</sup> Over time, there has been a change in the spatial distribution of production of pulses from the North to the South (urad and chickpeas moving from Punjab to Andhra Pradesh and Tamil Nadu) and from the East to the West (pigeon peas from Bihar to Maharashtra). But in the last few years, production patterns have stabilized with not much dynamism in evidence.

<sup>3</sup> Report of the Expert Group on Pulses (Alagh Committee Report), DAC, 2012. Expert Committee Report on Pulses, 2000.

**Map 1A. Top 50 pulses-producing districts**  
*(Contributes 57.5% of total pulses production)*

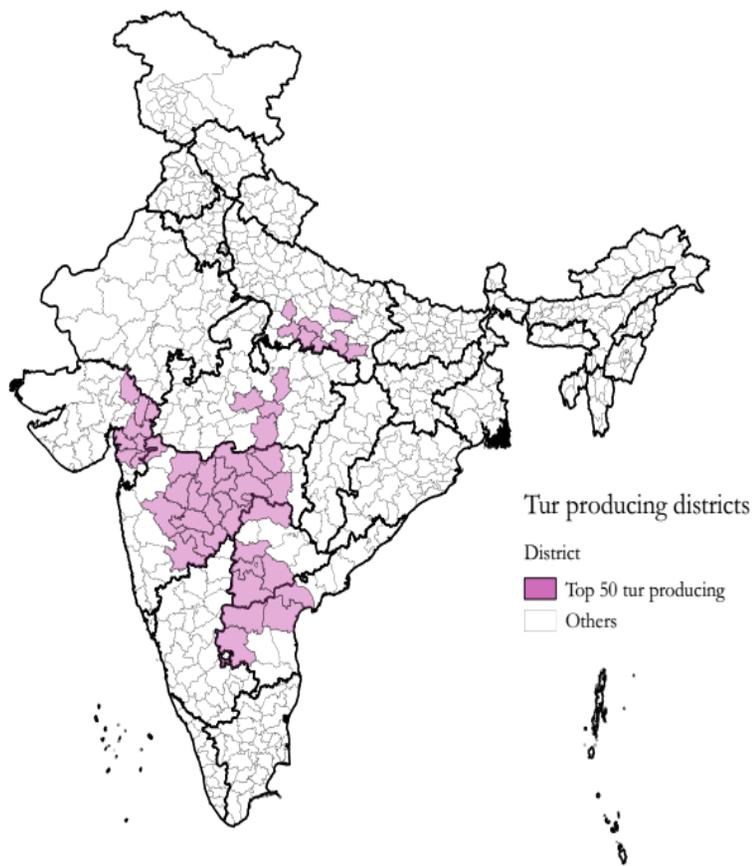


**Map 1B. Top 100 'All-pulses'-consuming districts**

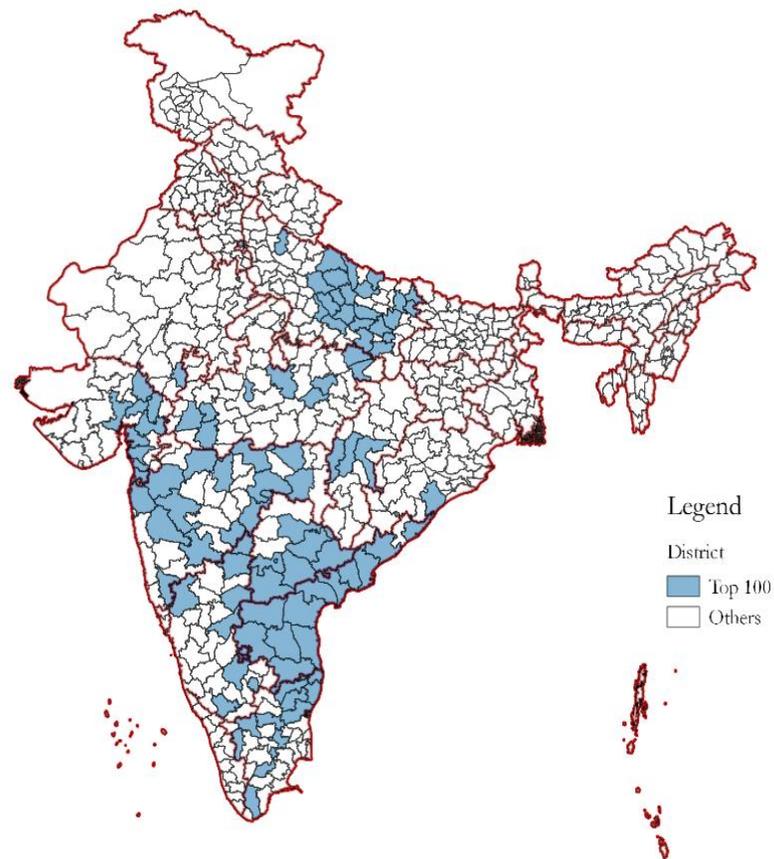


Source: Committee's calculations.

**Map 2A. Top 50 Tur-producing districts**  
(Contributes 77.7% of total pulses production)

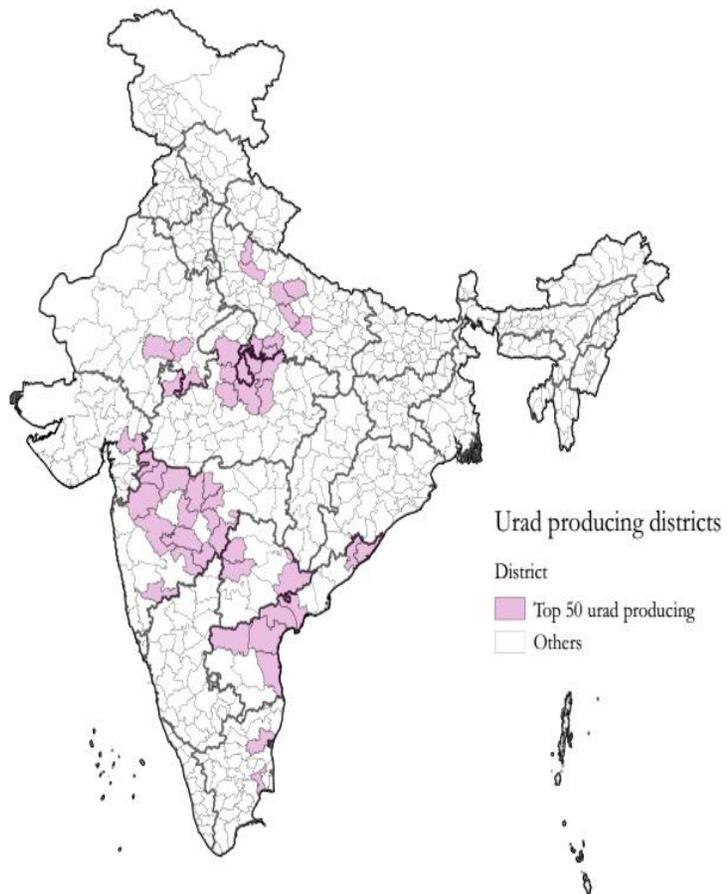


**Map 2B. Top 100 Tur-consuming districts**

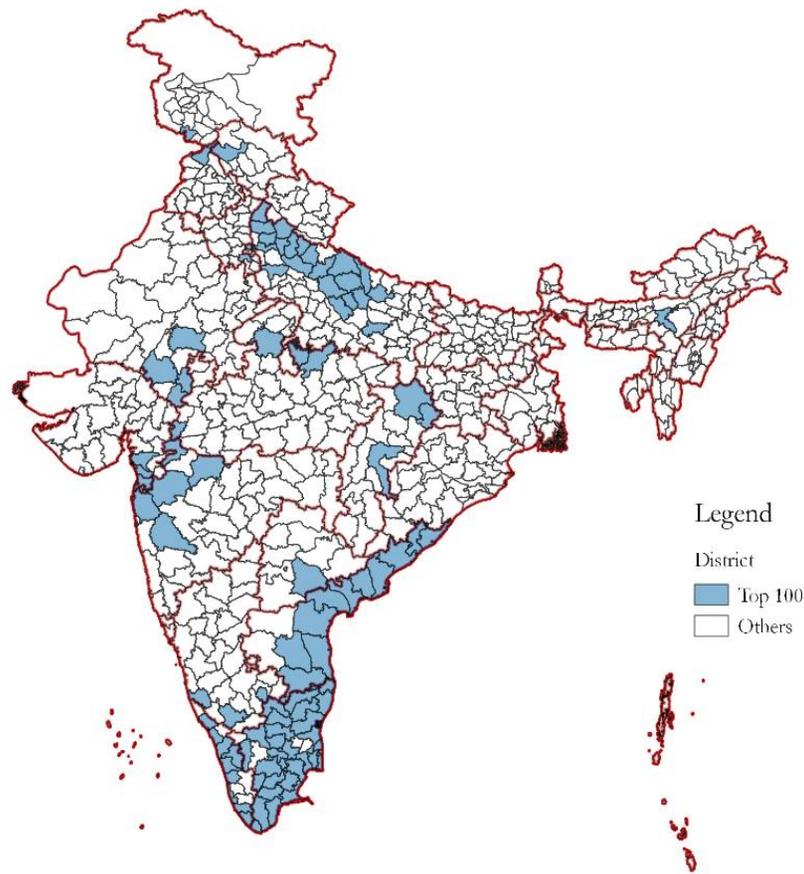


Source: Committee's calculations.

**Map 3A. Top 50 Urad-producing districts**  
(Contributes 70.0% of total pulses production)

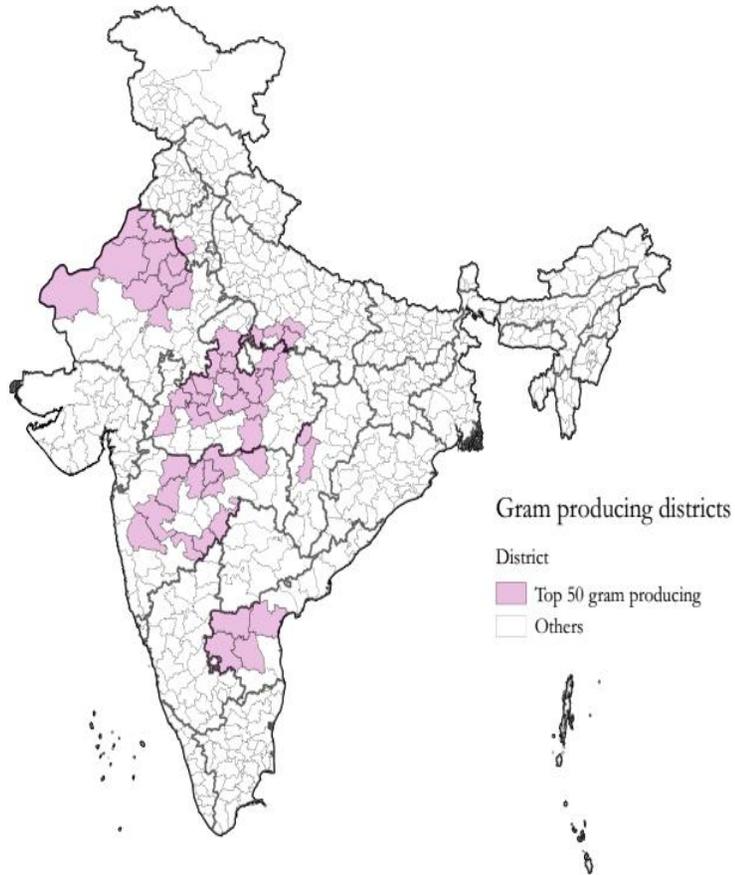


**Map 3B. Top 100 Urad-consuming districts**

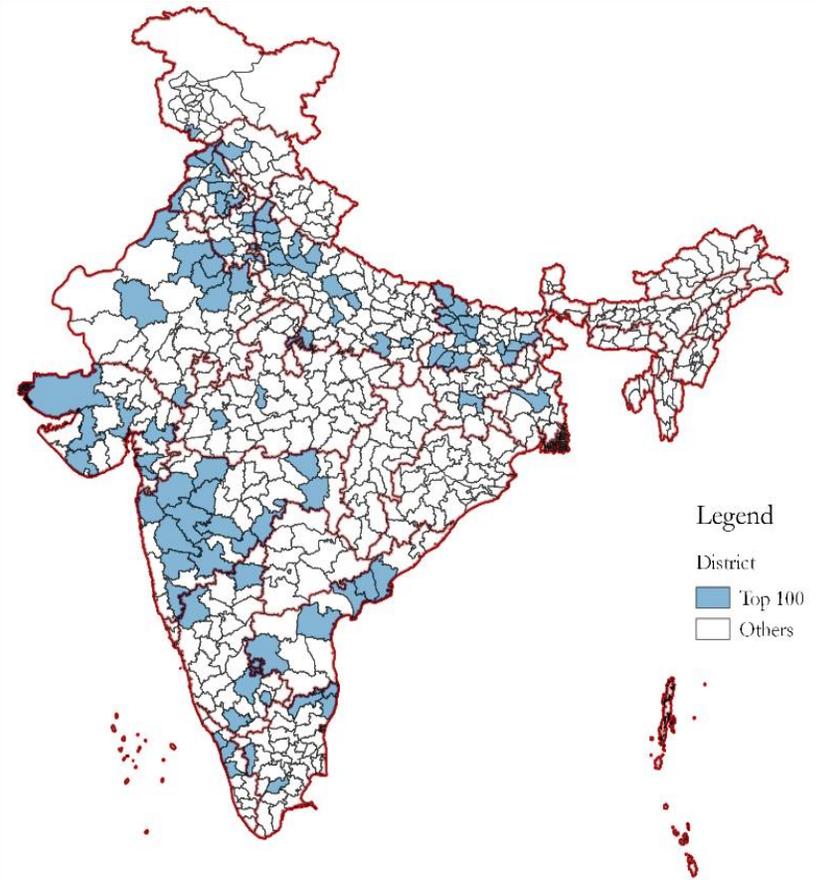


Source: Committee's calculations.

**Map 4A. Top 50 Gram-producing districts**  
*(Contributes 68.7% of total pulses production)*



**Map 4B. Top 100 Gram-consuming districts**



Source: Committee's calculations

Figure 6 below, which is reproduced from a forthcoming book by Devesh Roy and colleagues at IFPRI, depicts the share of farmers' output bought at MSP relative to the market price for three crops in three locations: paddy in Punjab; paddy in Bihar; and urad. Paddy is effectively procured in Punjab and is generally in surplus. Paddy is also surplus in Bihar but there the procurement machinery is not effective; urad differs from rice in that it is generally not in surplus reflected in the fact that market prices are almost always above the MSP, but it is like paddy in Bihar in that urad is rarely procured.

In the Figure 6, the horizontal axis shows the difference between the MSP and the market price expressed as a percentage of the MSP (0 means that the MSP= market price; a positive number shows that the market price is greater than the MSP) received by the farmer. The vertical axis shows the frequency at which farmers sold their product at these prices.

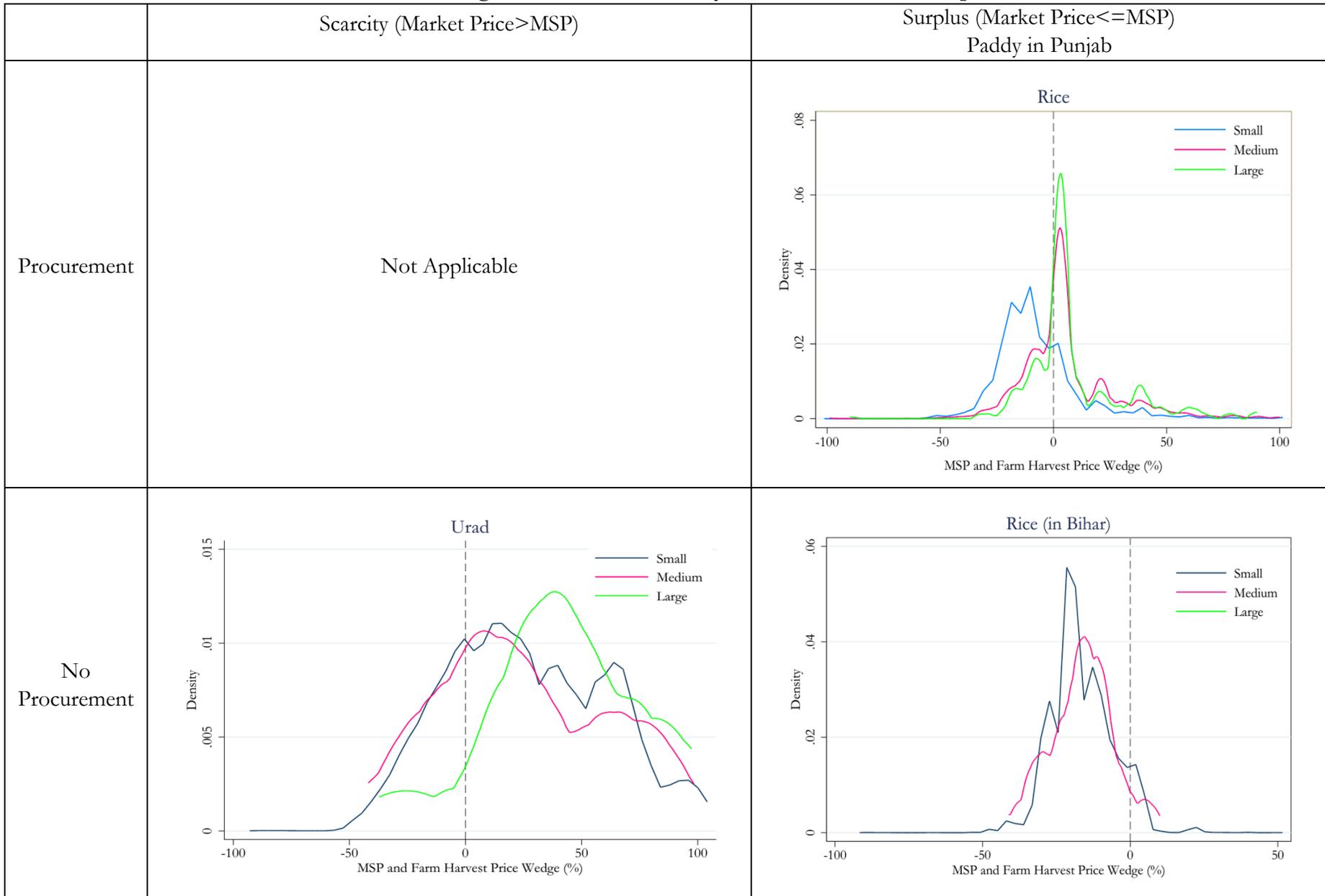
The top right hand corner shows that paddy procurement is highly effective in Punjab: most of the output is sold at the MSP (the frequency distribution peaks at 0), and prices received are the same for small, medium and large farmers (all three curves are close to each other).

In contrast, it is evident that paddy procurement is ineffective in Bihar (bottom right hand corner): the peak of the curve lies to the left of the zero point, indicating that the majority of farmers' sales take place at prices less than MSPs. In the absence of procurement, farmers have to sell at market prices which can dip below the MSP.

Even more interesting is the case of urad (bottom left hand corner). Here, despite market prices being consistently higher than the MSP, the small and medium farmers sell their produce at MSP; large farmers in contrast are able to secure greater than MSP prices. It seems that small farmers have less bargaining power relative to traders and are forced to sell at less than market prices. The MSP turns out to be a focal point for this bargaining, a sort of benchmark for traders in their dealing with small farmers.

An important corollary is that higher pulses MSPs will have a beneficial effect for small farmers, as their bargaining power with respect to traders might go up. In other words, a higher MSP might not affect consumers but might instead lead to a larger fraction of the value accruing to farmers relative to traders. And this might be true even if the MSPs were unaccompanied by effective procurement .

**Figure 6. Prices received by farmers for different crops**



### *b. Analytical framework for setting MSP for pulses*

If MSPs play an important role for pulses, then setting them at an appropriate level is critical. Currently, the CACP (Commission for Agricultural Costs and Prices) sets the MSP for all agricultural commodities based on estimates of the cost of production and cultivation. The final MSP is related to but not exclusively determined by these cost estimates. A number of additional factors such as international prices are also taken into account, an indication that some (subjective) judgement is exercised in the final determination of the MSP. The MSPs announced for the major pulses for the last five seasons are shown in Table 4. In this report we build on the CACP's methodology to arrive at new MSPs for pulses.

**Table 4. Minimum Support Prices for Pulses (Rs/quintal)**

| <b>Pulses</b>               | <b>2014-15</b> | <b>2015-16</b> | <b>2016-17</b> |
|-----------------------------|----------------|----------------|----------------|
| <i><b>Kharif Pulses</b></i> |                |                |                |
| Tur (Arhar)                 | 4350           | 4625*          | 5050^          |
| Moong                       | 4600           | 4850*          | 5225^          |
| Urad                        | 4350           | 4625*          | 5000^          |
| <i><b>Rabi Pulses</b></i>   |                |                |                |
| Gram                        | 3175           | 3425#          | Not announced  |
| Lentil (Masur)              | 3075           | 3325#          | Not announced  |

*Note: # Additional bonus Rs, 75 per Quintal, \*Includes bonus Rs.200 per Quintal, ^ Includes bonus of Rs.425 per Quintal.*

*Source: CACP.*

Our analytical framework rests on three pillars: returns; risks; and externalities. But our approach is relative. That is, when setting the MSP for pulses we compare returns, risks, and externalities for crops that compete with pulses in specific areas. In implementing our methodology, we need to identify the competing crops. These, of course, vary across regions and across pulses. We use data on production to identify the top producing districts for the four major pulses and identify the major competing crops in the major pulse producing regions.

We will explain in detail the methodology and calculations for estimating the MSP for one pulse: tur. Later we will show the results of the analysis for other pulses: urad and gram. Tur, is a major kharif pulse, urad is cultivated in both kharif and rabi seasons, whereas gram and masoor are rabi pulses.

Currently, tur is produced predominantly as a rainfed crop by small holders in mostly dryland conditions in the states noted above. In order to keep the analysis and presentation tractable, we focus on the major crops that compete with tur: cotton in Maharashtra, soya in Madhya Pradesh, and jowar in Karnataka.

However, we will not stop there. Scientists have suggested that tur can also potentially be grown in the irrigated areas of Punjab once the short duration (90 day) variety of tur is ready, which is now expected within two years.

Tur can, in principle, also be grown in the rice fallows regions of Bihar, Bengal, eastern Uttar Pradesh, Jharkhand and Chattisgarh. The term rice fallows derives from the fact that these lands are left

uncultivated after the harvesting of paddy. Clearly, growing tur at current yields, risks and returns are unremunerative, even relative to not cultivating the land.

We will thus be estimating the MSP for tur for two areas of cultivation: rainfed and irrigated, with the first being an actual area while the other is a potential area of cultivation. We will draw implications for the other potential area of cultivation, namely the fallows of Eastern India. Map 1 in the Appendix shows the three actual and potential areas of cultivation of tur.

#### i.Risk

Why is it important to take account of risk? Farmers’ cultivation practices—like all decisions by economic agents, whether stock market investors or manufacturers--depend on assessments of both returns and risk. Given that there is much greater inherent risk in agriculture because of weather, pest, and price shocks, pricing policy by the government must take these into account.

Risk is especially important for pulses. Table 5 compares the inherent risk of growing pulses compared to other—based on the coefficient of variation (COV)—for a number of parameters including wholesale and retail prices, acreage, yield, and production for the three major pulses and for rice and wheat.

**Table 5. Comparing Risks of Pulses and Cereals (based on the coefficient of variation)**

| <b>Variable</b> | <b>Rice</b> | <b>Wheat</b> | <b>Tur</b> | <b>Gram</b> | <b>Urad</b> |
|-----------------|-------------|--------------|------------|-------------|-------------|
| Wholesale Price | 43.9        | 34.8         | 55.4       | 41.3        | 60          |
| Retail Price    | 36.1        | 34.6         | 57.0       | 40.4        | 56          |
| Acreage         | 3.0         | 6.9          | 16.3       | 7.6         | n.a.        |
| Yield           | 8.9         | 6.8          | 9.8        | 9.2         | n.a.        |
| Production      | 10.1        | 12.9         | 24.0       | 12.5        | 17          |

*Source: Committee’s calculations based on data from Directorate of Economics and Statistics, DAC &FW and Ministry of Consumer Affairs.*

The table clearly shows that there is much greater volatility for pulses across all indicators. For example, prices are about 50 percent more volatile for pulses than rice and wheat as are yields. All this gets translated into much greater volatility in farmers’ planting decision reflected in acreage which is 2-5 times more volatile for Tur than for wheat and rice, respectively. Consequentially, production is also much riskier for pulses than for cereals. Given this situation, clearly there is a need to provide a price premium for growing pulses. It must be noted that the numbers for pulses are an underestimate since, few farmers today grow pulses. Once more farmers engage in production, the data is likely to show higher volatility.

#### ii.Externalities

Given the experience with the over-use of inputs in north-west India, and the resulting drop in the water table, the increased incidence of disease and erosion of soil quality, and deterioration of the environment (especially from burning of rice straws), it is imperative that government agricultural policy reflect these externalities. Pulses use less water and less fertilizer and emit less greenhouse gases

than most competing crops; in addition, they help fix nitrogen which replenishes soil nutrients, conferring a positive social externality. As argued by Professor Ramesh Chand and the Economic Survey (2015-16), MSP policy must reward the growing of pulses and disincentivize that of rice, wheat and cotton. Table 6 compares the costs of these externalities for tur relative to one competing crop, namely paddy in Punjab.

**Table 6. Social benefits of Tur compared with paddy (Rs./ha)**

| <b>Crop</b>           | <b>Fertilizer Subsidy (S)</b> | <b>Ground Water Subsidy (S)</b> | <b>Nitrogen Benefit (N)</b> | <b>GHG Cost (G)</b> | <b>Total Social Cost (S-N+G)</b> |
|-----------------------|-------------------------------|---------------------------------|-----------------------------|---------------------|----------------------------------|
| Tur                   | 2878                          | 1500                            | 3883                        | 0                   | 495                              |
| Paddy                 | 6897                          | 5000                            | 0                           | 1838                | 13735                            |
| Net Advantage for Tur | 4019                          | 3500                            | - 3883                      | 1838                | <u>13240</u>                     |

*Source: Committee's calculations based on data from various Government Ministries/Departments and Dr.Ramesh Chand.*

The contrast between tur and paddy is striking: adding up all the relative externalities yields a net social benefit of growing tur relative to rice of Rs. 13,240 per hectare which is substantial. And this is probably an under-estimate because it does not quantify other social negative externalities from paddy such as the burning of paddy husks post-harvest which contributes to air quality deterioration.

#### *c.MSP Calculations*

Taking all these factors into account, we are able to illustrate the results for tur which are shown in Table 7.<sup>4</sup>

**Table 7. MSP calculations for tur (Rs./Kg.)**

| <b>States/Competing crops</b> | <b>Simple MSP (based on return to competing crop)</b> | <b>Risk-adjusted MSP</b> | <b>Risk-adjusted + Externalities</b> |
|-------------------------------|-------------------------------------------------------|--------------------------|--------------------------------------|
| Madhya Pradesh (Soyabean)     | 64.3                                                  | 65.3                     | 70.0                                 |
| Maharashtra (Cotton)          | 60.2                                                  | 51.8                     | 56.0                                 |
| Karnataka (Jowar)             | 53.5                                                  | 53.7                     | 59.8                                 |
| <b>Average</b>                | <b>59.3</b>                                           | <b>56.9</b>              | <b>61.9</b>                          |
| Punjab (Kharif/Paddy)         | 76.5                                                  | 106.2                    | 125.4                                |

*Source: Committee's calculations based on data from various Government Ministries/Departments.*

The first column (simple MSP) shows the required MSP if the return from the competing crop is added to the cost of cultivation of tur (see Table 7 and Appendix 1). This varies between Rs. 54 and 64 per kg. Once we factor risk (second column), the required MSP actually decreases because the competing crops are also risky because they too are grown in rainfed areas. Factoring in the externalities (column

<sup>4</sup> We also quantified risk using an alternative method based on the standard deviation of annual changes in yields and the results were broadly similar.

3), increases the required MSP to a range of Rs. 56 -Rs. 70 per kg. Taking the average of all three yields a required MSP of about Rs.60 for tur under rainfed conditions.

We undertake a similar analysis for potential tur cultivation in Punjab in irrigated areas. Here we assume that the short duration variety currently in advanced stages of field trials will be ready for commercial use within two years, namely by the kharif season in 2018. The estimated yield for this variety is about 2 quintals per acre.<sup>5</sup>

The economics of growing (or rather incentivizing the production of) tur in Punjab—and hence the MSP calculations - is very different. The reasons are threefold: for paddy, the competing crop, the normal returns are greater, the risks are lower, and the negative externalities much greater. Note that these externalities are under-stated because the calculation excludes the (difficult to estimate) health costs of fertilizer usage and the environmental damage that occurs when paddy husks are burnt in North India after the harvesting of paddy in winter. To make tur competitive with paddy in Punjab (which would be a desirable outcome, as it would reduce the negative externalities) would require an MSP of close to Rs 125 per kilogram.

Of course, this MSP might be difficult to implement. MSPs cannot be location-specific. Yet if the MSP were Rs 125/kg across India, this would have seriously adverse consequences for the cultivation of competing crops such as soya, cotton, jowar and millets in rainfed areas. We will discuss later how the incentivization of pulses in Punjab can be attempted without seriously undermining incentives elsewhere.

An important point must be highlighted. All the calculations undertaken here are relative. So, for example, the externalities of growing paddy in Punjab are reflected in the MSP calculations for Tur, not paddy itself. Ideally, the negative externalities of paddy should be reflected in the MSP set for paddy. Specifically, the MSP for paddy should be lower than the current MSP by an amount of about Rs. 20 per kg. In practice, we think that it may not be politically feasible to reduce the absolute level of paddy MSP—although that is the appropriate public policy response (one way of achieving this could be to have the MSPs for rice and wheat grow slower than inflation). If that is the case, the need to maintain the relative incentives would require loading the negative externalities of growing paddy onto the MSP for tur.

What about tur cultivation in the fallows, which many scientists and agriculturists have argued is potentially important? Strictly speaking, calculating the incentives required to grow tur relative to leaving the land fallow after the kharif season would require some estimation of the opportunity cost. It seems that this can be measured by the wages earned by farmers who migrate to urban areas instead. Revealed preference suggests that they prefer to leave the land fallow and sell their labour rather than cultivate tur or other pulses. We do not have data on such wages but we assume that any increase in MSPs based on rainfed and irrigated conditions will also improve the incentives to grow pulses in the fallows of Eastern India. Of course, other interventions will be required such as providing better seeds, and extension and support but these are issues beyond the scope of this report.

Based on similar calculations, we obtain an MSP for urad of close to Rs. 60/kg (if we exclude Andhra Pradesh) and for gram of about Rs. 40 per kg.

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<sup>5</sup> Short duration pigeon pea. See Annual Report. 2014-15. ICAR-Indian Agricultural Research Institute, New Delhi. Crop Improvement : Grain Legumes Pigeonpea. pp. 20 -21.

**Table 8. MSP calculations for urad (Rs./Kg.)**

| States/Competing crops | Simple MSP  | Risk-adjusted MSP | Risk-adjusted + Externalities |
|------------------------|-------------|-------------------|-------------------------------|
| Tamil Nadu (Jowar)     | 41.7        | 41.0              | 46.6                          |
| Andhra Pradesh (Maize) | 45.5        | 73.5              | 83.3                          |
| Madhya Pradesh (Jowar) | 53.1        | 51.8              | 63.1                          |
| Maharashtra (Maize)    | 43.1        | 43.1              | 59.6                          |
| <b>Average</b>         | <b>45.9</b> | <b>52.4</b>       | <b>63.1</b>                   |

Source: Committee's calculations based on data from various Government Ministries/Departments.

**Table 9. MSP calculations for gram (Rs./Kg.)**

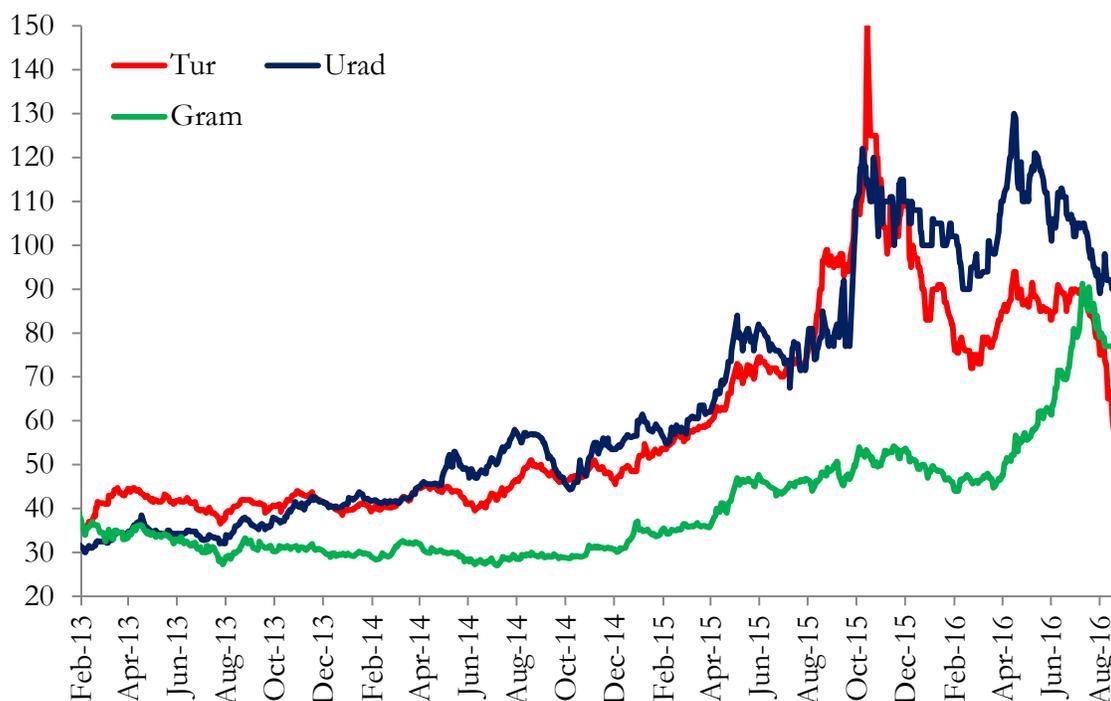
| States/Competing crops | Simple MSP  | Risk-adjusted MSP | Risk-adjusted + Externalities |
|------------------------|-------------|-------------------|-------------------------------|
| Madhya Pradesh (Wheat) | 30.4        | 28.9              | 35.6                          |
| Rajasthan (Barley)     | 33.2        | 36.4              | 43.7                          |
| Uttar Pradesh (Barley) | 29.2        | 30.3              | 36.1                          |
| Rajasthan (Wheat)      | 33.2        | 45.4              | 54.0                          |
| Uttar Pradesh (Wheat)  | 29.2        | 32.9              | 39.9                          |
| <b>Average</b>         | <b>31.0</b> | <b>34.8</b>       | <b>41.9</b>                   |
| Maharashtra (Wheat)    | 51.2        | 54.6              | 63.0                          |

Source: Committee's calculations based on data from various Government Ministries/Departments.

We can validate our estimate of Rs. 60 per kg for tur and urad from another angle, namely the revealed preference of farmers. This season, acreage under pulses increased substantially. In large part, this was because of the high prices that prevailed in the run-up to planting in June/July. Figure 7 shows wholesale prices (unprocessed) for the three major kharif pulses.

For tur, the average price was Rs. 90/kg and for urad about 105/kg. We know that these prices were responsible for, and sufficient to, inducing farmers to plant more pulses. From the farmer's perspective, these were the prices necessary on the assumption that procurement would be ineffective because that is the history. It may be possible to induce the same supply response with a lower price, provided that that price reduces the risks faced by farmers. In other words, an MSP lower than Rs.90/kg backed up with effective procurement could be similar to a risky market price of Rs. 90/kg. We cannot be sure how much lower that support price would be but it should be not too much below Rs. 60/kg (one-third less than the market price).

**Figure 7. Wholesale prices for pulses in the run-up to kharif plantings 2016 (unprocessed, Rs./kg.)**



Source: Ministry of Consumer Affairs. Note: Price center-Mumbai.

#### IV. The importance of procurement/price support: Price and Quantity Volatility

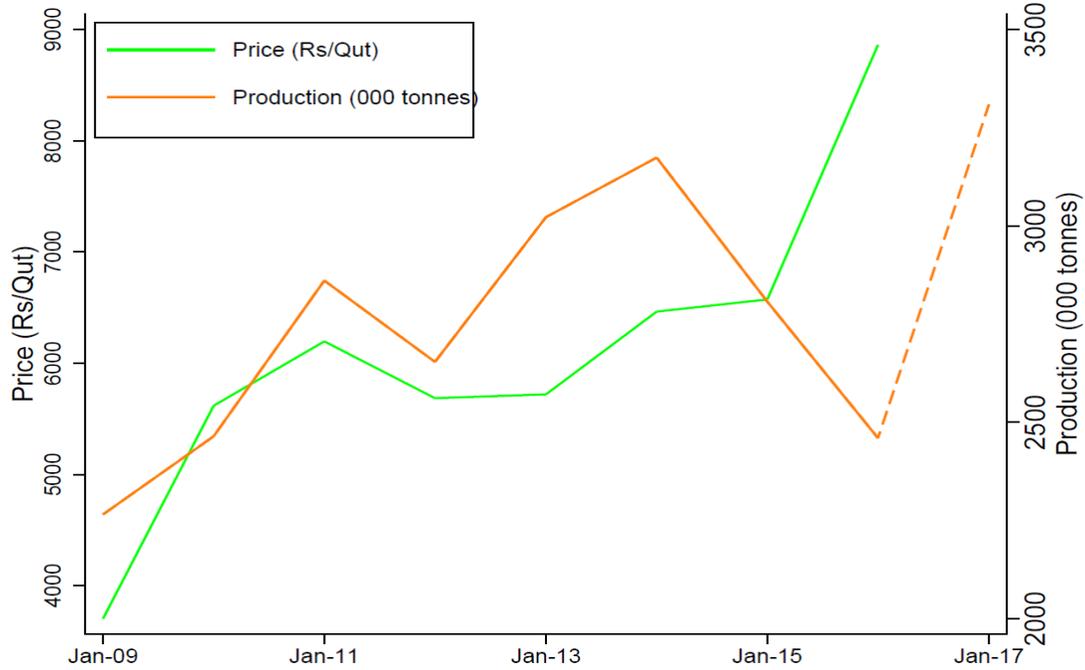
Remunerative MSPs alone will not be sufficient to induce farmers to switch to pulses production. They have to be backed up by price support/procurement operations to ensure that market prices do not fall precipitously and then deter farmers from cultivating pulses in the following season.

If we see the behavior of acreage and prices in the key pulses, there seems to be two distinct patterns that argue strongly in favor of an MSP backed up by effective procurement. Figure 8 below plots the output of pulses in a period against market prices prevailing in the *previous* period. The correlation is strong suggesting the inter-temporal nature of incentives and behavior. Anything that keeps market prices down in one period—for example, export bans or stock limits—will have output consequences the next period.

There is a second piece of suggestive evidence in favor of MSPs-cum-procurement illustrated in Figures 9A-9C. These figures plot quantities and prices over time for both pulses and one cereal, namely rice. There is a suggestive pattern in pulses which is notably absent in rice.

Riskiness in pulses and absence of procurement make quantity responses much more volatile than paddy. Note how quantities go up and down in response to price volatility for tur and urad while they move steadily upward for paddy. This uncertainty can be very debilitating for farmer's decisions and eventually for their incomes as well.

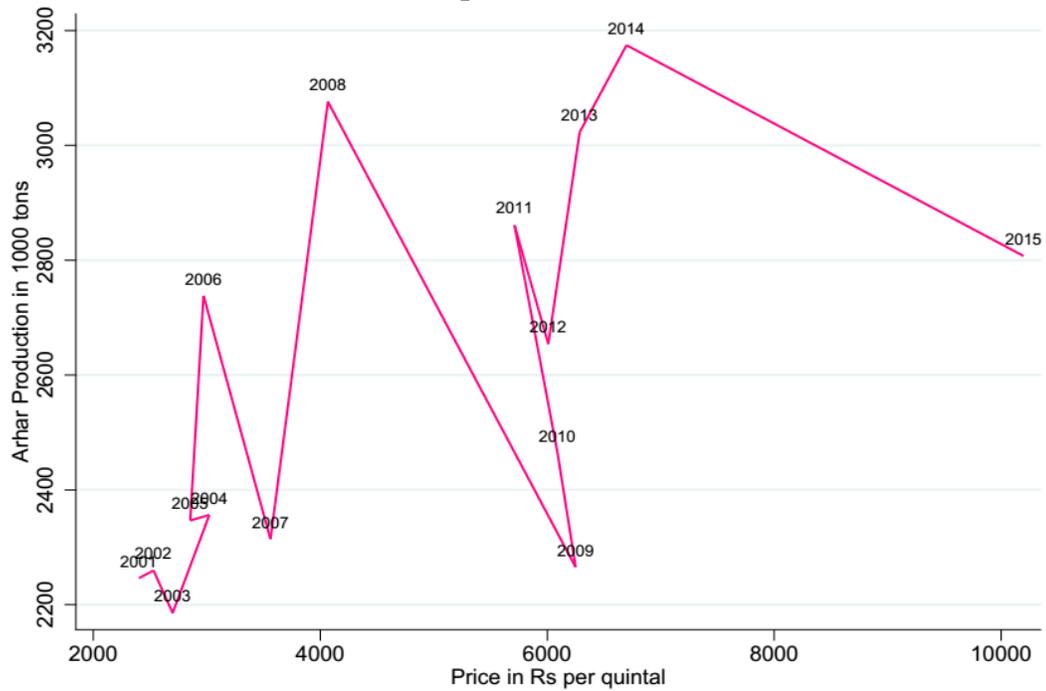
**Figure 8. Quantity Responses to Lagged Market Prices**



Source: Ministry of Agriculture and Committees' own calculations.

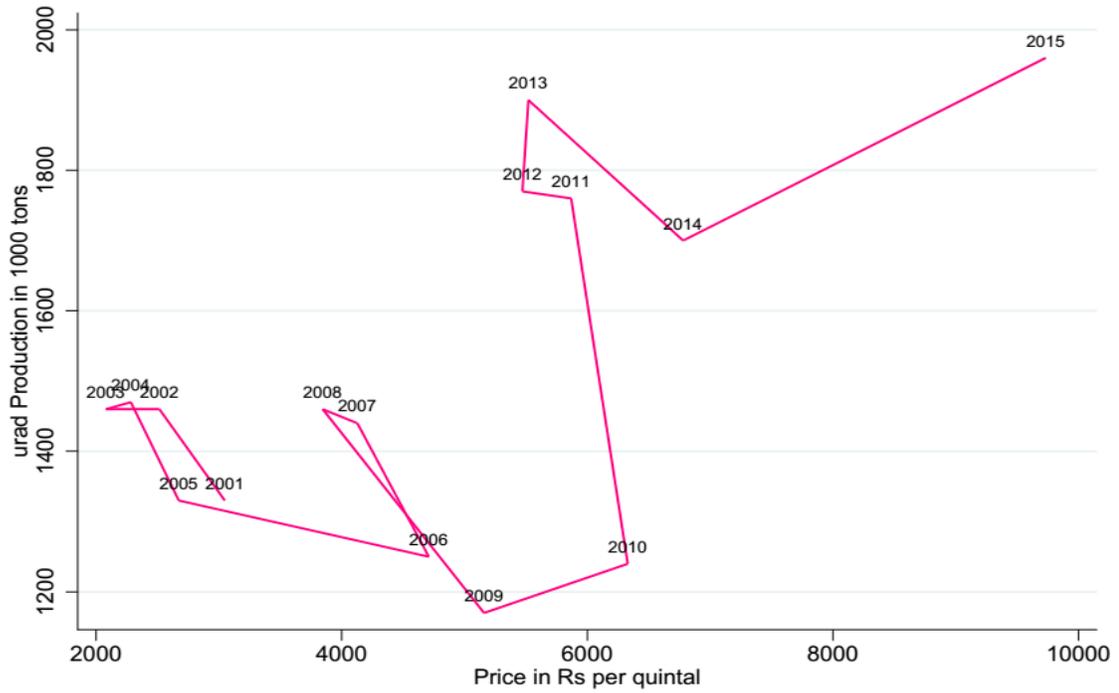
**Figure 9A-9C. Price and quantity movements for pulses and rice**

**9A. Arhar production vs Price**



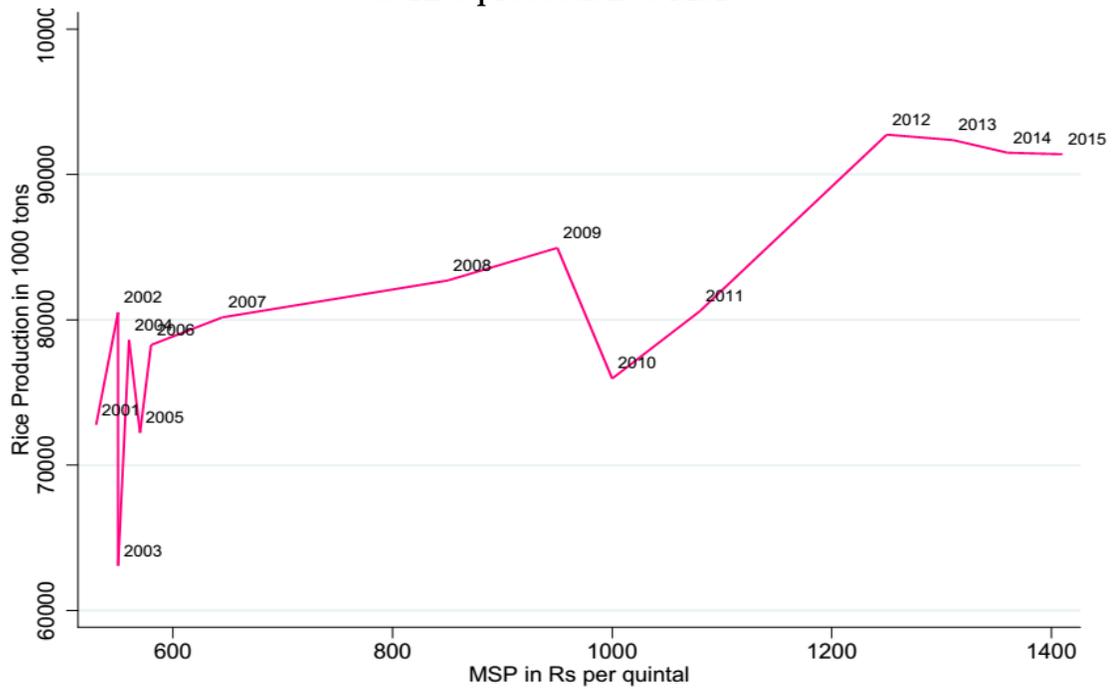
Source: Ministry of Agriculture and Committee's own calculations.

### 9B. Urad production vs Price



Source: Ministry of Agriculture and Committee's own calculations.

### 9C. Rice production vs MSP



Source: Ministry of Agriculture and Committee's calculations.

So, if pulses production has to be sustainably incentivized, it is critical that this price volatility and the consequential quantity volatility be avoided. This can only happen if the MSP acts as a floor on market price, which means the farmer must be able to sell to the government when market prices decline.

Therefore procurement operations to buy at the support price are critical to establish credibility. There is a particular challenge here in that procurement operations in pulses have never been systematically implemented, unlike those in paddy and wheat. So, there is a trust deficit here that needs to be overcome.

It is worth reiterating that farmers in these regions have never really had the benefit of price support for pulses: i.e. a remunerative post-harvest price reliably and regularly defended by physical procurement by government agencies in locally accessible marketing sites. They have also historically received little to nothing in the way of publicly funded production support for cultivation as agricultural subsidies are targeted towards irrigated wheat, paddy and sugarcane growing farmers.

This issue will in fact become salient in the coming months of this kharif season. Because of record plantings, production is expected to rise substantially and market prices are likely to decline substantially. If the government allows prices to fall below the MSP, it is almost certain that next year's plantings will be adversely affected.

## **V. General Equilibrium Consequences of MSP Increases**

Incentivising pulses production via higher MSPs-cum-procurement is not a costless policy. The experience of paddy and wheat production are testament to this proposition. A key cost is the general equilibrium effect: if MSPs for pulses are increased there will be consequences—generally adverse—for production of crops that compete with pulses. It is important to remember that the general equilibrium consequences will be felt on three margins: the intensive margin, the extensive margin, and the productivity margin.

Higher MSPs would lead to greater production by way of greater use of inputs (intensive margin). They could also lead to more area devoted to the crop (extensive margin). They could lead to greater efforts to increase research and development via a kind of pull effect which in turn would increase productivity (productivity margin).

The intensive and productivity margin effects need not adversely affect the acreage and production of other crops, resulting in a relatively benign general equilibrium effect. But the extensive margin effect could be a zero-sum game because with limited land, the more the area devoted to pulses production the less by definition will be devoted to the competing crops.

To some extent, this effect may have been in operation this year. While total area devoted to kharif crops increased, the area devoted to crops competing with pulses did decline. Cotton plantings, for example, were down by 13 percent over the comparable period last year and soya acreage also declined by 2 percent (Table 10). Declining cotton acreage has led to sharply increasing prices with adverse effects on downstream uses of cotton. Now, some of the decline in cotton plantings was because of factors such as cotton pests and declining world demand. But competition from pulses may also have played a key role.

These adverse general equilibrium effects from higher MSPs for pulses can be minimized in three ways.

First, in the medium term pulses production must be incentivized in the irrigated areas of Punjab. Here, the zero-sum acreage consequence will have a positive general equilibrium consequence because some reduction in paddy production in Punjab is socially desirable: paddy stocks are high and paddy cultivation has large negative externalities. Second, pulses production should also be encouraged in the fallows of eastern India. Third, a focus on increasing productivity and yields both in pulses and in competing crops such as cotton can also help minimize the adverse consequences.

**Table 10. Area coverage under major kharif crops**

| Crops          | Area Sown (in lakh hectares) |                        | Absolute difference of<br>2016-17 over | Percentage<br>difference of 2016-<br>17 over |
|----------------|------------------------------|------------------------|----------------------------------------|----------------------------------------------|
|                | 2016-17<br>(Current year)    | 2015-16<br>(Last year) | 2015-16                                | 2015-16                                      |
| Rice           | 380.3                        | 370.0                  | 10.2                                   | 2.8                                          |
| Pulses         | 144.0                        | 111.5                  | 32.5                                   | 29.1                                         |
| Arhar          | 52.2                         | 37.3                   | 14.9                                   | 39.8                                         |
| Uradbean       | 34.9                         | 27.8                   | 7.1                                    | 25.4                                         |
| Moongbean      | 33.6                         | 25.4                   | 8.3                                    | 32.7                                         |
| Other pulses   | 22.6                         | 20.5                   | 2.2                                    | 10.6                                         |
| Coarse cereals | 187.9                        | 177.1                  | 10.8                                   | 6.1                                          |
| Jowar          | 19.4                         | 18.9                   | 0.4                                    | 2.3                                          |
| Bajra          | 70.4                         | 67.6                   | 2.8                                    | 4.1                                          |
| Ragi           | 9.6                          | 10.1                   | -0.5                                   | -5.4                                         |
| Maize          | 83.2                         | 75.1                   | 8.1                                    | 10.8                                         |
| Oilseeds       | 187.0                        | 181.7                  | 5.3                                    | 2.9                                          |
| Soybean        | 114.7                        | 116.2                  | -1.5                                   | -1.3                                         |
| Sugarcane      | 45.8                         | 49.6                   | -3.8                                   | -7.7                                         |
| Cotton         | 102.1                        | 114.8                  | -12.6                                  | -11.0                                        |
| <b>Total</b>   | <b>1054.5</b>                | <b>1012.4</b>          | <b>42.2</b>                            | <b>4.2</b>                                   |

Source: Directorate of Economics & Statistics, DAC&FW. (Data as on 09.09.2016)

## VI. Other Issues

Some legitimate concerns can arise in relation to the key recommendations of this Committee, namely to increase MSPs and back it up with effective procurement.

*Will high MSPs lead to higher inflation?*

The proposed increase in MSPs could potentially lead to higher pulse prices and hence higher overall inflation. But this is unlikely to happen for two reasons. In the case of rice and wheat the MSP combined with heavy procurement functions effectively as a producer subsidy. In the case of pulses,

MSPs are envisaged as price support, where procurement will kick in only in some adverse states of the world. More importantly, the MSP in a dynamic sense will actually serve to reduce inflation relative to the counterfactual of no MSP. The reason is that in the absence of MSP-cum-procurement, domestic supply follows a pattern whereby a favorable supply response in one period leads to a decline in market prices which reduces supply in the subsequent period with adverse consequential impact on inflation.

To be sure, there is the possibility that like in the case of cereals, successful MSP-cum-procurement operations lead to market prices themselves converging toward the MSP which could potentially be inflationary.

#### *What about the WTO-consistency of Higher MSPs?*

The proposed increase in MSPs would not appear to run foul of India's WTO commitments for four reasons. First, the proposed MSP would be well below world prices. Second, for the purposes of calculating India's Aggregate Measurement of Support (AMS), it is actual procurement that matters. Since it is envisaged that procurement will be triggered only when market prices fall below the MSP, the actual AMS is not likely to be significant. Third, the proposed MSP includes a significant component which is meant to reward pulses for the positive environmental externalities that they generate and the negative externalities avoided by growing other crops. This component should therefore not be considered as AMS under the WTO's definition. Rather, they should be part of the "green box" subsidies. Finally, in any event, India's AMS for basic staples (which includes pulses in the case of India) is protected by the "peace clause" which was re-affirmed at the WTO Ministerial in Nairobi in December 2015.

#### *What about Trade Policy for Pulses?*

Stimulating domestic production sustainably via stable incentives for farmers is critical to addressing the problems of pulses. Export bans or taxes reduce prices received by farmers and blunt their incentives to produce. Such measures should be avoided. There is a tendency to use export bans (and the trade policy more generally) counter-cyclically: imposing them when prices are high and occasionally relaxing them when prices decline. This too should be avoided. As emphasized in this report, depressing prices in one period for the sake of the consumer affects production in the next which adversely affects consumers too.

On the import side, India's current tariffs on pulses have been set at 0 percent even though the WTO bindings are at 30 percent. In the long run, a modest tariff of say 5-10 percent (which is not constantly revised up and down depending on the vagaries of market conditions) may be one way of signaling that the government is interested in incentivizing the production of pulses and helping pulse growing regions and farmers. The revenue collected could be earmarked for financing procurement and buffer stock operations and for creating new institutional structures in this regard as well as for increased research. This would be WTO-consistent because bindings are well above 5-10 percent.

#### *What about Political Economy?*

Candour requires the admission that policy is in part driven by political economy. Policies favoring cereals are now well-entrenched because of the interests built up around that (both from the consumer side involving PDS operations and the NFSA, and the producer side involving the interests of strong and rich farmers).

Pulses, in contrast, are grown by small and marginal farmers in dryland areas. They are not as wealthy as cereal farmers and are less able to mobilize. Also, there are so many different kinds of pulses that coalitions are difficult to build. High MSPs that raise the incomes of pulse-growing farmers can help create a new constituency that lobbies for policies favoring pulses. There could be a virtuous circle whereby prices and incomes rise, creating a demand pull on research that further increases yields, productivity and income that further strengthens the pulses constituency.

Consideration could be given to bringing pulses into the fold of the PDS (as some states are already doing currently). There would be fiscal costs and implementation challenges but also benefits to nutrition and the building up of a long term constituency in favor of pulses. Also, recourse to PDS can only be feasible when substantial amounts are available. Otherwise there is the risk that PDS leads to reduced market availability. Further discussion at the national and state levels will be necessary before moving ahead with this idea.

## **VII. Recommendations for Immediate Action**

We group the recommendations by topic, highlighting also the sequence in which they might be implemented.

### *a. MSP and Procurement*

This kharif season, the government should launch a war-effort to procure moong, tur and urad at their respective MSPs. Not only because of likely bumper production in India but also in the other major pulses producing countries (Canada, Myanmar, Tanzania) there has been an increase in production. As a result, prices of moong (currently around Rs. 4500 per quintal in Rajasthan) have fallen below the MSP. For tur and urad current prices are a little above MSP but there is a good chance that they will go down further.

The government must allocate an additional Rs 10,000 crores to the various procurement agencies (NAFED, FCI, SFAC, state cooperatives etc.). Financing must be consistent with expected procurement. The more depressed market prices will be, the greater will be the need for procurement.

Given that pulses procurement has generally been ineffective in the past, monitoring of procurement at the highest level is an urgent priority. Accordingly, a High Level Committee comprising the Finance Minister, Minister of Consumer Affairs, Minister of Agriculture and the Principal Secretary should be set up with weekly reporting by all the major procurement agencies to this Committee.

Reporting must include real time online data on procurement with geo-coding of all procurement centers. It must also include physical verification of pulses procurement (via videoconference). Actual procurement must be combined with an active strategy of communication showing that procurement is actually taking place with visual images of procurement points and their spread and daily activity. Communication is important to engender credibility that government is backing up its policies with effective follow-up action.

### *b. Buffer stocks*

The government has announced the objective of building a buffer stock in pulses of 2 million tons. The basis for this number is unclear. This report has adopted a simple methodology for calculating buffer stocks. For the period 2001-02 to 2015-16, we calculate the deviations of actual production from trend production. We average the negative deviations (i.e. the shortfalls), express them as a share of trend

production, and suggest that the buffer stock should be twice this share. Another possibility (more prudent) would be to fix the buffer stock at the maximum of the deviations in the past, expressed as a share of trend production.

We undertake these calculations for total pulses, tur and urad. Co-incidentally, the estimate for total pulses is close to the government's target of 2 million tons. For tur and urad, the buffer stock estimates are 3.5 lakh tonnes and 2.1 lakh tonnes, respectively.

These stocks should be built up gradually but opportunistically, when prices are relatively low. This year will probably be an excellent time to begin sizable buffer stocking operations.

Our analysis for estimating buffer stocks can, of course, be refined further to incorporate shocks that arise from import volatility as well.

#### *Other price management policies*

In order to prevent further declines in prices, stock limits and export bans must be lifted immediately. At the very least, stock limits on wholesalers must be lifted followed by similar actions in relation to retailers. State governments should also be encouraged to take pulses out of their APMC Acts.

The government must realistically assess its procurement capability. The more there are limits to this, the greater the urgency to stabilize market prices above the MSP and hence the greater the urgency to take other policy actions (such as lifting stock limits and export bans). The worst case scenario for farmers is weak procurement combined with stock limits which force farmers to sell most of their output at market prices that are well below MSP. This would continue the status quo of low credibility of government policies.

The key point to recognize here is that the conflict between farmers and consumers is more apparent than real, valid perhaps only in the very short run. Over even two seasons, the farmer's interests and that of the consumers probably coincide because it is by ensuring greater availability and production that prices can be kept down sustainably.

#### *c. Institutional arrangements for procurement and stock management*

In the current kharif season, procurement will have to be undertaken by existing government institutions. However, for the future, there is need to shore up the institutional arrangements, including the creation of additional institutions with a variety of governance structures for pulses.

It must be remembered that while the immediate priority is procurement, there will also be a need to dispose of procured stocks. The more successful is procurement, the greater will be the need for policies to ensure effective stocking, warehousing, processing and disposal. Pulses deteriorate more quickly than cereals and hence need more efficient management. Efficient stock disposal under clear protocols (like those followed by FCI for their open market sales of cereals in 2015-16) will need to be spelt out.

The Ministry of Agriculture should be instructed to prepare a Cabinet Note on such new institutional arrangements for pulses. One example of what might be possible is described in Appendix 2. The aim would be to create an organization that is owned by government, public sector institutions and credentialed private players but operated through a board so that day-to-day management happens independently. To make the arrangement commercially viable, the institution could be allowed

gradually to conduct similar buying, stocking, warehousing, and trading operations in other agricultural crops including fruits and vegetables. There have been earlier precedents of such institutional arrangements in agriculture such as the NCML, which was a subsidiary of NCDEX. The time has now come to explore creation of such institutions not necessarily to replace existing ones but to provide competition to them. Expanding the scope of buyers would ultimately benefit farmers.

## **VIII. Recommendations for beyond the kharif season**

### *a. MSPs*

Our calculations indicate that the MSP of tur and urad should be about Rs. 60/kg. Ideally, this should have been applicable for this season. Since the MSP has already been announced, we would strongly recommend that Rs. 60/kg adjusted for inflation be announced for kharif for the next season. Similarly, the MSP for rabi pulses especially gram should be announced immediately and set at about Rs. 40/kg. This would be broadly consistent with the percentage increases for tur and urad for the next kharif season. Prices for other pulses should be increased by the same percent as calculated in this report for tur, urad, and gram.

Since, the Committee is of the view that MSP determination, especially in the context of pulses, but more broadly should take account of factors such as risk and externalities, it recommends that the CACP comprehensively review its current methodology which does not incorporate these factors. The new framework and methodology for determining MSP should be in place for the next kharif season onwards. The CACP should be instructed accordingly.

As discussed earlier, incentivizing pulses production through higher MSPs will have some adverse consequences especially in rainfed areas. Promoting science and R&D is one way to minimize them. Another is to incentivize the production of pulses in irrigated areas that are currently growing rice. The consequences will be minimized because the switch from input-intensive and negative externality-creating rice to pulses will be socially beneficial.

Commercialization of the high yield short duration variety of tur is about two years away. But even with this variety, inducing the switch away from rice will require an MSP over Rs. 100/kg. This will be difficult to implement. MSP cannot be location specific for economic and political reasons. Equally, a high and uniform MSP will have deleterious consequences for crops competing with rice in rainfed areas.

One possible way forward would be to move to an MSP of say Rs.70/kg in kharif 2018 when the short duration variety is ready. But this would need to be combined with the reduction of some of the subsidies for water and fertilizer, consideration should be given to the introduction of direct production subsidies to farmers who switch to pulses which could be implemented through direct transfers (DBT). To this end, the central government could earmark financial resources to states for implementing such DBTs.

There is already a government scheme to diversify toward pulses. This could be reviewed to see whether DBT is a more effective way of encouraging diversification toward pulses.

*b. Increasing productivity: Pulses and competing crops*

Increasing MSPs are not costless as discussed earlier. There is in general a need to minimize the impact on competing crops. Two essentials for this are to focus on yield improvements for pulses themselves and for the competing crops such as cotton.

Currently, pulses research attracts less public attention than research on cereals. Yields in India are relatively low compared with those abroad. For example, tur yields average close to 725 kg/ha whereas in Myanmar it is nearly double that. A prerequisite for increasing yields in pulses is to clearly signal the openness and encouragement to GM technologies. In pulses, breeding is limited both by the narrow genetic base of varieties and their high susceptibility to pest and disease attacks. Hence, molecular breeding and GM technology are vital. Moreover, much of the research is being (and will be done) by Indian scientists and institutions, minimizing the possibility of monopoly behavior by foreign corporations. Promoting GM would be a way of promoting Create in India. Indian scientists have already made progress: GM pod borer insect pest-resistant chana and arhar have been developed by Assam Agricultural University and ICRISAT respectively, both public institutions. These should be quickly cleared once they are ready for use.<sup>6</sup>

If promoting productivity increase in pulses is one prong of the strategy to minimize adverse consequences of higher MSPs, doing the same for other crops (jowar, millets etc.) is the other prong. In the current context, the case of cotton is particularly relevant. Since its release in 2002, Bt cotton varieties have diffused rapidly and now account for almost all of India's cotton area and production. After years of stagnation, productivity jumped up sharply. India now figures among the world's largest cotton producers and exporters. But after several years, their effectiveness has diminished. The next generation of technology needs to be adopted but the conditions need to be created for their introduction and adoption. A prerequisite is to ensure respect for private contracts and prevent de facto or de jure expropriation of property rights.

*c. Other policies*

Looking ahead, a broader review of other policies is overdue. One of them is the Essential Commodities Act, 1955 which is a vestige of an economic environment of the past (See Appendix 3). The objectives of the Act are laudable but increasingly government needs to assess whether there are more effective and less costly ways of achieving them.

The same applies to futures trading of agricultural commodities. Should the choice always be between allowing unfettered markets and bans? Is there a role for more graduated responses? These are matters of utmost importance as India moves away from reliance on blunt, and occasionally outdated, instruments for agriculture and food management.

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<sup>6</sup> According to Indian scientists, promising possibilities include:

*Mungbean:*

A. New variety for northern hills Pusa 1371; B. New variety Pusa 1431 Delhi zone; C. Advanced under final testing in AICRP for 50-55 days under summer moong

*Lentil:*

A. L4147 ( North West Plain , Biofortified for iron-102 mg/kg seed and zinc- 65 mg/ kg seed; B. New variety L 4717 (for Central India maturity in less than 100 days, escapes heat and drought; C. L 4704 registered line with NBPGR for high grain Fe and Zn. Many lines are testing in AICRP at advanced stage maturing in less than 100 days.

*Chickpea:*

A. Chickpea for north eastern plains new variety, Developed Pusa 3043

| <i>Incentivizing Pulses Production: Summary of Recommendations</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| <i>Policy</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <i>Timing</i>                          |
| <b><u>1. MSP and Procurement</u></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                        |
| a. Government procurement machinery should be on high gear to ensure the procurement of kharif pulses at this season's announced MSP                                                                                                                                                                                                                                                                                                                                                                                                                                    | Immediate                              |
| b. To ensure effective procurement, a High Level Committee comprising Ministers of Finance, Agriculture, and Consumer Affairs and Principal Secretary to PM should be constituted. There should be weekly reporting by procurement agencies on the ground with physical verification of procurement                                                                                                                                                                                                                                                                     | Immediate                              |
| c. Build up 2 million tons of pulses stock with targets for individual pulses, especially tur (3.5 lakh tonnes) and urad (2 lakh tonnes). These should be built up gradually but opportunistically, buying when prices are low as in the current year                                                                                                                                                                                                                                                                                                                   | Immediate                              |
| d. Announce MSP of Rs. 40/kg for gram for rabi 2016 and MSP of Rs. 60/kg for both urad and tur for kharif 2017 (adjusted for inflation between 2016-17). Minimum Support Prices for other pulses should be increased by the same percent as calculated in this report for tur, urad, and gram                                                                                                                                                                                                                                                                           | Immediate                              |
| e. MSP to be increased to Rs. 70/kg in 2018 when short duration kharif tur is ready for commercialization. Efforts to be made to give production subsidies to farmers for growing pulses in irrigated areas of about Rs. 10-15 per kg to be given via DBT                                                                                                                                                                                                                                                                                                               | Kharif 2018 but planning to begin soon |
| f. Instruct CACP to comprehensively review its MSP-setting framework to incorporate risk and social externalities along the lines done in this report                                                                                                                                                                                                                                                                                                                                                                                                                   | Immediate                              |
| <b><u>2. Other Price Management Policies</u></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |
| Eliminate export ban on pulses and stock limits; at the very least limits on wholesalers should be eliminated. The greater the limits on procurement by the government, the greater the urgency to take these actions to ensure that market prices stabilize above the MSP. The worst case scenario for farmers is weak procurement and stock limits which force farmers to sell most of their output at market prices that are well below MSP. More generally, the use of trade policy to control domestic prices, which induces policy volatility, should be avoided. | Immediate                              |
| Encourage states to delist pulses from their APMCs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Immediate                              |
| Review Essential Commodities Act,1955 and futures trading of agricultural commodities with a view to preserving objectives but finding more effective and less costly instruments for achieving them                                                                                                                                                                                                                                                                                                                                                                    | As appropriate                         |
| <b><u>3. Institutions for procurement-stocking-disposal</u></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                        |

|                                                                                                                                                          |                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Create a new institution as a Public Private Partnership (PPP) to compete with and complement existing institutions to procure, stock and dispose pulses | Preparation to start immediately with aim of implementation by rabi 2016. cabinet note to be ready within 4 weeks |
| Announce clear rules for disposal of stocks                                                                                                              |                                                                                                                   |
| <b>4. Minimizing Adverse Impacts</b>                                                                                                                     |                                                                                                                   |
| a. Encourage development of GM technologies. Grant expeditious approval to indigenously developed new varieties of pulses                                | As appropriate                                                                                                    |

## IX. Conclusions

It is the strong view of this report that enhancing domestic productivity and production rapidly and sustainably is the only reliable way of minimizing volatility in prices of pulses, and safeguarding the interests of farmers and also consumers. There need be no serious conflict in the medium run between the interests of these two groups. Short-term actions that apparently benefit consumers end up hurting them because production and availability of pulses decline over time. In turn, better incentives for farmers in the form of higher MSPs (to reflect the true social value of growing pulses compared to other crops) combined with effective procurement offers the best way of increasing domestic availability and preventing price spikes. The current crisis offers a rare opportunity to show that government intervention, especially procurement, can be effective beyond rice and wheat. It is also a rare opportunity for pulses to get the policy attention it deserves. To this end, especially as prices decline, government procurement must be on war footing.

### **Appendix 1. Which Costs to use: A2+FL versus C2?**

The basic input for calculating the MSP is costs of production and cultivation. The CACP calculates a number of costs. A2 includes essentially all the variable costs of cultivation. To this is added FL, family labor, to ensure that wages (actual and imputed) are included in the costs of cultivation. This A2+FL captures all of the variable costs. C2 also includes the returns on land and capital: the imputed rent on owned land and the costs of working capital. The question is whether C2 should also be included in MSP calculations.

If the idea of the MSP is one of a support price, namely one that insures against disastrous losses because of a price crash, then A2+FL might be the appropriate costs to cover. An A2+FL based price will ensure that all paid out costs are covered. Ex-ante such a price reduces market risks. Ex-post it enables the farmer to survive for another day.

If C2 costs are also covered that is like saying that investors should be compensated for all costs plus the market return on capital. This would make the MSP less of a support price and more of a guaranteed market return.

Our aim is in fact to make the MSP more of a support price unlike rice and wheat. This would favor the use of A2+FL costs.

However, two arguments make us favor the use of C2. First, data on A2+FL costs are extremely variable across regions. More importantly, remunerating farmers based on A2+FL costs yields levels of net farm income that are below the poverty line which seems inequitable.

## Appendix 2. Possible Structure of a PPP Venture for Pulses Management

### A. Objectives of the proposed entity

- i. The entity would be the designated agency of the Central Government for pulses management.
- ii. It would ensure effective price support operations by bringing private sector participation, to achieve efficiency in procurement, storage and distribution of pulses.
- iii. It would help stabilize prices by making effective time to time market interventions in domestic and international markets and maintaining a satisfactory level of operational and buffer stocks of agricultural commodities.

### B. Constitution of the proposed entity / company

- i. The shareholding would be as follows:

|                                    |            |
|------------------------------------|------------|
| Public and Private sector entities | Government |
| 51%                                | 49%        |

- ii. The promoter shareholder would be the anchor private investor, with a shareholding of 26 percent. Other shareholders – public sector entities – could include LIC, NABARD, Public Sector Banks, PSUs – MMTC, STC, PEC, etc.
- iii. Private sector entities could include supply chain services companies, agricultural warehousing companies, private sector banks, credible private equity funds

### C. Eligibility criteria for private sector entities

- i. Institutionally held entities with a clean governance record and net worth of not less than say Rs. 250 cores. Choice of promoter shareholder would be through a regular bidding procedure.

### D. Governance Structure

- i. Professionally managed commercial entity, with a Board comprising professional nominees of the anchor investor (promoter), Government nominees and independent directors.

### E. Equity

- i. The Company would have an initial paid up equity of Rs. 250 crore with government contributing Rs. 122.50 core, Rs. 65 crore contributed by promoter (anchor investor) and balance Rs. 62.5 core being brought in by other private institutional entities.

### **Appendix 3. Essential Commodities Act (ECA)**

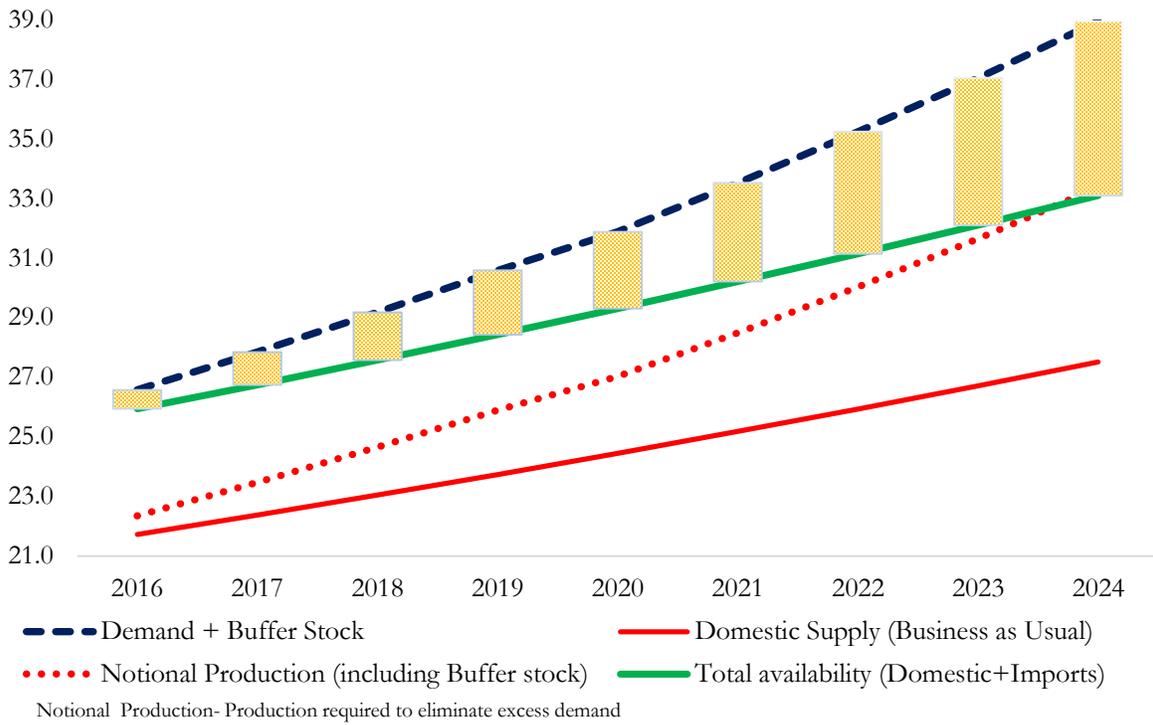
The Government of India implements the Essential Commodities Act 1955 in the event of short supply, to control the supply and distribution of cereals, pulses, oilseeds, sugar, and other items. The Act itself does not lay out Rules and Regulations but allows the States to issue Control Orders. These Orders typically impose dealer licensing, regulate stock limits, restrict movement of goods and require compulsory purchases under the system of levy.

Though this Act is meant to check hoarding and black marketing, its benefits have been exceeded by its harmful unintended consequences:

1. The restrictive provisions of the Act and Orders issued thereunder have discouraged private investment in large-scale marketing infrastructure, such as storage facilities, contract farming and direct marketing.
2. The Act has discouraged agricultural marketing firms from expanding, thereby depriving the sector of scale, competitiveness and efficiency. This is because the Act favours small traders. Imposing stock limits of say 2000 tonnes will have no impact on traders with holdings below that quantity, while large operators with say 5000 tonnes will be forced to liquidate 60 per cent of their holding. Small traders are also able to escape sanctions under the ECA by keeping/showing stock in the name of others and even by keeping stock with farmers because of their informal relations. Large players do not have such scope.
3. For these reasons, private sector players do not hold stocks sufficient to play a price stabilisation role. For example, during bumper harvests private players will not purchase beyond a certain point, because of stock limits. Consequently, farmgate prices will crash, seriously hurting producers. And then the state will need to intervene again, this time to support farm incomes.
4. Actions under the ECA are directed toward black marketers/hoarders. But some actions, such as maintaining stocks, are necessary for the proper functioning of businesses. More generally, by circumscribing the role of the private sector, the Essential Commodities Act limits competition, which is the true and only way to check hoarding and black marketing.

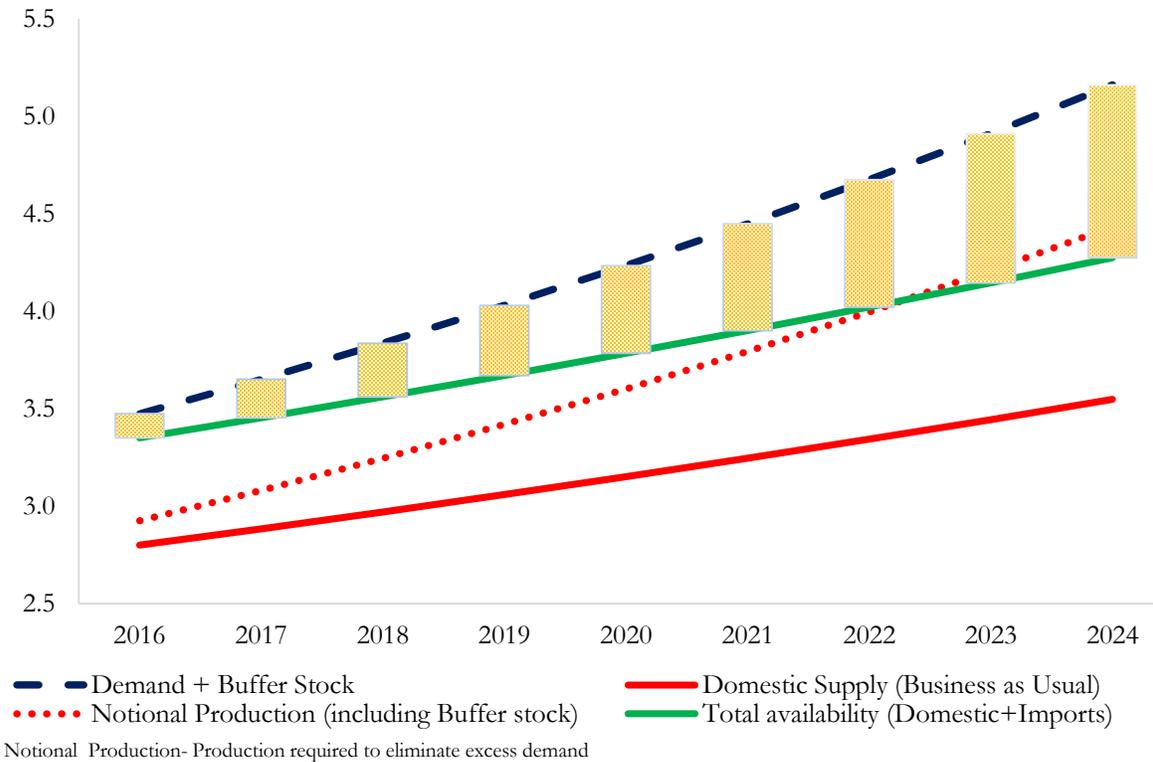
## Appendix Figures

### Figure 1. Total Pulses Demand Estimation



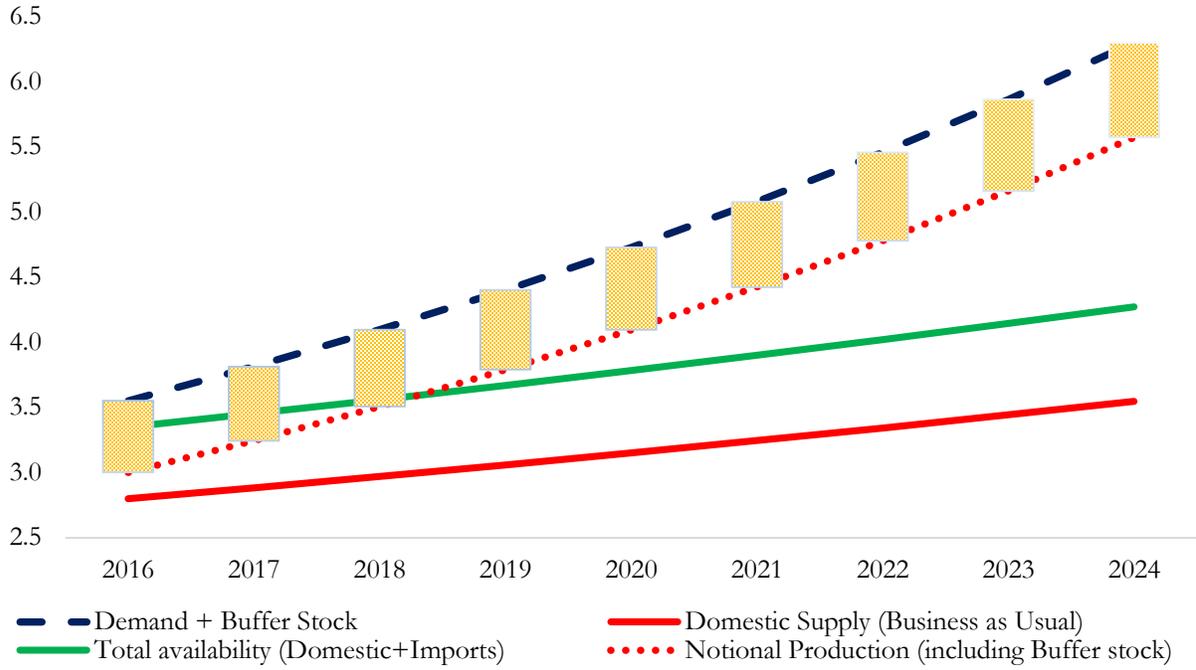
*Source: Committee's calculations*

### Figure 2A. Urad Demand Estimation under Lower Consumption Scenario



*Source: Committee's calculations*

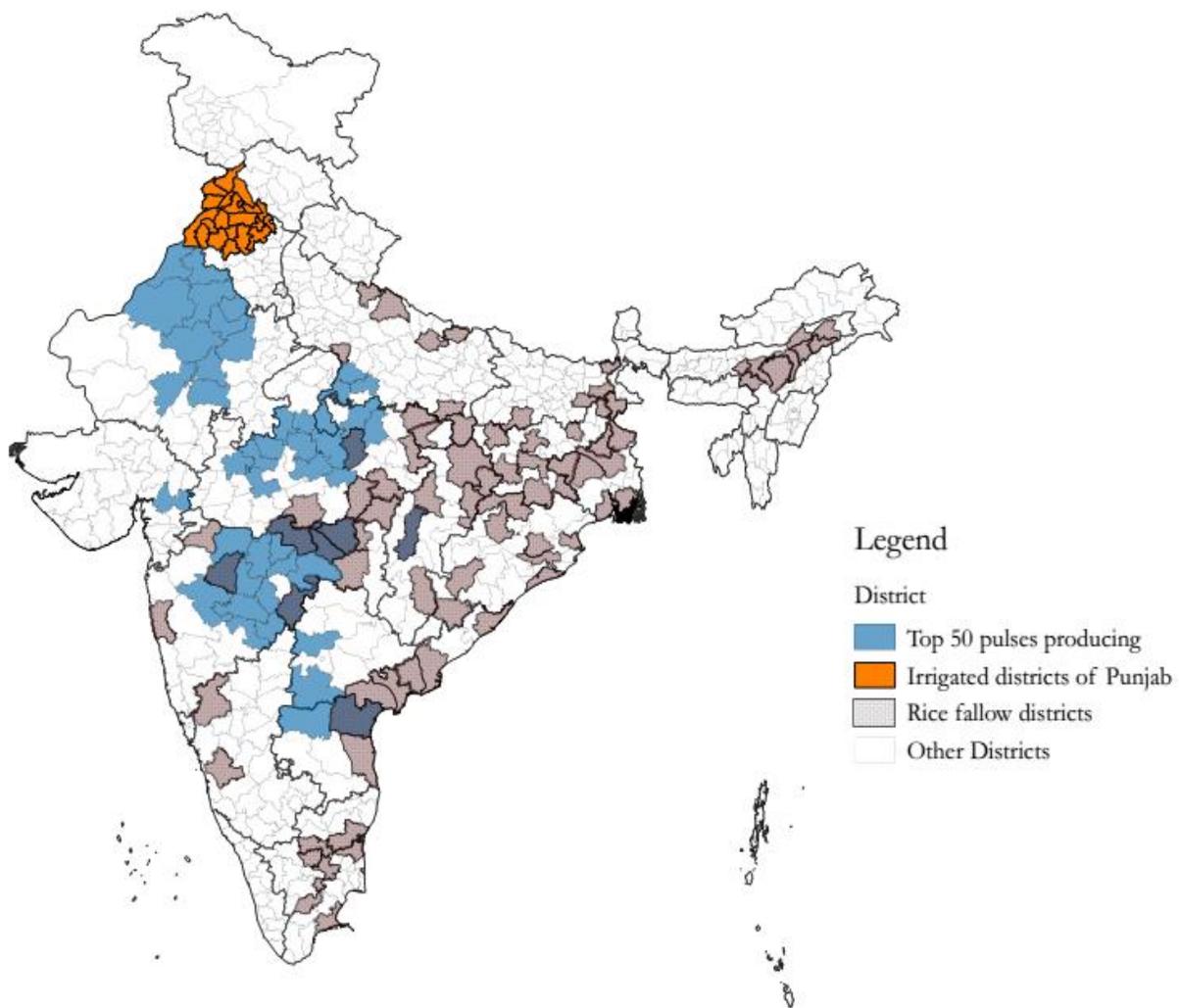
**Figure 2B. Urad Demand Estimation under Higher Consumption Scenario**



Notional Production- Production required to eliminate excess demand

*Source: Committee's calculations*

Appendix Map 1. Three Potential Area of Pulses Expansion: Rainfed, Irrigated and Fallows



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